ReasoningMind

Basic I-2 Curriculum Highlights by Objective

Figures and their Names

Objective 1 Curriculum Highlights

Related TEKS

3.6A, 3.6B

Related Student Expectations

- Prerequisite for classifying three-dimensional solids, including cones, based on attributes using formal geometric language
- Prerequisite for classifying three-dimensional solids, including cylinders, based on attributes using formal geometric language
- Prerequisite for classifying three-dimensional solids, including spheres, based on attributes using formal geometric language
- Prerequisite for classifying three-dimensional solids, including triangular prisms, based on attributes using formal geometric language
- Prerequisite for classifying three-dimensional solids, including rectangular prisms, based on attributes using formal geometric language
- Prerequisite for classifying three-dimensional solids, including cubes, based on attributes using formal geometric language
- Prerequisite for sorting three-dimensional solids, including cones, based on attributes using formal geometric language
- Prerequisite for sorting three-dimensional solids, including cylinders, based on attributes using formal geometric language
- Prerequisite for sorting three-dimensional solids, including spheres, based on attributes using formal geometric language
- Prerequisite for sorting three-dimensional solids, including triangular prisms, based on attributes using formal geometric language
- Prerequisite for sorting three-dimensional solids, including rectangular prisms, based on attributes using formal geometric language
- Prerequisite for sorting three-dimensional solids, including cubes, based on attributes using formal geometric language
- Prerequisite for using attributes to recognizing squares as examples of quadrilaterals
- Introduces using attributes to recognizing rhombus as examples of quadrilaterals
- Introduces using attributes to recognizing parallelograms as examples of quadrilaterals
- Introduces using attributes to recognizing trapezoids as examples of quadrilaterals
- Introduces using attributes to recognizing rectangles as examples of quadrilaterals
- Fully covers classifying two-dimensional solids based on attributes using formal geometric language
- Fully covers sorting two-dimensional solids based on attributes using formal geometric language

Foundational RM Prerequisites

- Triangles, Quadrilaterals, and Perimeter

Vocabulary

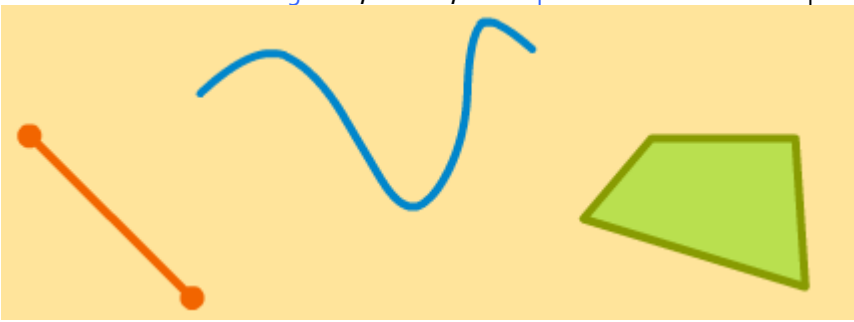
line segment
segment chain
curve
vertices

Key Theory Material

I) Figures

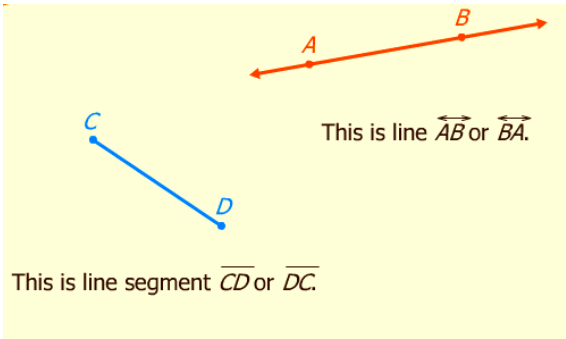
a. Line segments are figures. A triangle is a figure. Even a single point is a figure.

b. **Write this down:** A line segment, a curve, and a quadrilateral are all examples of figures.

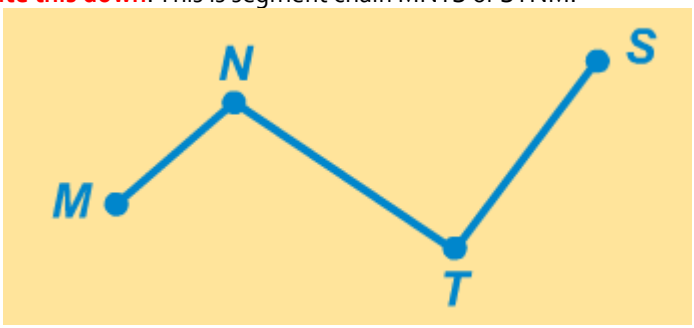


II) Names of Figures

a. To talk about figures, we give them names.
b. The simplest figure gets the simplest name.
   1. A point is the simplest figure. We simply name it with a letter.
c. We name a line segment after its two endpoints.
d. To name a segment chain we name its vertices, and write the names of all vertices in order, starting with an endpoint.
   1. To get another name, we start at another end point.
e. **Write this down:**



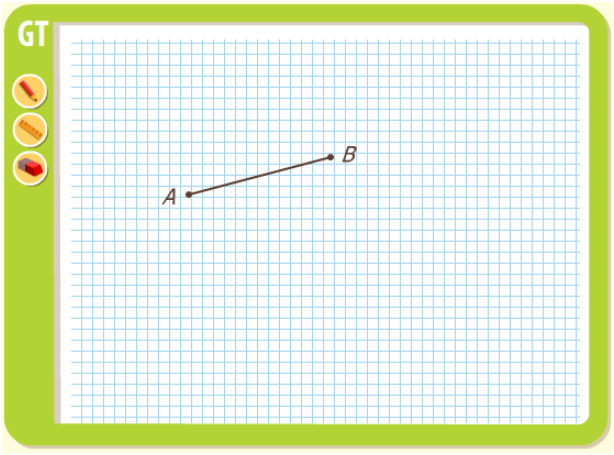
f. **Write this down**: This is segment chain MNTS or STNM.



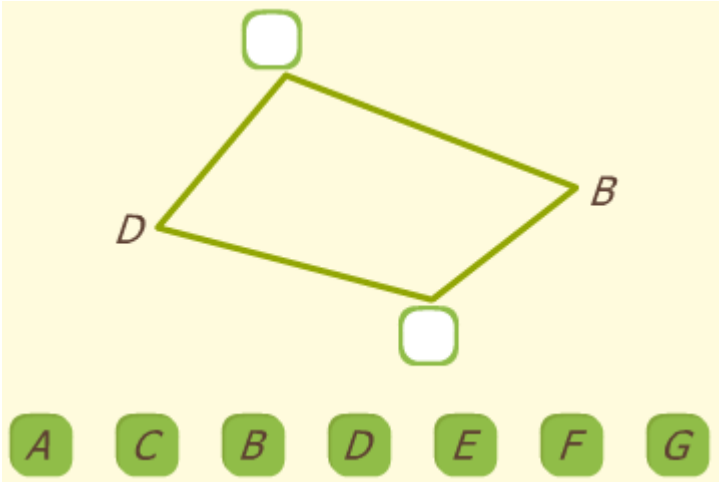
1. **Write this down:** To name a triangle, we start with any vertex and list the vertices in order. For example: One of the names of a triangle could be NBF if you start with vertex N and the other two vertices are B and F.
2. **Write this down:** To name a quadrilateral, we start with any vertex and list the vertices in order. For example: One of the names of a quadrilateral could be CDAB if you start with vertex C, and the other three vertices in order are D, A, and B.

Key Problems for Practice

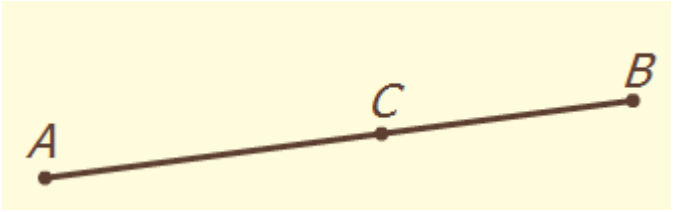
1. 1. Complete the drawing of triangle ABC.



2. Label the two vertices that don't have letters so that the quadrilateral's name is ABCD.



3. Give a name of the line segment in this drawing that is not listed here: AB, CA



4. What is another name for line segment BC?


B
C

Rays up to 100

Objective 2 Curriculum Highlights

Related TEKS

3.3A, 3.3B, 3.3F, 3.4E, 3.5A, 3.7A

Related Student Expectations

- Prerequisite for representing fractions greater than zero and less than or equal to one with denominators of 2 using pictorial models, including number lines
- Prerequisite for representing fractions greater than zero and less than or equal to one with denominators of 3 using pictorial models, including number lines
- Prerequisite for representing fractions greater than zero and less than or equal to one with denominators of 4 using pictorial models, including number lines
- Prerequisite for representing fractions greater than zero and less than or equal to one with denominators of 6 using pictorial models, including number lines
- Prerequisite for representing fractions greater than zero and less than or equal to one with denominators of 8 using pictorial models, including number lines
- Prerequisite for determining the corresponding fraction greater than zero and less than or equal to one with [a] denominator of 2 given a specified point on a number line
- Prerequisite for determining the corresponding fraction greater than zero and less than or equal to one with [a] denominator of 3 given a specified point on a number line
- Prerequisite for determining the corresponding fraction greater than zero and less than or equal to one with [a] denominator of 4 given a specified point on a number line
- Prerequisite for determining the corresponding fraction greater than zero and less than or equal to one with [a] denominator of 6 given a specified point on a number line
- Prerequisite for determining the corresponding fraction greater than zero and less than or equal to one with [a] denominator of 8 given a specified point on a number line
- Prerequisite for representing equivalent fractions with denominators of 2 using pictorial models, including number lines
- Prerequisite for representing equivalent fractions with denominators of 3 using pictorial models, including number lines
- Prerequisite for representing equivalent fractions with denominators of 4 using pictorial models, including number lines
- Prerequisite for representing equivalent fractions with denominators of 6 using pictorial models, including number lines
- Prerequisite for representing equivalent fractions with denominators of 8 using pictorial models, including number lines
- Prerequisite for representing multiplication facts by using a variety of approaches
- Prerequisite for representing one-step problems involving subtraction of whole numbers to 1,000 using number lines
- Prerequisite for representing two-step problems involving addition of whole numbers to 1,000 using number lines
- Prerequisite for representing two-step problems involving subtraction of whole numbers to 1,000 using number lines
- Introduces representing fractions of halves as distances from zero on a number line
- Introduces representing fractions of fourths as distances from zero on a number line
- Introduces representing fractions of eighths as distances from zero on a number line

Foundational RM Prerequisites

- Segment Chains

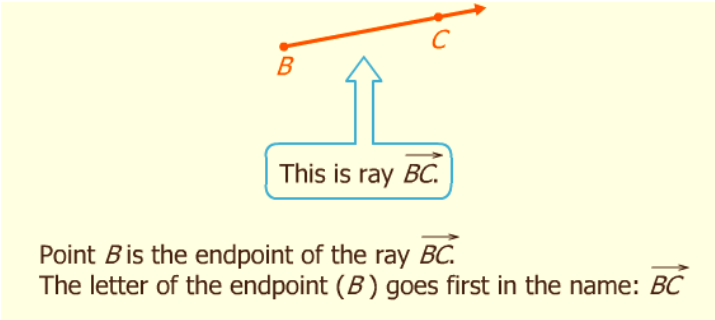
Vocabulary

ray forever arrow extend

Key Theory Material

I) I) Rays

a. When we place a point on an existing line, we divide the line into two parts, and each of these parts is a ray.
b. Each ray has one endpoint.
c. Each ray goes on forever in one direction. The arrow shows this direction.
d. **Write this down:**

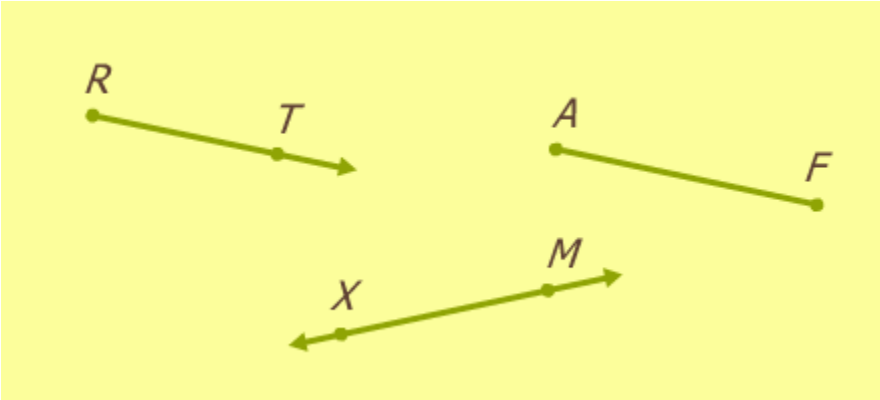


1. The letter of the endpoint goes first when you name a ray.
2. For example: If point B is the endpoint of the ray, the name of the ray must begin with B (i.e. BC)

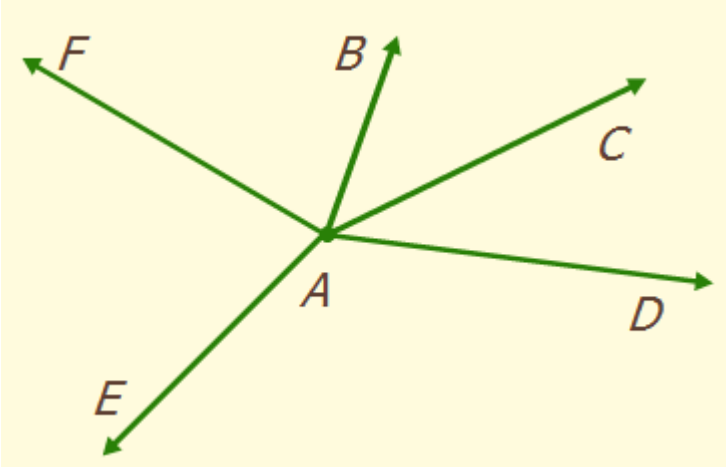
e. To draw a ray, we connect two points and extend the line past the second point. We add one arrow to show that the ray extends forever in one direction.

Key Problems for Practice

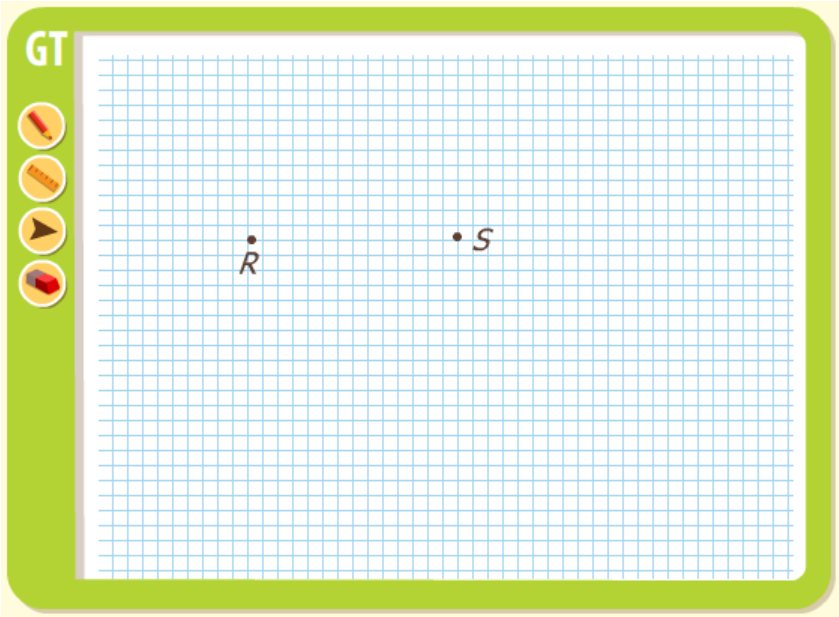
1. 1 Choose the ray:



2. In this picture, there are _____ rays.



3. Draw ray SR through points S and R.



Angles: Right Angles

Objective 3 Curriculum Highlights

Related TEKS

3.6A, 3.6B

Related Student Expectations

- Prerequisite for using attributes to recognizing squares as examples of quadrilaterals
- Fully covers using attributes to recognize rhombus as examples of quadrilaterals
- Fully covers using attributes to recognize parallelograms as examples of quadrilaterals
- Fully covers using attributes to recognize trapezoids as examples of quadrilaterals
- Fully covers using attributes to recognize rectangles as examples of quadrilaterals
- Fully covers using attributes to recognize squares as examples of quadrilaterals
- Maintains or enriches classifying two-dimensional solids based on attributes using formal geometric language
- Maintains or enriches sorting two-dimensional solids based on attributes using formal geometric language

Foundational RM Prerequisites

- Rays up to 100

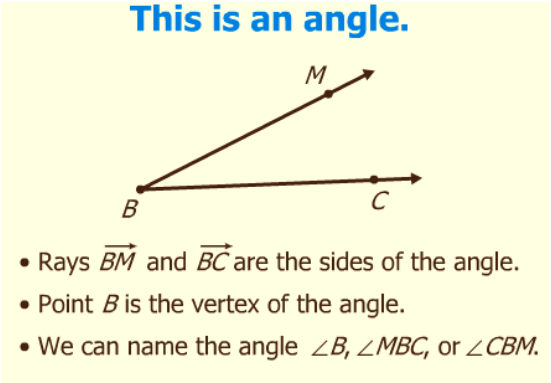
Vocabulary

angle, side, vertex, right angle, in relation to, drafting triangle

Key Theory Material

I) **I) Angles**

a. **Write this down:**



b. When two rays meet at one endpoint, they make an angle.

c. Each ray is a side of the angle.

d. The common endpoint of the two rays is the vertex of the angle.

e. We can name an angle using just the vertex or by using all the points on the angle with the vertex in the middle.

II) For example, one angle could be named ∠B, ∠MBC, or ∠CBM.

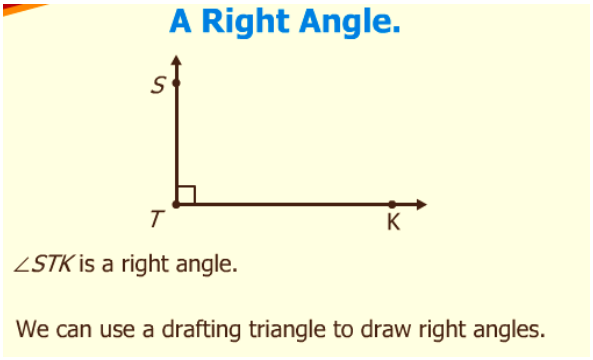
III) **Right Angles**

a. When you fold a piece of paper in half once and then in half again, you create a right angle.

b. A right angle is an angle that has one straight side from right to left, and another side that travels straight up and down in relation to the first side.

c. We draw a small box in the corner of a right angle to symbolize that the angle is a right angle.

d. **Write this down:**



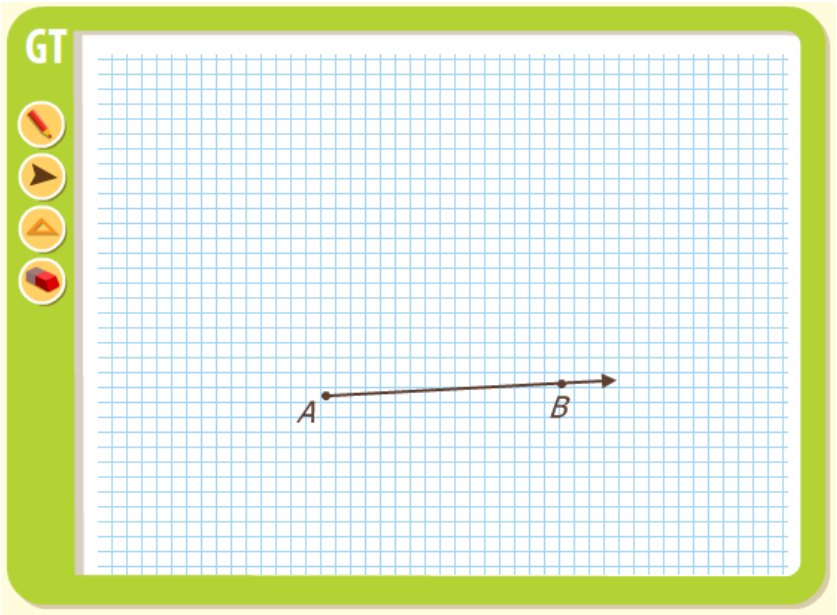
1. We can use a drafting triangle to draw right angles.

e. **Write this down:** A quadrilateral has 4 angles.

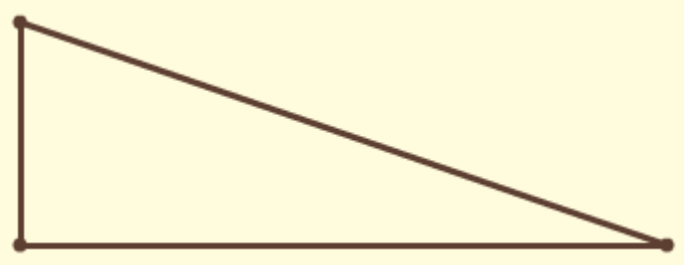
Key Problems for Practice

1. Draw ray AC to form angle CAB. Don't forget to put point C and add an arrow.

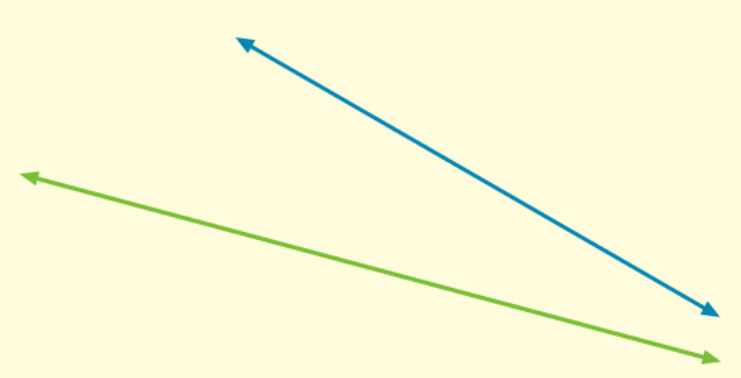
   Then, draw ray CO to form angle ACO. Don't forget to put point O and add an arrow.



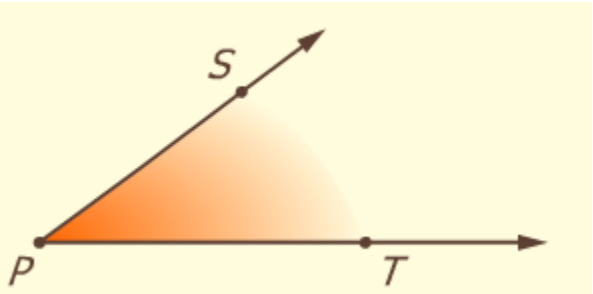
2. Choose the vertex of this triangle's right angle.



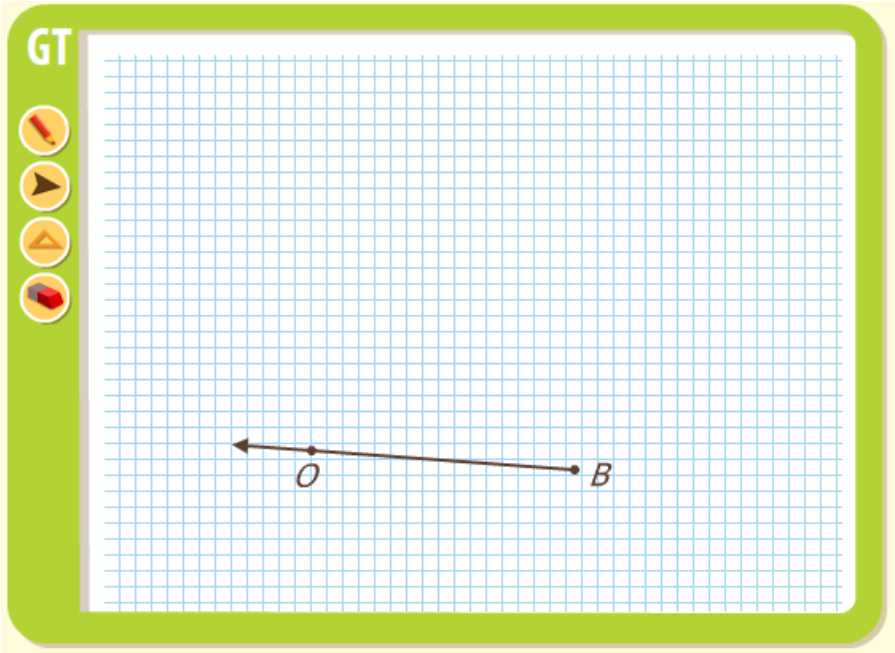
3. Move and rotate the two lines to make four right angles.



4. What are the names of the sides of ∠SPT?



5. Use the drafting triangle to draw a right angle named ∠OBC. Don't forget to mark point C and add an arrow.



Equations up to 100

Objective 4 Curriculum Highlights

Related TEKS

3.4A, 3.5A

Related Student Expectations

- Prerequisite for solving with fluency two-step problems involving addition within 1,000 using strategies based on properties of operations
- Prerequisite for solving with fluency two-step problems involving addition within 1,000 using strategies based on the relationship between addition and subtraction
- Prerequisite for solving with fluency two-step problems involving subtraction within 1,000 using strategies based on properties of operations
- Prerequisite for representing two-step problems involving addition of whole numbers to 1,000 using equations
- Prerequisite for representing two-step problems involving subtraction of whole numbers to 1,000 using equations
- Prerequisite for representing two-step problems involving addition and subtraction of whole numbers to 1,000 using equations
- Introduces solving with fluency one-step problems involving addition within 1,000 using strategies based properties of operations
- Introduces solving with fluency one-step problems involving addition within 1,000 using strategies based on the relationship between addition and subtraction
- Introduces solving with fluency one-step problems involving subtraction within 1,000 using strategies based on properties of operations
- Introduces solving with fluency one-step problems involving subtraction within 1,000 using strategies based on the relationship between addition and subtraction
- Introduces representing one-step problems involving addition of whole numbers to 1,000 using equations
- Introduces representing one-step problems involving subtraction of whole numbers to 1,000 using equations

Foundational RM Prerequisites

- Equations
- Column Subtraction Basics

Vocabulary

equality unknown equation true equality solution

Key Theory Material

I) **I) Equations**

a. Mental Math: Enter a number to get a correct equality: 70 + ____ = 90
   1. 70 + 20 = 90
   2. Answer: 20

b. In math, we use a letter instead of ____ for an unknown number.
   1. We write 50 – *x* = 20 instead of 50 - ____ = 20

c. **Write this down:** An equality with a letter standing for an unknown number that we have to find is called an equation.
   1. Here is an example of an equation:
      (i) 50 – *x* = 20
      (ii) *x* is the unknown number

d. Remember, any letter, not just *x*, can stand for an unknown number.

1. For example, we could use *y*, *a*, *b*, or other letters.

II) Solving Equations

a. Mental Math: $x + 40 = 100$
   1. This is an equation, and *x* is the unknown
   2. Let's substitute 60 for *x* in the equation:
      (i) $60 + 40 = 100$
   3. The equation is now a true equality.
   4. 60 is called a solution of this equation.

b. **Write this down**: A solution of an equation is a number that, when substituted for the letter, turns the equation into a true equality.
   1. 60 is a solution of the equation $x + 40 = 100$, since $60 + 40 = 100$ is a true equality.

Key Problems for Practice

1. 1. Which of the following are equations?

   a. $b + 37 = 50$

   b. $x + 23 - 15$

   c. $72 - y < 81$

   d. $52 + 43 = 95$

2. Fill in the blank to get a correct equality: $20 + \_\_\_\_\_ = 100$

3. Which number is a solution of the equation? $20 + (z + 37) = 98$

   a. 21

   b. 31

   c. 41

   d. 42

4. Fill in the missing digits to complete the column addition.

$$\begin{array}{r} 38 \\ +\quad \\ \hline 84 \end{array}$$

5. Which of the numbers 3, 30, 40 and 50 is a solution of the equation $70 - z = 40$?

Measuring Weight up to 100

Objective 5 Curriculum Highlights

Related TEKS

3.7E, 3.7D

Related Student Expectations

- Introduces determining liquid volume (capacity) or weight using appropriate units
- Introduces determining liquid volume (capacity) or weight using appropriate tools
- Prerequisite for determining when it is appropriate to use measurements of liquid volume (capacity) or weight

Foundational RM Prerequisites

- Weight; Customary Units of Weight
- Column Subtraction Basics

Vocabulary

pound (lb) ounce (oz) weights units measurement
convert

Key Theory Material

I) I) Review: The Pound and the Ounce

a. **Write this down:** lb is short for pounds, and oz is short for ounces.
   1. 1 pound = 16 ounces
   2. 1 lb = 16 oz

b. **Write this down:** We add and subtract weights measured in the same units the same way we add and subtract numbers. We write the units with each measurement.
   1. For example:
      (i) 20 lb + 5 lb = 25 lb
      (ii) 25 lb – 5 lb = 20 lb

II) Word Problems on Weighing

a. Example:
   1. The Math Pirate's grandmother gave him 33 pounds of cookies, and 15 pounds less candy. How many pounds of candy did the Math Pirate's grandmother give him?
   2. Shorthand:
      (i) Cookies: 33 lb
      (ii) Candies: ? lb, 15 lb less than the cookies
   3. The weight of the candy is: 33 lb – 15 lb = 18 lb
   4. Answer: The weight of the candy is 18 lb.

III) Unit Conversion

a. Sometimes we have to convert units so that we can add, subtract, or compare two amounts.
   1. To do this we must first convert our weight into just one measurement.
   2. For example, if we have 1 lb 2 oz, we need to turn the pounds and ounces into just ounces.
      (i) 1 lb = 16 oz
   3. Then, we just add on the remaining ounces.
      (i) 16 oz + 2 oz = 18 oz

b. **Write this down:** The weight 1 lb 2 oz is equal to the weight 18 oz.
   (i) 1 lb + 2 oz = 16 oz + 2 oz = 18 oz

Key Problems for Practice

1. 136 lb + 15 lb = _____ lb

2. 42 oz – 12 oz = _____ oz

3. The teddy bear weighs 1 lb 3 oz. The monkey weighs 9 oz. It is _____ oz lighter than the teddy bear.

4. 1 lb – 9 oz = _____ oz

5. Jack and Jill went apple-picking. Jack picked 22 lb, and Jill picked 9 lb less. What weight of apples did Jack and Jill pick in total?

6. 1 lb + 9 oz = _____ oz + 9 oz = _____ oz

Mass in Kilograms up to 100

Objective 6 Curriculum Highlights

Related TEKS
3.7E, 3.7D

Related Student Expectations

- Introduces determining liquid volume (capacity) or weight using appropriate units
- Introduces determining liquid volume (capacity) or weight using appropriate tools
- Prerequisite for determining when it is appropriate to use measurements of liquid volume (capacity) or weight

Foundational RM Prerequisites

- Measuring Weight up to 100

Vocabulary

kilogram (kg)

Key Theory Material

I) I) **Review: Mass in Kilograms**

a. **Write this down:** The word kilogram is often shortened to kg. 1 kilogram is a bit more than 2 pounds.

b. **Write this down:** We add and subtract masses measured in the same units the same way we add and subtract numbers. We write the units with each measurement. For example:

1. 25 kg + 22 kg = 47 kg
2. 25 kg – 22 kg = 3 kg

c. We can use shorthand diagrams to solve word problems involving mass in kilograms.

Key Problems for Practice

1. 24 kg + 37 kg – 15 kg + 43 kg = _____ kg

2. 94 kilograms of fireworks were set up for New Year's Day in RM City. But it rained, so only 25 kg of fireworks were used. How many kg of fireworks were left over?

3. The masses of three sheep are 27 kg, 23 kg, and 12 kg. Find their total mass.

4. The walker's mass is 13 kg when empty and 12 kg greater when Baby Jude is in it. What is Baby Jude's mass?

5. After 23 kg of water and a 2-kg turtle were added to an empty fish tank, the total mass of the aquarium was 34 kg. What was the mass of the empty fish tank?

Rectangles and Squares; Perimeters up to 100

Objective 7 Curriculum Highlights

Related TEKS
3.6B, 3.7B

Related Student Expectations

- Introduces drawing examples of quadrilaterals that do not belong to any of these subcategories
- Fully covers determining the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems

Foundational RM Prerequisites

- Column Subtraction Basics

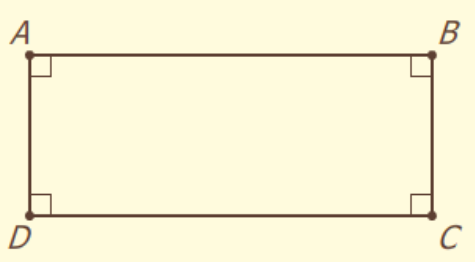
Vocabulary

rectangle opposite sides square

Key Theory Material

I) I) Rectangles

a. **Write this down:** A quadrilateral in which all four angles are right angles is called a rectangle. ABCD is a rectangle. ∠A, ∠B, ∠C, and ∠D are right angles.



b. Rectangle ABCD: BC and AD are opposite sides of rectangle ABCD. AB and CD are the other pair of opposite sides.

c. **Write this down:** Figure ABCD is a rectangle. Opposite sides of a rectangle have the same length.

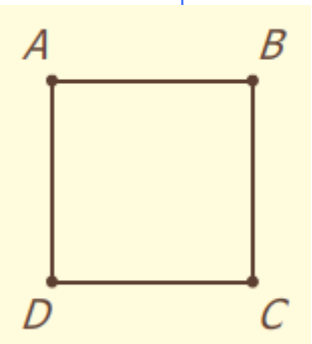
1. Opposite sides:
   (i) AB and CD
   (ii) BC and AD

II) Squares

a. A square is a special rectangle in which all sides are equal.

b. **Write this down:** A special rectangle in which all the sides have an equal length is called a square.

1. ABCD is a square.

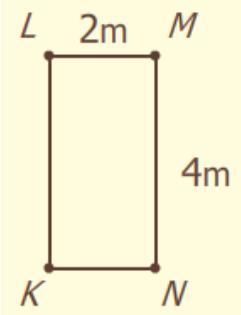


c. **Write this down:** Every square is a rectangle, but not every rectangle is a square.

III) Perimeters

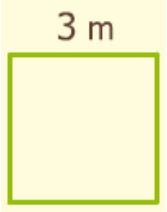
a. **Write this down:** The perimeter of a rectangle.

1. The sum of the lengths of all the sides of a rectangle is called its perimeter.
2. 4 m + 2 m + 4 m + 2 m = 12 m



b. The perimeter of a square.
   1. The perimeter of a square is the sum of the lengths of all its sides.

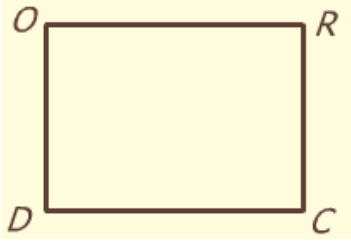
c. Mental Math: The length of one side of this square is 3m. Let's find the square's perimeter by adding all the side lengths:
   1. 3 m + 3 m + 3 m + 3 m = 12 m
   2. Answer: The square's perimeter is 12 meters.



Key Problems for Practice

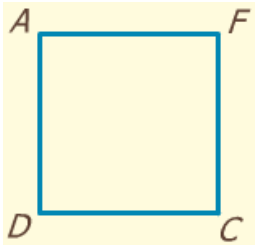
1. A new house is being built in RM City. What length of ribbon is needed to mark off the rectangular building site if the width is 12 yd and the length is 24 yd?

2. Which side has the same length as side CD?



3. The perimeter of a rectangle is 24 cm, and the length of the shorter side is 3 cm. What is the length of the longer side?

4. In square AFCD, the opposite side to AD is:



5. A rectangle's perimeter is 24 ft, and a square's perimeter is 4 ft less. Find the square's side length.

Customary Units of Capacity and Operations

Objective 8 Curriculum Highlights

Related TEKS

3.7E

Related Student Expectations

- Fully covers determining liquid volume (capacity) or weight using appropriate units
- Fully covers determining liquid volume (capacity) or weight using appropriate tools
- Prerequisite for determining when it is appropriate to use measurements of liquid volume (capacity) or weight

Foundational RM Prerequisites

- Column Subtraction Basics
- Capacity and its Customary Units

Vocabulary

capacity cup (c) gallon (gal) pint (pt)

Key Theory Material

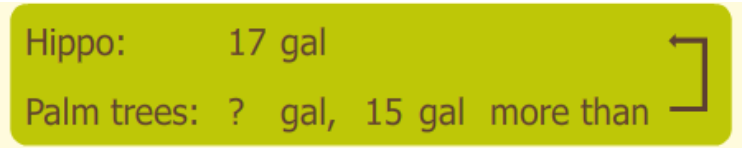
I) Review: Cup, Pint, Gallon

a. **Write this down:** Customary Units of Capacity
   1. Units
      (i) cup (c)
      (ii) pint (pt)
      (iii) gallon (gal)
   2. Conversions
      (i) 1 pt = 2 c
      (ii) 1 gal = 8 pt
      (iii) 1 gal = 16 c

b. **Write this down:** We compare, add, and subtract capacities measured in the same units the same way as numbers. We write the units with each measurement.
   1. For example:
      (i) 10 c + 5 c = 15 c
      (ii) 25 pt – 5 pt = 20 pt
      (iii) 17 gal < 30 gal

II) Word Problems on Capacity

a. **Write this down:**
   1. It took 17 gal of water to wash a hippo. 15 gal more than that was used to water some coconut palm trees. How much water was used on the palm trees?
   2. Shorthand:



   3. Solution 17 gal + 15 gal = 32 gal
   4. Answer: 32 gal.

III) Converting Customary Units of Capacity

a. **Write this down:** To add capacities in different units, first write them in the same units, then add.
   1. Example:
      (i) 1 gal + 2 c = 16 c + 2 c = 18 c
      (ii) 6 pt + 1 gal = 6 pt + 8 pt = 14 pt

b. **Write this down:** To subtract capacities in different units, first write them in the same units, then subtract.
   1. Example:
      (i) 1 gal – 3 c = 16 c – 3 c = 13 c
      (ii) 1 gal – 6 pt = 8 pt – 6 pt = 2 pt

Key Problems for Practice

1. A bowl was filled with a gallon of water in the morning. In the evening, there were 13 cups of water left in it. How many cups of water had been drunk from the bowl?

2. 1 gal + 17 pt – 6 pt = □ pt

3. There were 3 pints of soup in a saucepan. Then someone ate 4 cups. How much soup was left?

Operations with Capacities: The Liter

Objective 9 Curriculum Highlights

Related TEKS

3.7E

Related Student Expectations

- Maintains or enriches determining liquid volume (capacity) or weight using appropriate units
- Maintains or enriches determining liquid volume (capacity) or weight using appropriate tools
- Prerequisite for determining when it is appropriate to use measurements of liquid volume (capacity) or weight

Foundational RM Prerequisites

- Customary Units of Capacity and Operations

Vocabulary

liter (L)

Key Theory Material

I) Adding and Subtracting Capacities

a. **Write this down:** Capacity: The Liter

1. The liter is a unit of capacity.

2. A liter is a bit more than 2 pints.
3. 5 L means 5 liters.

b. **Write this down:** We compare, add, and subtract capacities measured in the same units the same way as numbers. We write the units with each measurement.

1. For example:
   (i) 40 L + 20 L = 60 L
   (ii) 34 L – 4 L = 30 L
   (iii) 37 L < 90 L

II) Word Problems with Capacities in Liters

a. **Write this down:**

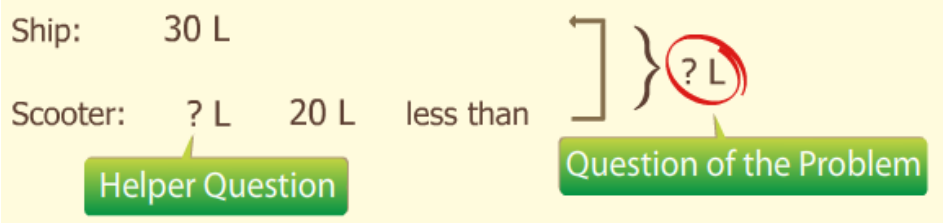
1. The capacity of the spaceship's fuel tank is 73 liters. The tank now has 6 liters of fuel in it. How many liters of fuel need to be added to the tank to fill it?

In the tank now:	6 L	} 73 L
To be added:	? L	

2. 73 L – 6 L = 67 L
3. Answer: 67 L need to be added to the tank.

b. **Write this down:**

1. A spaceship used 30 L of fuel in a race against a space scooter, which used 20 L less fuel. How much fuel was used in total during the race?



c. **Write this down:**

1. Now we solve the problem.
2. Solution:
   (i) 1. The scooter used: 30 L – 20 L = 10 L
   (ii) 2. The total amount of fuel used: 30 L + 10 L = 40 L
3. Answer: 40 L

d. **Write this down:**

1. The Math Pirate asked Becky to bring 20 L of lemonade, but she brought 40 L. How much extra lemonade did Becky bring?

Asked for:	20 L	? L
Brought:	40 L	

(i) 40 L – 20 L = 20 L
(ii) Answer: Becky brought 20 extra liters of lemonade.

Key Problems for Practice

1. 37 L + 23 L = □ L

2. The Math Pirate took two barrels of fresh water with him on a voyage. There were 51 liters in the first barrel. How much water was in the second barrel, if there were 79 liters in total in the two barrels?

3. 47 L – (31 L + 15 L) = □ L

4. 6 L of tomato juice can be bought for $12. How many liters of tomato juice can be bought for $30?

Multiplication Basics

Objective 10 Curriculum Highlights

Related TEKS

3.4K, 3.4D, 3.4E, 3.4F, 3.4G, 3.4J, 3.4K, 3.5C

Related Student Expectations

- Prerequisite for using strategies to multiply a two-digit number by a one-digit number
- Prerequisite for using algorithms, including the standard algorithm, to multiply a two-digit number by a one-digit number
- Prerequisite for solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for describing a multiplication expression as a comparison
- Introduces representing multiplication facts by using a variety of approaches
- Introduces recalling facts to multiply up to 10 by 10 with automaticity
- Introduces determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Prerequisite for determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Numerical Expressions

Vocabulary

factor multiplication (x) product order summands

Key Theory Material

I) What is Multiplication?

a. **Write this down:** The addition of equal summands is called multiplication.
   1. For example: 3 + 3 + 3 + 3 + 3 = 3 x 5
   2. We read 3 x 5 as "three times five."
   3. The sign for multiplication is x.

b. **Write this down**: Multiplication
   1. 4 + 4 + 4 = 4 x 3
   2. Each summand is 4.
   3. Each summand happens 3 times.

II) The Names of the Numbers in Multiplication

a. **Write this down:** A multiplication problem is made up of two factors multiplied together to get a product.
   1. For example: 5 (factor) x 2 (factor) = 10 (product)

b. **Write this down**: 3 x 2 = 6
   1. We read this as:
      (i) "3 times 2 equals 6."
      (ii) "3 multiplied by 2 is 6."
      (iii) "The product of 3 and 2 is 6."

III) Changing the Order of Factors

a. **Write this down:** Changing the order of the factors does not change the product.
   1. For example: 7 x 2 = 2 x 7 = 14

IV) Multiplying by 1

a. **Write this down:** When we multiply a number by 1, we get the same number.
   1. For example:
      (i) 5 x 1 = 5
      (ii) 10 x 1 = 10
      (iii) 37 x 1 = 37

Key Problems for Practice

1. Look for a pattern. What number comes next?

   5, 10, 15, 20, 25, ☐

2. Find the product by calculating the sum.

$7 \times 4 = 7 + 7 + 7 + 7 = \square$

3. If $6 \times 8 = 48$, then $8 \times 6 = \square$.

Division Basics

Objective 11 Curriculum Highlights

Related TEKS

3.5K, 3.4D, 3.4F, 3.4H, 3.4J, 3.5D

Related Student Expectations

- Prerequisite for solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Introduces recalling the corresponding division facts
- Introduces determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Prerequisite for determining the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product
- Fully covers determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Fully covers determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Multiplication Basics

Vocabulary

dividend | division (÷) | divisor | quotient | related facts

Key Theory Material

I) What is Division?

a. **Write this down:** Dividing 6 things into 2 groups:
   1. 6 ÷ 2 = 3
   2. 6 is the total amount
   3. 2 is the number of groups
   4. 3 is the number in each group
   5. The sign for division is ÷

II) The Names of the Numbers in Division

a. **Write this down:** 6 ÷ 2 = 3
   1. 6 is the dividend
   2. 2 is the divisor
   3. 3 is the quotient
   4. We read 6 ÷ 2 = 3 as "6 divided by 2 is 3" or "The quotient of 6 and 2 is 3."

III) How Division is Related to Multiplication

a. Multiplication and division facts are related if you can rearrange the numbers in each fact to get a true equality by using both division and multiplication.

b. **Write this down:** Related Multiplication and Division Facts
   1. 4 x 3 = 12
   2. 12 ÷ 3 = 4
   3. 3 x 4 = 12
   4. 12 ÷ 4 = 3

Key Problems for Practice

1. Look for a pattern. What number comes next?

   16, 8, 4, □

2. Add the dividend and the quotient in 18 ÷ 9 = 2.

3. Fill in the blank to get the multiplication fact related to the division shown.

   30 ÷ 3 = 10

   10 x □ = 30

Multiplying and Dividing by 2

Objective 12 Curriculum Highlights

Related TEKS
3.4D, 3.4E, 3.4F, 3.4H , 3.4J, 3.4K, 3.5B

Related Student Expectations

- Prerequisite for solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for representing two-step multiplication problems within 100 using arrays
- Prerequisite for representing two-step multiplication problems within 100 using strip diagrams
- Prerequisite for representing two-step division problems within 100 using arrays
- Prerequisite for representing two-step division problems within 100 using strip diagrams
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- Prerequisite for solving two-step multiplication and division problems within 100 using strip diagrams
- Introduces representing multiplication facts by using a variety of approaches
- Introduces recalling facts to multiply up to 10 by 10 with automaticity
- Introduces recalling the corresponding division facts
- Introduces representing one-step multiplication problems within 100 using arrays
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- Introduces solving one-step division problems within 100 using strip diagrams
- Introduces determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Division Basics

Vocabulary

division by | half | multiplication by | multiplication of

Key Theory Material

I) Multiplying by 2

a. When we count by twos, we get each next number by adding 2.
   (i) For example, this is how we would start counting by twos: 2, 4, 6, 8, because 2 + 2 = 4, 4 + 2 = 6, 6 + 2 = 8, etc.

b. **Write this down:** Multiplication of 2
   1. 2 x 1 = 2
   2. 2 x 2 = 4
   3. 2 x 3 = 6
   4. 2 x 4 = 8
   5. 2 x 5 = 10
   6. 2 x 6 = 12
   7. 2 x 7 = 14
   8. 2 x 8 = 16
   9. 2 x 9 = 18
   10. 2 x 10 = 20

c. **Write this down:** Multiplication by 2
   1. 1 x 2 = 2
   2. 2 x 2 = 4
   3. 3 x 2 = 6
   4. 4 x 2 = 8
   5. 5 x 2 = 10
   6. 6 x 2 = 12
   7. 7 x 2 = 14
   8. 8 x 2 = 16
   9. 9 x 2 = 18
   10. 10 x 2 = 20

II) Dividing by 2

a. Multiplication can help you remember division facts because multiplication and division are related.
   1. For example, if we know that 5 x 2 = 10, then we also know that 10 ÷ 2 = 5.

b. **Write this down:** Division by 2
   1. 2 ÷ 2 = 1

2. 4 ÷ 2 = 2
3. 6 ÷ 2 = 3
4. 8 ÷ 2 = 4
5. 10 ÷ 2 = 5
6. 12 ÷ 2 = 6
7. 14 ÷ 2 = 7
8. 16 ÷ 2 = 8
9. 18 ÷ 2 = 9
10. 20 ÷ 2 = 10

III) Half

a. **Write this down:** To get a half of something you need to divide it into two equal parts. To find one half of a number you need to divide the number by 2.

1. For example: Find half of 12
   (i) 12 ÷ 2 = 6
   (ii) Answer: 6

Key Problems for Practice

1. What number do you need to multiply by 2 to get 16?

2. □ ÷ 2 = 3

3. 18 flamingos went to a lake in RM City. Then half of them flew away, and 5 storks arrived. How many birds are at the lake now?

Multiplying and Dividing by 3

Objective 13 Curriculum Highlights

Related TEKS

3.4D, 3.4E, 3.4F, 3.4H , 3.4J, 3.4K, 3.5B

Related Student Expectations

- Prerequisite for solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
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- Introduces recalling facts to multiply up to 10 by 10 with automaticity
- Introduces recalling the corresponding division facts
- Introduces representing one-step multiplication problems within 100 using arrays
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- Introduces determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Multiplying and Dividing by 3

Vocabulary

N/A

Key Theory Material

I) Multiplying by 3

a. When we count by threes, we get each next number by adding 3.
   1. For example, this is how we would start counting by threes: 3, 6, 9, 12, because 3 + 3 = 6, 6 + 3 = 9, 9 + 3 = 12, etc.

b. **Write this down:** Multiplication of 3
   1. 3 x 1 = 3
   2. 3 x 2 = 6
   3. 3 x 3 = 9
   4. 3 x 4 = 12
   5. 3 x 5 = 15
   6. 3 x 6 = 18
   7. 3 x 7 = 21
   8. 3 x 8 = 24
   9. 3 x 9 = 27
   10. 3 x 10 = 30

c. **Write this down:** Multiplication by 3
   1. 1 x 3 = 3
   2. 2 x 3 = 6
   3. 3 x 3 = 9
   4. 4 x 3 = 12
   5. 5 x 3 = 15
   6. 6 x 3 = 18
   7. 7 x 3 = 21
   8. 8 x 3 = 24
   9. 9 x 3 = 27
   10. 10 x 3 = 30

II) Dividing by 3

a. Multiplication can help you remember division facts because multiplication and division are related.
   1. For example, if we know that 5 x 3 = 15, then we also know that 15 ÷ 3 = 5.

b. **Write this down:** Division by 3
   1. 3 ÷ 3 = 1
   2. 6 ÷ 3 = 2
   3. 9 ÷ 3 = 3
   4. 12 ÷ 3 = 4
   5. 15 ÷ 3 = 5
   6. 18 ÷ 3 = 6
   7. 21 ÷ 3 = 7
   8. 24 ÷ 3 = 8
   9. 27 ÷ 3 = 9
   10. 30 ÷ 3 = 10

Key Problems for Practice

1. What number do you need to multiply by 3 to get 18?

2. □ ÷ 3 = 2

3. 30 students from the Forest Animal Academy are divided equally into 3 classes. How many students are in each class?

Multiplying and Dividing by 4

Objective 14 Curriculum Highlights

Related TEKS

3.4D, 3.4E, 3.4F, 3.4H , 3.4J, 3.4K, 3.5B

Related Student Expectations

- Prerequisite for solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
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- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Multiplying and Dividing by 2

Vocabulary

N/A

Key Theory Material

I) The Table for Multiplying by 4

a. When we count by fours, we get each next number by adding 4.
   1. For example, this is how we would start counting by fours: 4, 8, 12, 16, because 4 + 4 = 8, 8 + 4 = 12, 12 + 4 = 16, etc.

b. **Write this down:** Multiplication of 4
   1. 4 x 1 = 4
   2. 4 x 2 = 8
   3. 4 x 3 = 12
   4. 4 x 4 = 16
   5. 4 x 5 = 20
   6. 4 x 6 = 24
   7. 4 x 7 = 28
   8. 4 x 8 = 32
   9. 4 x 9 = 36
   10. 4 x 10 = 40

c. **Write this down:** Multiplication by 4
   1. 1 x 4 = 4
   2. 2 x 4 = 8
   3. 3 x 4 = 12
   4. 4 x 4 = 16
   5. 5 x 4 = 20
   6. 6 x 4 = 24
   7. 7 x 4 = 28
   8. 8 x 4 = 32
   9. 9 x 4 = 36
   10. 10 x 4 = 40

II) Division by 4

a. Multiplication can help you remember division facts because multiplication and division are related.
   1. For example, if we know that 5 x 4 = 20, then we also know that 20 ÷ 4 = 5.

b. **Write this down:** Division by 4
   1. 4 ÷ 4 = 1
   2. 8 ÷ 4 = 2
   3. 12 ÷ 4 = 3
   4. 16 ÷ 4 = 4
   5. 20 ÷ 4 = 5
   6. 24 ÷ 4 = 6
   7. 28 ÷ 4 = 7
   8. 32 ÷ 4 = 8
   9. 36 ÷ 4 = 9
   10. 40 ÷ 4 = 10

c. Remember that the parts of a division problem are labeled dividend, divisor, and quotient.
   1. For example, in the problem 8 ÷ 2 = 4, 8 is the dividend, 2 is the divisor, and 4 is the quotient.

Key Problems for Practice

1. Find the product of 4 and 9.

2. The Math Pirate divided 24 shells equally into 4 groups. Then he divided each group into 2 equal piles. How many shells are in each pile?

3. Find the quotient of 20 and 4.

The Order of Operations: Multiplication and Division

Objective 15 Curriculum Highlights

Related TEKS
3.4K

Related Student Expectations
♦ Introduces solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Introduces solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Introduces solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Introduces solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Introduces solving two-step problems involving multiplication and division within 100 using strategies based on objects;

pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts

Foundational RM Prerequisites

- Numerical Expressions with Parentheses
- Multiplying and Dividing by 4

Vocabulary

evaluating | expression | operations
Order of Operations Rule | parentheses

Key Theory Material

I) The Order of the Operations x and ÷ in Expressions Without Parentheses

a. **Rule:** The Order of Operations Rule
   1. To evaluate an expression without parentheses:
      (i) If only + or – signs, work left to right.
      (ii) If only x or ÷ signs, work left to right, too.
   2. For example:
      (i) $4 + 3 - 2 = 7 - 2 = 5$
      (ii) $4 \times 3 \div 2 = 12 \div 2 = 6$

II) The Order of Operations x and ÷ in Expressions With Parentheses

a. **Write this down:** Operations in parentheses are done first.
   1. For example: $8 \times (6 \div 3) = 8 \times 2 = 16$

b. **Write this down:** Example
   1. Divide 8 by the quotient of 12 and 3.
   2. $8 \div (12 \div 3) = 8 \div 4 = 2$

III) Evaluating a Numerical Expression

a. **Write this down:** Steps for evaluating an expression:
   1. Give the order of operations.
   2. Do operation 1.
   3. Write down operation 2 and calculate it.

b. For example:

$$(18 \div 3) \times 4 = 6 \times 4 = 24$$

Key Problems for Practice

1. Follow the Order of Operations Rule to number each operation with a 1 or 2: $24 \div (3 \times 2)$

2. $\underbrace{9 \times 2}_{18} \div 3 = \square \div 3 = \square$

How can we write the expression 6 x (4 ÷ 2) in words?

Multiplying and Dividing by 5

Objective 16 Curriculum Highlights

Related TEKS
3.4D, 3.4E, 3.4F, 3.4H , 3.4J, 3.4K, 3.5B

Related Student Expectations
♦ Prerequisite for solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
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♦ Prerequisite for solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for representing two-step multiplication problems within 100 using arrays
♦ Prerequisite for representing two-step multiplication problems within 100 using strip diagrams
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- Introduces representing multiplication facts by using a variety of approaches
- Introduces recalling facts to multiply up to 10 by 10 with automaticity
- Introduces recalling the corresponding division facts
- Introduces representing one-step multiplication problems within 100 using arrays
- Introduces representing one-step multiplication problems within 100 using strip diagrams
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- Introduces solving one-step division problems within 100 using strip diagrams
- Introduces determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Order of Operations: Multiplication and Division

Vocabulary

order of operations

Key Theory Material

I) Multiplying by 5

a. When we count by fives, we get each next number by adding 5.
   1. For example, this is how we would start counting by fives: 5, 10, 15, 20…
   2. Because:
      (i) 5 + 5 = 10
      (ii) 10 + 5 = 15
      (iii) 15 + 5 = 20

b. **Write this down:** Multiplication of 5
   1. 5 x 1 = 5
   2. 5 x 2 = 10
   3. 5 x 3 = 15
   4. 5 x 4 = 20
   5. 5 x 5 = 25
   6. 5 x 6 = 30
   7. 5 x 7 = 35
   8. 5 x 8 = 40
   9. 5 x 9 = 45
   10. 5 x 10 = 50

c. **Write this down:** Multiplication by 5

1. 1 x 5 = 5
2. 2 x 5 = 10
3. 3 x 5 = 15
4. 4 x 5 = 20
5. 5 x 5 = 25
6. 5 x 6 = 30
7. 5 x 7 = 35
8. 5 x 8 = 40
9. 9 x 5 = 45
10. 10 x 5 = 50

II) Adding to a Previous Result

a. We get the next multiplication result by adding 5 to the current one.
b. For example:
   1. 5 x 1 = 5
   2. 5 x 2 = 5 + 5 = 10
   3. 5 x 3 = 10 + 5 = 15
   4. 5 x 4 = 15 + 5 = 20
   5. 5 x 5 = 20 + 5 = 25
   6. 5 x 6 = 25 + 5 = 30
   7. 5 x 7 = 30 + 5 = 35
   8. 5 x 8 = 35 + 5 = 40
   9. 5 x 9 = 40 + 5 = 45
   10. 5 x 10 = 45 + 5 = 50

III) Dividing by 5

a. Multiplication can help you remember division facts because multiplication and division are related.
   1. For example, if we know that 5 x 5 = 25, then we also know that 25 ÷ 5 = 5.
b. **Write this down:** Division by 5
   1. 5 ÷ 5 = 1
   2. 10 ÷ 5 = 2
   3. 15 ÷ 5 = 3
   4. 20 ÷ 5 = 4
   5. 25 ÷ 5 = 5
   6. 30 ÷ 5 = 6
   7. 35 ÷ 5 = 7
   8. 40 ÷ 5 = 8
   9. 45 ÷ 5 = 9
   10. 50 ÷ 5 = 10

IV) Order of Operations

a. When an expression has only numbers and × or ÷ signs, we evaluate it, one operation at a time, from left to right.
b. If a problem has parentheses, we do operations in parentheses first.
c. **Write this down:** Order of Operations
   1. Parentheses: 24 ÷ (6 ÷ 2) = 24 ÷ 3 = 8
   2. No Parentheses: 5 x 6 ÷ 3 = 30 ÷ 3 = 10

Key Problems for Practice

1. Which of these numbers is NOT a dividend in the "Division by 5" table?

a. 16

b. 35

c. 40

d. 25

2. A bookcase has 5 shelves, with 6 books on each self. How many books are there in the bookcase?

3. Evaluate this expression by recalling it or look it up in the multiplication table: 8 x 5 = □.

4. Compare the values of the expressions.

a. 3 x 8 ÷ 4 ?? 4 x 6 ? ÷ 3

b. 40 ÷ 5 x 2 ?? 30 ÷ 5 x 2

c. 8 x (6 ÷ 2) ?? 4 x (18 ÷ 3)

d. 5 x (36 ÷ 4) ? 5 x (18 ÷ 3)

Expressions with Letters, × and ÷

Objective 17 Curriculum Highlights

Related TEKS

3.5B

Related Student Expectations

- Prerequisite for representing one-step multiplication problems within 100 using equations
- Prerequisite for representing one-step division problems within 100 using equations
- Prerequisite for representing two-step multiplication problems within 100 using equations
- Prerequisite for representing two-step division problems within 100 using equations
- Prerequisite for representing two-step multiplication and division problems within 100 using equations
- Prerequisite for solving one-step multiplication problems within 100 using equations
- Prerequisite for solving one-step division problems within 100 using equations
- Prerequisite for solving two-step multiplication problems within 100 using equations

Foundational RM Prerequisites

- Expressions with Letters
- Multiplying and Dividing by 5

Vocabulary

replace value

Key Theory Material

I) Multiplication in Expressions with Letters

a. In expressions with letters, we use a dot (·) for the multiplication sign.
b. **Write this down:** $k \cdot 3$ is the product of k and 3.
c. When evaluating expressions with letters, we replace the letter with a given value to evaluate the expression.
d. **Write this down:** Example:
   1. Evaluate the expression $c \cdot 6$ when $c = 4$.
   2. $c \cdot 6 = 4 \cdot 6 = 24$
   3. Answer: 24

II) Division in Expressions with Letters

a. **Write this down:**
   1. $m \div 3$ is the quotient of m and 3.
   2. $21 \div k$ is the quotient of 21 and k.

b. When evaluating expressions with letters, we replace the letter with a given value to evaluate the expression.

c. **Write this down:** Example:
   1. Evaluate the expression $a \div 3$ when $a = 12$.
   2. $a \div 3 = 12 \div 3 = 4$.
   3. Answer: 4.

Key Problems for Practice

1. Evaluate the expression $8 \cdot a$ when $a = 2$.

2. How do you evaluate $4 \cdot k$ when $k = 6$?
   a. $4 \cdot k = 4 \cdot 6 = 23$

   b. $4 \cdot k = 4 \cdot 6 = 25$

   c. $4 \cdot k = 24 \div 6 = 4$

   d. $4 \cdot k = 4 \cdot 6 = 24$

3. 2-Ring put 5 for x and got 45. Which expression did he evaluate?

   a. $45 \div x$

   b. $9 \cdot x$

   c. $45 - x$

Equations with Multiplication and Division

Objective 18 Curriculum Highlights

Related TEKS

3.4J, 3.5B, 3.5D

Related Student Expectations

- Introduces representing one-step multiplication problems within 100 using equations
- Introduces representing one-step division problems within 100 using equations
- Introduces representing two-step multiplication problems within 100 using equations
- Introduces representing two-step division problems within 100 using equations
- Introduces representing two-step multiplication and division problems within 100 using equations
- Introduces solving one-step multiplication problems within 100 using equations
- Introduces solving one-step division problems within 100 using equations
- Introduces solving two-step multiplication problems within 100 using equations
- Fully covers determining the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Expressions with Letters, × and ÷

Vocabulary

N/A

Key Theory Material

I) Equations with Multiplication and Division

a. An equation is about looking for an unknown number.
b. In math, we use a letter instead of □.
c. **Write this down:** This is an equation.
   1. $3 \cdot x = 27$
   2. x is the unknown number.
d. **Write this down:** What is a Solution of an Equation?
   1. $x \cdot 5 = 20$
   2. We replace x with 4.
   3. $4 \cdot 5 = 20$
   4. This is a correct equality, so 4 is a solution of the equation.

e. **Write this down:** How to Find an Unknown
   1. $x \cdot 2 = 16$
   2. Use the "Multiplication by 2" table.
   3. $8 \cdot 2 = 16$
   4. Answer: 8

Key Problems for Practice

1. What number do we put for x in $4 \cdot x = 24$ to get a true equality?

2. Which of the numbers 20, 24, and 28 is a solution of the equation $x \div 4 = 6$?

3. In which of the following equations can you substitute half of 10 for x and get a true equality?

   a. $x + 28 = 48$

   b. $x \cdot 6 = 30$

   c. $24 + x = 30$

Perimeter of a Square: Formula

Objective Curriculum Highlights

Related TEKS

3.5A, 3.5B, 3.5D, 3.6A, 3.6B, 3.7B

Related Student Expectations

- Maintains or enriches representing one-step problems involving addition of whole numbers to 1,000 using equations
- Maintains or enriches representing one-step multiplication problems within 100 using equations
- Maintains or enriches representing two-step multiplication and division problems within 100 using equations
- Maintains or enriches classifying two-dimensional solids based on attributes using formal geometric language
- Maintains or enriches using attributes to recognizing squares as examples of quadrilaterals
- Maintains or enriches determining the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product
- Maintains or enriches determining the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in problems

Foundational RM Prerequisites

- Rectangles and Squares; Perimeters up to 100

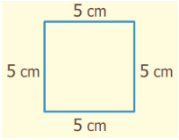
Vocabulary

formula

Key Theory Material

I) The Formula for the Perimeter of a Square

a. **Write this down:** To find the perimeter of a square, we multiply its side length by 4.

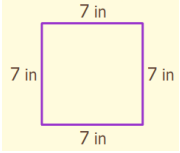


1. *Perimeter* = 5· 4 = 20 (cm)

b. **Write this down:** The formula for the perimeter of a square is: $P = s \cdot 4$.
   1. *P* stands for perimeter
   2. *S* stands for side length

c. When calculating the perimeter, we use the same units as the sides.

d. **Write this down:**



1. Find the perimeter of a square with a side length of 7 *in*.
   (i) $P = s \cdot 4$
   (ii) $P = 7 \cdot 4 = 28$
   (iii) Answer: 28 *in*

e. **Write this down:**

1. Find the side length of a square with a perimeter of 32 *in*.
2. $P = s \cdot 4$
3. To get 32, we multiply 8 by 4.
4. $32 = 8 \cdot 4$
5. So, the side length must be 8 *in*.
6. Answer: 8 *in*

Key Problems for Practice

1. What is the perimeter of a square with a side length of 5 *cm*?

   a. *P = 20 in*

   b. *P = 20 ft*

   c. *P = 20 cm*

2. Farmer Bill is building a fence around his square yard, which has a side length of *7 m.* How long will the fence be?

3. The perimeter of a square is *36 ft.* What is its side length?

Multiplying and Dividing by 6

Objective 20 Curriculum Highlights

Related TEKS

3.4D, 3.4E, 3.4F, 3.4H, 3.4J, 3.4K, 3.5B

Related Student Expectations

- Prerequisite for solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Prerequisite for representing two-step multiplication problems within 100 using arrays
- Prerequisite for representing two-step multiplication problems within 100 using strip diagrams
- Prerequisite for representing two-step division problems within 100 using arrays
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- Prerequisite for solving two-step division problems within 100 using strip diagrams
- Prerequisite for solving two-step multiplication and division problems within 100 using arrays
- Prerequisite for solving two-step multiplication and division problems within 100 using strip diagrams
- Introduces representing multiplication facts by using a variety of approaches
- Introduces recalling facts to multiply up to 10 by 10 with automaticity
- Introduces recalling the corresponding division facts
- Introduces representing one-step multiplication problems within 100 using arrays
- Introduces representing one-step multiplication problems within 100 using strip diagrams
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- Introduces solving one-step multiplication problems within 100 using strip diagrams
- Introduces solving one-step division problems within 100 using arrays
- Introduces solving one-step division problems within 100 using strip diagrams
- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Equations with Multiplication and Division

Vocabulary

Key Theory Material

I) Multiplying by 6

a. When we count by sixes, we get each next number by adding 6.
   1. For example, this is how we would start counting by sixes: 6, 12, 18, 24…
   2. Because:
      (i) 6 + 6 = 12
      (ii) 12 + 6 = 18
      (iii) 18 + 6 = 24

b. **Write this down:** Multiplication of 6
   1. 6 x 1 = 6
   2. 6 x 2 = 12
   3. 6 x 3 = 18
   4. 6 x 4 = 24
   5. 6 x 5 = 30
   6. 6 x 6 = 36
   7. 6 x 7 = 42
   8. 6 x 8 = 48
   9. 6 x 9 = 54
   10. 6 x 10 = 60

c. **Write this down:** Multiplication by 6
   1. 1 x 6 = 6
   2. 2 x 6 = 12
   3. 3 x 6 = 18
   4. 4 x 6 = 24
   5. 5 x 6 = 30
   6. 6 x 6 = 36
   7. 7 x 6 = 42
   8. 8 x 6 = 48
   9. 9 x 6 = 54
   10. 10 x 6 = 60

d. **Write this down:**
   1. Evaluate the expression $a \cdot 6$ when $a = 3$.
   2. $a \cdot 6 = 3 \cdot 6 = 18$
   3. Answer: 18

II) Dividing by 6

a. Multiplication can help you remember division facts because multiplication and division are related.
   1. For example, if we know that 6 x 5 = 30, then we also know that 30 ÷ 6 = 5.

b. **Write this down:** Division by 6
   1. 6 ÷ 6 = 1
   2. 12 ÷ 6 = 2
   3. 18 ÷ 6 = 3
   4. 24 ÷ 6 = 4
   5. 30 ÷ 6 = 5
   6. 36 ÷ 6 = 6
   7. 42 ÷ 6 = 7
   8. 48 ÷ 6 = 8

9. $54 \div 6 = 9$
10. $60 \div 6 = 10$

Key Problems for Practice

1. Choose the expression for "the product of 3 and 6."

   a. 3×6
   b. $6 \div 3$
   c. $3 + 6$
   d. $6 - 3$

2. Put a number in for x to make a true equality: $6 \cdot x = 48$.

3. Grandma baked 24 rolls. She put half of them aside for the evening. Then she divided the rest equally among her 6 grandchildren. How many rolls did each grandchild get?

4. What number needs to replace x to make the values of the expressions $x + 6$ and $x \cdot 2$ equal?
   a. 1
   b. 6
   c. 2

Multiplication Word Problems

Objective Curriculum Highlights

Related TEKS
3.4E, 3.4F, 3.4K, 3.5B, 3.5C, 3.5D

Related Student Expectations

- Introduces solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Introduces solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Introduces describing a multiplication expression as a comparison
- Fully covers representing real-world relationships using verbal descriptions
- Maintains or enriches recalling facts to multiply up to 10 by 10 with automaticity
- Maintains or enriches representing one-step multiplication problems within 100 using equations
- Maintains or enriches representing two-step multiplication problems within 100 using equations
- Maintains or enriches solving one-step multiplication problems within 100 using equations
- Maintains or enriches determining the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product

Foundational RM Prerequisites

- Step-by-Step Solutions for Two-Step Problems
- Multiplying and Dividing by 6

Vocabulary

shorthand

Key Theory Material

I) Writing Problems in Shorthand

a. To write a problem in shorthand, we identify the important information first, and then use that information to create an expression to solve the problem.

b. **Write this down:**

1. One ride on Cloud Dive costs $2. How much does it cost for 6 rides?
2. Here is how we write this problem in shorthand:

1 ride: $2

6 rides: $?

II) Word Problems Solved by Multiplication

a. There are 6 piles of oranges. Each pile has 5 oranges. How many oranges are there in total?

1. **Write this down:**

1 pile: 5 oranges

6 piles: ? oranges

(i) Solution: 5 x 6 = 30 (oranges)
(ii) Answer: 30 oranges

Key Problems for Practice

1. Michael was traveling around the country. He sent 6 postcards to each of his 4 friends. How many postcards in total did he send?

Fill in the blanks in the shorthand:

1 friend:	☐ postcards
☐ friends:	?? postcards

2. Mikah bought four computer games.

1 game: $7

4 games: $?

How much did Mikah pay in total?

3. A pack of fruit chews weighs 4 ounces. There are 8 packs in a box. What is the total weight of all the fruit chews in one box?

Division Word Problems

Objective 22 Curriculum Highlights

Related TEKS
3.4F, 3.4H, 3.4K, 3.5B, 3.5D, 3.5E

Related Student Expectations
♦ Introduces solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts

- Introduces solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Fully covers representing real-world relationships using verbal descriptions
- Maintains or enriches recalling the corresponding division facts
- Maintains or enriches representing one-step division problems within 100 using equations
- Maintains or enriches representing two-step division problems within 100 using equations
- Maintains or enriches solving two-step multiplication problems within 100 using arrays
- Maintains or enriches representing one-step division problems within 100 using equations
- Maintains or enriches representing two-step division problems within 100 using equations
- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches determining the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product

Foundational RM Prerequisites

- Multiplication Word Problems

Vocabulary

N/A

Key Theory Material

I) Sharing Equally: How Many Does Each Get?

a. **Write this down:**

1. Higgie shared 16 gallons of water equally between 4 animatrees. How many gallons of water did each animatree get?

16 gal: 4 animatrees

? gal: 1 animatree

(i) Solution: 16 ÷ 4 = 4 (*gal*)
(ii) Answer: Each animatree got 4 gallons of water.

II) Sharing Equally: Between How Many?

a. **Write this down:**

1. Each adult has 3 youngsters. There are 9 youngsters. How many adults are there?

1 adult: 3 youngsters

? adults: 9 youngsters

(i) Solution: 9 ÷ 3 = 3 (adults)
(ii) Answer: There are 3 adults.

Key Problems for Practice

1. A robot-chef can make 24 salads in 3 hours. How many salads can it make in 4 hours?

2. Solve the problem given in shorthand.

4 coins:	8 *oz*
1 coin:	? *oz*

3. Taylor has 36 cups of juice to pour into jugs. Each jug holds 4 cups. How many jugs does he need for all of the juice?

Area Basics

Objective 23 Curriculum Highlights

Related TEKS
3.4D, 3.4E, 3.4J, 3.4K, 3.5B, 3.6C, 3.6E

Related Student Expectations
♦ Prerequisite for expressing the area of each part as a unit fraction of the whole
♦ Introduces representing one-step multiplication problems within 100 using equations
♦ Introduces representing two-step multiplication and division problems within 100 using equations
♦ Introduces solving one-step multiplication problems within 100 using arrays
♦ Introduces solving one-step multiplication problems within 100 using equations
♦ Introduces solving two-step multiplication problems within 100 using arrays
♦ Introduces solving two-step multiplication problems within 100 using equations
♦ Introduces decomposing two congruent two-dimensional figures into parts with equal areas

- Introduces recognizing that equal shares of identical wholes need not have the same shape
- Introduces decomposing composite figures formed by rectangles into non-overlapping rectangles to determine the area of the original figure using the additive property of area
- Fully covers determining the area of rectangles with whole number side lengths in problems using multiplication related to the number of rows times the number of unit squares in each row
- Maintains or enriches representing multiplication facts by using a variety of approaches
- Maintains or enriches solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Perimeter of a Square: Formula

Vocabulary

Area *(A)*	equal areas	square centimeter *(cm^2)*
square inch *(in^2)*	square unit	unit square

Key Theory Material

I) The Area of a Shape

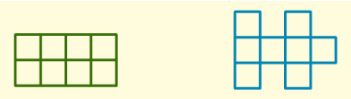
a. If a shape fits inside another shape, then we say that the area of the first shape is smaller than the area of the second shape.

b. **Write this down:**

1. The square fits in the triangle.
2. The area of the square is smaller.
3. The area of the triangle is greater.

c. **Write this down:** Two shapes that match up exactly have equal areas.

d. **Write this down:**

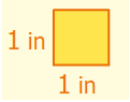


1. All the little squares are the same size.
2. Both of these shapes have 8 squares.
3. So, the two shapes have the same area.

II) Measuring Area

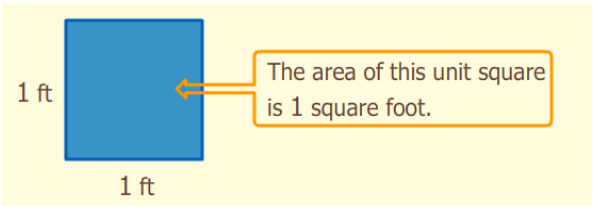
a. We measure area in square units.
   1. For example: square inches, square feet, square centimeters, etc.

b. **Write this down:**



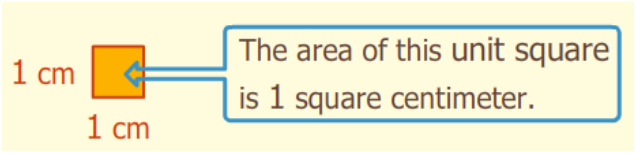
1. The area of this unit square is 1 square inch.
2. We write 1 in^2 for 1 square inch.

c. **Write this down:**



1. We write 1 ft^2 for 1 square foot.
2. 1 ft^2 is greater than 1 in^2

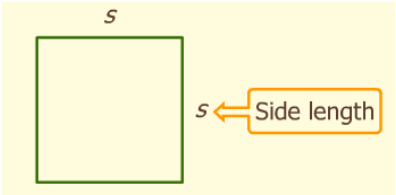
d. **Write this down:**



1. We write 1 cm^2 for 1 square centimeter.
2. 1 cm^2 is smaller than 1 in^2.

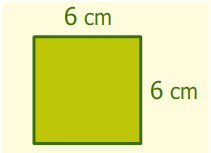
III) The Formula for the Area of a Square

a. **Write this down:** The Formula for the Area of a Square



1. The formula for the area A of a square is: $A = s \cdot s$.

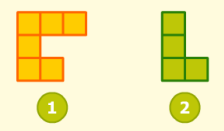
b. **Write this down:**



1. Find the area of a square with sides 6 cm long.
2. $A = s \cdot s$
3. $A = 6 \cdot 6 = 36\ cm^2$
4. *Answer:* The area of the square is 36 cm^2

Key Problems for Practice

1. Each small square has an area of 1 ft^2. How much greater is the area of figure 1?



2. Use the formula $A = s \cdot s$ to find the area of a square with a side length of 5 inches.

3. What is the area of a square with a side length equal to half of 4 inches?

Multiplying and Dividing by 7

Objective 24 Curriculum Highlights

Related TEKS
3.4D, 3.4E, 3.4F, 3.4H, 3.4J. 3.4K, 3.5B

Related Student Expectations
♦ Prerequisite for solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for representing two-step multiplication problems within 100 using arrays
♦ Prerequisite for representing two-step multiplication problems within 100 using strip diagrams
♦ Prerequisite for representing two-step division problems within 100 using arrays
♦ Prerequisite for representing two-step division problems within 100 using strip diagrams

- Prerequisite for representing two-step multiplication and division problems within 100 using arrays
- Prerequisite for representing two-step multiplication and division problems within 100 using strip diagrams
- Prerequisite for solving two-step multiplication problems within 100 using arrays
- Prerequisite for solving two-step multiplication problems within 100 using strip diagrams
- Prerequisite for solving two-step division problems within 100 using arrays
- Prerequisite for solving two-step division problems within 100 using strip diagrams
- Prerequisite for solving two-step multiplication and division problems within 100 using arrays
- Prerequisite for solving two-step multiplication and division problems within 100 using strip diagrams
- Introduces representing multiplication facts by using a variety of approaches
- Introduces recalling facts to multiply up to 10 by 10 with automaticity
- Introduces recalling the corresponding division facts
- Introduces representing one-step multiplication problems within 100 using arrays
- Introduces representing one-step multiplication problems within 100 using strip diagrams
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- Introduces solving one-step division problems within 100 using arrays
- Introduces solving one-step division problems within 100 using strip diagrams
- Introduces determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Multiplying and Dividing by 6

Vocabulary

N/A

Key Theory Material

I) Multiplying 7

a. Let's count by 7's. We will start with 7 and add 7 each time.
   1. 7 + 7 = 14
   2. 14 + 7 = 21
   3. 21 + 7 = 28
   4. 28 + 7 = 35…

b. **Write this down:** Multiplication of 7
   1. 7 x 1 = 7
   2. 7 x 2 = 14
   3. 7 x 3 = 21
   4. 7 x 4 = 28
   5. 7 x 5 = 35
   6. 7 x 6 = 42
   7. 7 x 7 = 49
   8. 7 x 8 = 56
   9. 7 x 9 = 63
   10. 7 x 10 = 70

II) Multiplying by 7

a. Changing the order of factors does not change the product: 7 x 8 = 8 x 7.
b. **Write this down:** Multiplication by 7
   1. 1 x 7 = 7
   2. 2 x 7 = 14
   3. 3 x 7 = 21
   4. 4 x 7 = 28
   5. 5 x 7 = 35
   6. 6 x 7 = 42
   7. 7 x 7 = 49
   8. 8 x 7 = 56
   9. 9 x 7 = 63
   10. 10 x 7 = 70

III) Dividing by 7

a. Multiplication can help you remember division facts because multiplication and division are related. For example, if we know that 7 x 5 = 35, then we also know that 35 ÷ 7 = 5.
b. **Write this down:** Division by 7
   1. 7 ÷ 7 = 1
   2. 14 ÷ 7 = 2
   3. 21 ÷ 7 = 3
   4. 28 ÷ 7 = 4
   5. 35 ÷ 7 = 5
   6. 42 ÷ 7 = 6
   7. 49 ÷ 7 = 7
   8. 56 ÷ 7 = 8
   9. 63 ÷ 7 = 9
   10. 70 ÷ 7 = 10

c. **Write this down:** To find 14 ÷ 7, look for the missing number in ☐ x 7 = 14.
   1. 2 x 7 = 14
   2. 14 ÷ 7 = 2
d. **Write this down:** Evaluate the expression $7 \cdot k$ when $k = 2$.
   1. $7 \cdot k = 7 \cdot 2 = 14$
e. **Write this down:** Evaluate the expression:

   1 2
   1. 30 ÷ 6 x 7 = 5 x 7 = 35

   5

Key Problems for Practice

1. Evaluate this expression: 32 ÷ 4 x 7.

2. A superhero helped 35 people in 7 days. He helped the same number of people each day. How many people did he help each day?

3. In the expression $d \div 7$, replace d with 42. Then, find the quotient.

4. A pipe has 8 pieces. 7 pieces are each 5 *m* long, and one piece is 4 *m* long. What is the length of the pipe?

5. Higgie wants to paint some walls in her house yellow. She bought 7 cans of paint. Each can holds 4 pints. Will all the paint fit in a pail with a capacity of 24 pints?

Multiplying and Dividing by 8

Objective 25 Curriculum Highlights

Related TEKS
3.4D, 3.4E, 3.4F, 3.4H, 3.4J. 3.4K, 3.5B

Related Student Expectations
♦ Prerequisite for solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for representing two-step multiplication problems within 100 using arrays
♦ Prerequisite for representing two-step multiplication problems within 100 using strip diagrams
♦ Prerequisite for representing two-step division problems within 100 using arrays
♦ Prerequisite for representing two-step division problems within 100 using strip diagrams
♦ Prerequisite for representing two-step multiplication and division problems within 100 using arrays
♦ Prerequisite for representing two-step multiplication and division problems within 100 using strip diagrams
♦ Prerequisite for solving two-step multiplication problems within 100 using arrays
♦ Prerequisite for solving two-step multiplication problems within 100 using strip diagrams
♦ Prerequisite for solving two-step division problems within 100 using arrays
♦ Prerequisite for solving two-step division problems within 100 using strip diagrams
♦ Prerequisite for solving two-step multiplication and division problems within 100 using arrays
♦ Prerequisite for solving two-step multiplication and division problems within 100 using strip diagrams
♦ Introduces representing multiplication facts by using a variety of approaches
♦ Introduces recalling facts to multiply up to 10 by 10 with automaticity
♦ Introduces recalling the corresponding division facts

- Introduces representing one-step multiplication problems within 100 using arrays
- Introduces representing one-step multiplication problems within 100 using strip diagrams
- Introduces representing one-step division problems within 100 using arrays
- Introduces representing one-step division problems within 100 using strip diagrams
- Introduces solving one-step multiplication problems within 100 using arrays
- Introduces solving one-step multiplication problems within 100 using strip diagrams
- Introduces solving one-step division problems within 100 using arrays
- Introduces solving one-step division problems within 100 using strip diagrams
- Introduces determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Multiplying and Dividing by 7

Vocabulary

N/A

Key Theory Material

I) Multiplying 8

a. Let's count by 8's. We start with 8, and add 8 each time.
   1. 8 + 8 = 16
   2. 16 + 8 = 24
   3. 24 + 8 = 32
   4. 32 + 8 = 40… and so on.

b. **Write this down:** We get the next multiplication result by adding 8 to the current one.
   1. 8 x 7 = 56
   2. 8 x8 = 56 + 8 = 64

c. **Write this down:** Multiplication of 8
   1. 8 x 1 = 8
   2. 8 x 2 = 16
   3. 8 x 3 = 24
   4. 8 x 4 = 32
   5. 8 x 5 = 40
   6. 8 x 6 = 48
   7. 8 x 7 = 56
   8. 8 x 8 = 64
   9. 8 x 9 = 72
   10. 8 x 10 = 80

II) Multiplying by 8

a. Remember: 8 x 2 = 16 and 2 x 8 = 16
   1. We can change the order of the factors. It does not change the product.
   2. We get multiplication *by 8* from multiplication *of 8.*

b. **Write this down:** Multiplication by 8
   1. 1 x 8 = 8
   2. 2 x 8 = 16
   3. 3 x 8 = 24
   4. 4 x 8 = 32

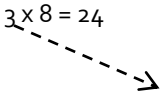
5. 5 x 8 = 40
6. 6 x 8 = 48
7. 7 x 8 = 56
8. 8 x 8 = 64
9. 9 x 8 = 72
10. 10 x 8 = 80

III) Dividing by 8

a. Division is related to multiplication! You know how to multiply by 8, so you can divide by 8.
   1. For example, if we know that 5 x 8 = 40, then we also know that 40 ÷ 8 = 5.

b. **Write this down:** Division by 8
   1. 8 ÷ 8 = 1
   2. 16 ÷ 8 = 2
   3. 24 ÷ 8 = 3
   4. 32 ÷ 8 = 4
   5. 40 ÷ 8 = 5
   6. 48 ÷ 8 = 6
   7. 56 ÷ 8 = 7
   8. 64 ÷ 8 = 8
   9. 72 ÷ 8 = 9
   10. 80÷ 8 = 10

c. **Write this down:**
   1. To find 24 ÷ 8, we look for the missing number in □ x 8 = 24.
   2. 3 x 8 = 24



   3. So, 24 ÷ 8 = 3

d. **Write this down:** How to Find an Unknown Factor
   1. *y* x 8 = 56
   2. Use the multiplication table.
   3. 7 x 8 = 56
   4. Answer: 7

Key Problems for Practice

1. Bertha eats 8 *lb* of food each day. How much food does she eat in 3 days?

2. Jay needs 32 cartons of apple juice. There are 8 cartons in each pack. How many packs must he buy?

3. The Inventor put 22 robots in a building. He wants exactly 8 robots on each floor. How many more robots must he put in the building?

4. Which of these gives a number that is different from all the others?

a. Ten groups of four

b. Eight groups of five

c. Forty

d. Six groups of seven

e. Four tens

Finding a Number Several Times More/Less

Objective 26 Curriculum Highlights

Related TEKS

3.4J, 3.4K, 3.5B, 3.5C

Related Student Expectations

- Introduces representing one-step multiplication problems within 100 using equations
- Introduces representing one-step division problems within 100 using equations
- Introduces representing two-step multiplication problems within 100 using equations
- Introduces representing two-step division problems within 100 using equations
- Introduces representing two-step multiplication and division problems within 100 using equations
- Introduces solving one-step multiplication problems within 100 using equations
- Introduces solving one-step division problems within 100 using equations
- Introduces solving two-step multiplication problems within 100 using equations
- Introduces solving two-step division problems within 100 using equations
- Introduces solving two-step multiplication and division problems within 100 using equations
- Introduces describing a multiplication expressingion as a comparison
- Maintains or enriches solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Multiplying and Dividing by 8

Vocabulary

times as many times fewer times greater times less

times more

Key Theory Material

I) Several Times More

a. To find a number that is several times more than another number, we multiply the second number by how many times more the answer should be.

b. **Write this down:** To find the number 4 times more than 5, we multiply 5 by 4:
   1. 5 x 4 = 20
   2. "4 times more," "4 times greater," and "4 times as many" mean the same thing.

c. **Write this down:** 3 x 5 = 15
   1. 5 times more than 3 is 15.
   2. 3 times more than 5 is 15.

II) Several Times Less

a. "Times fewer" and "times less" mean the same thing.

b. **Write this down:** To find the number that is 4 *times less than* 12, we *divide* 12 by 4:

1. 12 ÷ 4 = 3.
2. 4 times less than 12 is 3.

Key Problems for Practice

1. Fill in the blanks:

   ☐ times greater than 5 is 30.

   ☐ times less than 30 is 6.

2. To find the number that is 5 times less than 10, we find:

   a. 10 + 5

   b. 10 - 5

   c. 10 x 5

   d. 10 ÷ 5

3. What is 4times less than 12?

4. What do you need to add to 8 to get a number that is 2 times greater than 8?

5. The wizard dreamed of a number. Then he dreamed of a number 4 times as great. Then he dreamed of a number 2 times greater than that. The number he dreamed about last is how many times greater than the number he dreamed about first?

Times More/Less Than Word Problems

Objective 27 Curriculum Highlights

Related TEKS

3.4J, 3.4K, 3.5B, 3.5C

Related Student Expectations

- Introduces representing one-step multiplication problems within 100 using equations
- Introduces representing one-step division problems within 100 using equations
- Introduces representing two-step multiplication problems within 100 using equations
- Introduces representing two-step division problems within 100 using equations
- Introduces representing two-step multiplication and division problems within 100 using equations
- Introduces solving one-step multiplication problems within 100 using equations
- Introduces solving one-step division problems within 100 using equations
- Introduces solving two-step multiplication problems within 100 using equations
- Introduces solving two-step division problems within 100 using equations
- Introduces solving two-step multiplication and division problems within 100 using equations
- Fully covers describing a multiplication expression as a comparison
- Maintains or enriches solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Finding a Number Several Times More/Less

Vocabulary

N/A

Key Theory Material

I) Word Problems: "Times More Than"

a. **Write this down:** Example: solving a word problem on "times more"

1. There are 7 coconut trees in a garden and twice as many palm trees. How many palm trees are there?
2. Coconut: 7 trees
   Palm: ? trees, 2 times more than
3. 7 x 2 = 14 (trees)
4. Answer: There are 14 palm trees in the garden.

II) Word Problems: "Times Less Than"

a. **Write this down:** Example: solving a word problem on "times less"

1. Higgie was promised $50, but got 5 times less. How much did Higgie get?
2. Promised: $50
   Got: $?, 5 times less than
3. 50 ÷ 5 = 10 (dollars)
4. Answer: Higgie got $10.

Key Problems for Practice

1. Sally made four paper boats. Kelvin made twice as many boats. How many boats did Kelvin make?

   a. Fill in the shorthand.
   Sally: □ boats
   Kelvin: ? boats, □ times more than

   b. Kelvin made □ boats.

2. Higgie sailed 8 miles down a river, then 4 times fewer miles up the river. How many miles did Higgie sail up the river? Choose the expression that we can use to solve the problem:

   a. 8 x 4

   b. 8 ÷ 4

   c. 8 + 4

   d. 8 - 4

3. There are 5 times more CDs on the desk than on the shelf, and there are 2 times fewer CDs on the floor than on the shelf. If there are 10 CDs on the shelf, how many CDs are on the desk? How about on the floor?

   Shelf: 10 CDs
   Desk: ? CDs, 5 times more than
   Floor: ? CDs, 2 times less than

   a. There are □ CDs on the desk.
   b. There are □ CDs on the floor.

4. Michael has $4, and Jane has  times more. How much money does Jane have?

   If Jane and Michael have less then $30 together, choose the statement that could be true:

   a. Jane has 4 x 9 = 36 dollars

   b. Jane has 4 x 7 = 28 dollars

   c. Jane has 4 x 5 = 20 dollars

   d. Jane has 3 x 7 = 21 dollars

   Based on your answer above, what number is hidden under the bee? _____

5. A movie ticket costs $10, and a concert ticket is 7 times more expensive. How much does a concert ticket cost?

Numerical Expressions with All Operations

Objective 28 Curriculum Highlights

Related TEKS
3.4A, 3.4F, 3.4K

Related Student Expectations
♦ Introduces solving with fluency one-step problems involving addition within 1,000 using strategies based properties of operations ♦ Introduces solving with fluency one-step problems involving subtraction within 1,000 using strategies based on properties of operations ♦ Introduces solving with fluency two-step problems involving addition within 1,000 using strategies based on properties of operations

- Introduces solving with fluency two-step problems involving subtraction within 1,000 using strategies based on properties of operations
- Introduces solving with fluency two-step problems involving addition and subtraction within 1,000 using strategies based on properties of operations
- Introduces solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Introduces solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Introduces solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Introduces solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Introduces solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches recalling facts to multiply up to 10 by 10 with automaticity
- Maintains or enriches recalling the corresponding division facts

Foundational RM Prerequisites

- Multiplying and Dividing by 8

Vocabulary

N/A

Key Theory Material

I) Order of Operations in Expressions without Parentheses

a. **Write this down:** The Order of Operations Rule

2 1

1. $4 + 8 \times 6 = 4 + 48 = 52$

48

2. In expressions without parentheses, we:
   (i) Multiply and divide first,
   (ii) Then add and subtract.

b. **Write this down:**
   1. Sum: $9 + 3$
   2. Difference: $9 - 3$
   3. Product: 9×3
   4. Quotient: $9 \div 3$

c. **Write this down:** To find $6 + 15 \div 3$, add 6 to the quotient of 15 and 3.

II) Order of Operations in Expressions with Parentheses

a. **Write this down:** The Order of Operations Rule

1 2

1. $\underbrace{(5 + 4)}_{9} \times 2 = 9 \times 2 = 18$

2. In expressions with parentheses, we:
   (i) Do the operations in parentheses first.
   (ii) Then, the multiplication and division.
   (iii) Then, the addition and subtraction.

b. **Write this down:** To find $(20 + 8) \div 4$:
   1. Find the sum of 20 and 8, and divide it by 4.

Key Problems for Practice

1. Becky found the sum of 8 and 2 and then found the quotient of this sum and 5. Mortimer found the product of 2 and 3 then added 1 to it. Who got the greater number?

2. Evaluate the expression: $20 - 4 \times 4 = 20$.

3. Choose the statement that says how to find $35 - 7 \times 4$.

   a. Add 35 to the product of 7 and 4.

   b. Subtract the product of 7 and 4 from 35.

   c. Subtract the quotient of 7 and 4 from 35.

4. Evaluate this expression: $(16 - 10) \times 4$.

5. Fill in the blank to make a true equality: $57 + 2 - \square = 6$.

Multiplying and Dividing by 9

Objective 29 Curriculum Highlights

Related TEKS
3.4D, 3.4E, 3.4F, 3.4H, 3.4J. 3.4K, 3.5B

Related Student Expectations
♦ Prerequisite for solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
♦ Prerequisite for representing two-step multiplication problems within 100 using arrays
♦ Prerequisite for representing two-step multiplication problems within 100 using strip diagrams
♦ Prerequisite for representing two-step division problems within 100 using arrays
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♦ Prerequisite for solving two-step division problems within 100 using strip diagrams
♦ Prerequisite for solving two-step multiplication and division problems within 100 using arrays
♦ Prerequisite for solving two-step multiplication and division problems within 100 using strip diagrams
♦ Fully covers representing multiplication facts by using a variety of approaches

- Fully covers recalling facts to multiply up to 10 by 10 with automaticity
- Fully covers recalling the corresponding division facts
- Fully covers solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Fully covers solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Fully covers representing one-step multiplication problems within 100 using arrays
- Fully covers representing one-step multiplication problems within 100 using strip diagrams
- Fully covers representing one-step division problems within 100 using arrays
- Fully covers representing one-step division problems within 100 using strip diagrams
- Fully covers solving one-step multiplication problems within 100 using arrays
- Fully covers solving one-step multiplication problems within 100 using strip diagrams
- Fully covers solving one-step division problems within 100 using arrays
- Fully covers solving one-step division problems within 100 using strip diagrams
- Fully covers determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10
- Maintains or enriches determining the number of objects in each group when a set of objects is partitioned into equal shares or a set of objects is shared equally
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Multiplying and Dividing by 8

Vocabulary

N/A

Key Theory Material

I) Multiplication of 9

a. Let's count by 9's. We start with 9, and add 9 each time.
   1. 9 + 9 = 18
   2. 18 + 9 = 27
   3. 27 + 9 = 36…

b. **Write this down:** Multiplication of 9
   1. 9 x 1 = 9
   2. 9 x 2 = 18
   3. 9 x 3 = 27
   4. 9 x 4 = 36
   5. 9 x 5 = 45
   6. 9 x 6 = 54
   7. 9 x 7 = 63
   8. 9 x 8 = 72
   9. 9 x 9 = 81
   10. 9 x 10 = 90

c. **Write this down:** Multiplication by 9
   1. 1 x 9 = 9
   2. 2 x 9 = 18
   3. 3 x 9 = 27
   4. 4 x 9 = 36
   5. 5 x 9 = 45

6. 6 x 9 = 54
7. 7 x 9 = 63
8. 8 x 9 = 72
9. 9 x 9 = 81
10. 10 x 9 = 90

II) Division by 9

a. Multiplication can help you remember division facts because multiplication and division are related. For example, if we know that 9 x 5 = 45, then we also know that 45 ÷ 9 = 5.

b. **Write this down:** Division by 9

1. 9 ÷ 9 = 1
2. 18 ÷ 9 = 2
3. 27 ÷ 9 = 3
4. 36 ÷ 9 = 4
5. 45 ÷ 9 = 5
6. 54 ÷ 9 = 6
7. 63 ÷ 9 = 7
8. 72 ÷ 9 = 8
9. 81 ÷ 9 = 9
10. 90 ÷ 9 = 10

c. Sid flew 36 yards on a dragonfly-kite and Ronny flew 9 times less. How far did Ronny fly?

d. **Write this down:**

1. Sid: 36 *yd*
   Ronny: ? *yd*, 9 times less than
2. *36 ÷ 9 = 4 yd*
3. Answer: Ronny flew 4 yards.

Key Problems for Practice

1. There are 9 cars at the service center. Each car needs 4 new wheels. The mechanic has 21 wheels. How many more wheels are needed?

2. What number do we multiply 9 by to get 36?

3. Find the dividend: ☐ ÷ 9 = 3.

4. The purple fox has 9 times more than $7. The blue fox has 9 times less than $72. How much money does each fox have?

5. Which of these expressions have the same value?

   a. 9 x 8

   b. 9 x 7 + 9

   c. 9 x 8 + 9

   d. 9 x 3 + 9 x 3

e. 9 x 6

f. 9 x 9

Comparing Numbers Using Division

Objective 30 Curriculum Highlights

Related TEKS

3.4F, 3.4J, 3.5B

Related Student Expectations

- Fully covers representing two-step division problems within 100 using arrays
- Fully covers representing two-step division problems within 100 using strip diagrams
- Fully covers representing two-step division problems within 100 using equations
- Fully covers solving two-step division problems within 100 using arrays
- Fully covers solving two-step division problems within 100 using strip diagrams
- Fully covers solving two-step division problems within 100 using equations
- Maintains or enriches recalling facts to multiply up to 10 by 10 with automaticity
- Maintains or enriches recalling the corresponding division facts
- Maintains or enriches representing one-step division problems within 100 using arrays
- Maintains or enriches representing one-step division problems within 100 using strip diagrams
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Finding a Number Several Times More/Less
- Multiplying and Dividing by 9

Vocabulary

how many times more

how many times less

Key Theory Material

I) Comparing Numbers using Division

a. **Write this down:** To find *how many times more*, we *divide*:
   1. 15 ÷ 3 = 5
   2. 15 is 5 times more than 3

b. *Example:* 20 is *how many times more than* 4?
   1. 20 is 5 groups of 4
   2. So, 20 is 5 times more than 4

3. To find *how many times more*, we *divide*: 20 ÷ 4 = 5
4. 20 is 5 times more than 4

c. **Write this down:** To find *how many times less*, we *divide*:
1. 6 ÷ 3 = 2
2. 3 is 2 times less than 6

d. **Write this down:**
1. 56 is *how many times more* than 8?
2. 8 is *how many times less* than 56?
3. To answer both questions, divide: 56 ÷ 8 = 7
4. 56 is 7 times more than 8
5. 8 is 7 times less than 56

Key Problems for Practice

1. Replace the stars with numbers to make the calculations correct:

   23 - *6 = *

   3 + 26 = 4

   The sum is how many times more than the difference?

2. Two rectangles have the same width: 1 *cm*. The length of the 1st rectangle is 15 *cm*. The length of the 2nd rectangle is five times less than the length of the 1st. The perimeter of the 2nd rectangle is how many times less than the perimeter of the 1st rectangle?

3. Increase 9 by 36. 9 is how many times less than your result?

4. 2 is how many times less than 18? Make an equality that answers the question.

5. 72 is how many times more than 9?

Word Problems on Comparing Using Division

Objective 31 Curriculum Highlights

Related TEKS

3.4F, 3.4J, 3.5B

Related Student Expectations

- Maintains or enriches recalling facts to multiply up to 10 by 10 with automaticity
- Maintains or enriches recalling the corresponding division facts
- Maintains or enriches representing one-step division problems within 100 using arrays
- Maintains or enriches representing one-step division problems within 100 using strip diagrams
- Maintains or enriches representing two-step division problems within 100 using arrays
- Maintains or enriches representing two-step division problems within 100 using strip diagrams
- Maintains or enriches representing two-step division problems within 100 using equations
- Maintains or enriches solving two-step division problems within 100 using arrays
- Maintains or enriches solving two-step division problems within 100 using strip diagrams
- Maintains or enriches solving two-step division problems within 100 using equations
- Maintains or enriches determining a quotient using the relationship between multiplication and division

Foundational RM Prerequisites

- Comparing Numbers using Division
- Times More/Less Than Word Problems

Vocabulary

how many times as much how many times as many how many times fewer

Key Theory Material

I) **Word Problems: How Many Times More?**
   a. **Write this down:** These all mean the same thing:
      1. How many times more?
      2. How many times as much?
      3. How many times as many?
   b. Example: 6 strawberries is *how many times more* than 2?
      1. 6 ÷ 2 = 3
   c. **Write this down:**
      1. An energy bar weighs 5 *oz*. A box of candy weighs 20 *oz*. How many times heavier is the box than the bar?

Bar: 5 *oz*

Box: 20 *oz* ← ? times ?

20 ÷ 5 = 4

2. Answer: The box of candy is 4 times heavier.

II) Word Problems: How many times less?

a. The Math Pirate knocked 15 nails into 5 planks.
   1. How many times more nails than planks are there?
   2. How many times fewer planks than nails are there?
   3. How many times less planks than nails are there?
   4. Three different questions, same answer.

b. **Write this down:**
   1. Shorthand:
      Nails: 15 ← ?? times?
      Planks: 5 ←
   2. 15 ÷ 5 = 3
   3. 3 times more nails than planks.
   4. 3 times fewer planks than nails.

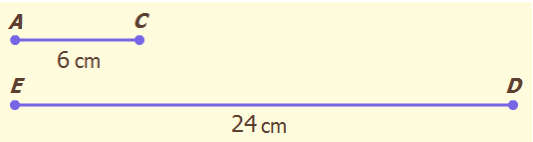
Key Problems for Practice

1. A tank holds 5 times more gas than a tub. A can holds 4 times less gas than the tub. Compared to the can, how much gas does the tank hold?

2. Edison did his homework in 8 minutes and then spent 32 minutes watching TV. How many times longer did Edison spend watching TV than doing homework? Do the shorthand, then answer the question.

3. A backpack costs $27 and an art box costs $18. In a "Back to School" sale, the backpack and art box cost $9 in total. How many times cheaper did the backpack and art box get?

4. How many times longer is *ED* than *AC*? How many times shorter is *AC* than *ED*?



5. The sum 29*L* + 13*L* is how many times greater than the difference 53*L* − 46*L*?

Expressions with Two Letters

Objective 32 Curriculum Highlights

Related TEKS

3.4K, 3.5B, 3.5D

Related Student Expectations

- Fully covers solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Fully covers solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Fully covers solving two-step problems involving multiplication and division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Fully covers representing one-step multiplication problems within 100 using equations
- Fully covers representing one-step division problems within 100 using equations
- Fully covers representing two-step multiplication problems within 100 using arrays
- Fully covers representing two-step multiplication problems within 100 using strip diagrams
- Fully covers representing two-step multiplication problems within 100 using equations
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- Fully covers representing two-step multiplication and division problems within 100 using equations
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- Fully covers solving two-step multiplication and division problems within 100 using arrays
- Fully covers solving two-step multiplication and division problems within 100 using strip diagrams
- Fully covers solving two-step multiplication and division problems within 100 using equations
- Maintains or enriches representing two-step division problems within 100 using arrays
- Maintains or enriches representing two-step division problems within 100 using strip diagrams
- Maintains or enriches representing two-step division problems within 100 using equations
- Maintains or enriches solving two-step division problems within 100 using arrays
- Maintains or enriches solving two-step division problems within 100 using strip diagrams
- Maintains or enriches solving two-step division problems within 100 using equations
- Maintains or enriches determining the unknown whole number in a multiplication or division equation relating three whole numbers when the unknown is either a missing factor or product

Foundational RM Prerequisites

- Expressions with Letters, × and ÷
- Multiplying and Dividing by 9

Vocabulary

expressions with two letters

Key Theory Material

I) Review: Expressions with a Letter

a. Expressions with a letter look like this:
   1. $a - 4$
   2. $9 \cdot b$
   3. $15 \div c$
   4. $d + 23$

b. Let's evaluate $b \cdot 4$ when $b = 5$
   1. To find the value, we *put 5 for b*
   2. $b \cdot 4 = 5 \cdot 4 = 20$
   3. **Write this down:** Evaluate the expression $a \div 7$ when $a = 28$.
   4. $a \div 7 = 28 \div 7 = 4$
   5. Answer: 4

II) Expressions with Two Letters

a. Expressions with two letters look like this:
   1. $a \div c$

b. To find the value of $a \div c$ when $a = 15$, and $c = 3$, we replace a with 15 and c with 3
   1. $a \div c = 15 \div 3$
   2. $15 \div 3 = 5$
   3. The value of the expression is 5.
   4. **Write this down:** Evaluate the expression $x \div y$ when $x = 24$, $y = 4$.
   5. $x \div y = 24 \div 4 = 6$
   6. Answer: 6

Key Problems for Practice

1. What is the value of the expression $3 \cdot a + 4 \cdot b$ when $a = 1$ and b=10?
   a. 31
   b. 41
   c. 33
   d. 44
   e. 43

2. Find $12 \div a$ when $a = 6$.

3. Put 32 for s and 8 for k. Then find the quotient for $s \div k$.

4. Becky evaluated $n \cdot 2$ when $n = 6$. 2-Ring subtracted 40 from a number, and got the same answer as Becky. What number did 2-Ring subtract from?

5. What is the value of the expression $2 \cdot b + a$ when $b = 10$ and $a = 6$?

Area and Perimeter of a Rectangle

Objective 33 Curriculum Highlights

Related TEKS

3.6C, 3.7B

Related Student Expectations

- Maintains or enriches determining the area of rectangles with whole number side lengths in problems using multiplication related to the number of rows times the number of unit squares in each row
- Maintains or enriches determining the perimeter of a polygon or a missing length when given perimeter and remaining side lengths in a problem

Foundational RM Prerequisites

- Area Basics
- Perimeter of a Square: Formula

Vocabulary

N/A

Key Theory Material

I) Perimeter of a Rectangle

a. To find the perimeter of a rectangle, we add all of the rectangle's sides together.

b. Also, to find the perimeter of a rectangle, we can add the length and width of the rectangle and we multiply their sum by 2. The formula for the perimeter of a rectangle is:

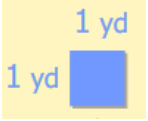
1. Perimeter = (length + width) · 2;
2. or $P = (l + w) \cdot 2$

c. **Write this down:** Find the perimeter of a rectangle 4 *cm* long and 3 *cm* wide.

1. $P = (l + w) \cdot 2$
2. $P = (4 + 3) \cdot 2 = 14$
3. Answer: The perimeter of the rectangle is 14 *cm*.

II) Area of a Rectangle

a. This is a unit square. Its area is: 1 yd^2



b. To find the area of a rectangle, we multiply its length by its width.

1. The formula for the area of a rectangle is: Area = length • width, or $A = l \cdot w$

c. **Write this down:** Find the area of a rectangle 3 feet long and 2 feet wide.

1. $A = l \cdot w$
2. $A = 3 \cdot 2 = 6\ ft^2$

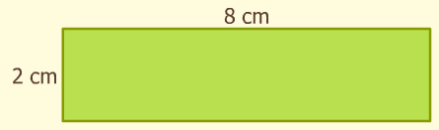
Answer: the area of the rectangle is 6 ft^2

Key Problems for Practice

1. A square has the same perimeter as a rectangle with side lengths of 4 inches and 2 inches. What is the square's side length?

2. A rectangle has a width of 2 meters and a length of 4 meters. Use the formula $P = (l + w) \cdot 2$ to find the perimeter of the rectangle.

3. What is the area A of this rectangle?



4. Which has a greater perimeter, a square with a side length of 5 *cm*, or a rectangle with side lengths of 3 *cm* and 2 *cm*? Or, are the perimeters equal?

5. 2-Ring used $A = 6 \cdot 7$ (in^2) to find the area of a rectangle. Choose the expression for the perimeter of the rectangle.

a. $(6 + 2 \cdot 7)$

b. $6 \cdot 2 + 7$

c. $7 \cdot 6 + 2$

d. $(6 + 7) \cdot 2$

Multiplication Properties of 1 and 0

Objective 34 Curriculum Highlights

Related TEKS

3.4G, 3.4F, 3.4K

Related Student Expectations

- Prerequisite for using strategies to multiply a two-digit number by a one-digit number
- Prerequisite for using algorithms, including the standard algorithm, to multiply a two-digit number by a one-digit number
- Introduces solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Introduces solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches recalling facts to multiply up to 10 by 10 with automaticity
- Maintains or enriches recalling the corresponding division facts

Foundational RM Prerequisites

- Multiplying and Dividing by 9

Vocabulary

N/A

Key Theory Material

I) Multiplying with 1

a. **Write this down:** When we multiply a number by 1, we get the same number.
   1. For example: 24 x 1 = 24

b. **Write this down:** When we multiply 1 by a number, we get the same number.
   1. For example: 1 x 63 = 63

II) Multiplying with 0

a. **Write this down:** When we multiply a number by 0, we get 0.
   1. For example: 9 x 0 = 0

b. **Write this down:** When we multiply 0 by any number, we get 0.
   1. For example: 0 x 6 = 0

c. **Write this down:** We *cannot* divide by 0!

III) Dividing a Number By 1 and By Itself

a. **Write this down:** Related Multiplication and Division Facts:

4 x 7 = 28 28 ÷ 7 = 4	7 x 4 = 28 28 ÷ 4 = 7

   1. Remember that multiplication and division facts are related if we can rearrange the numbers in the fact and use the opposite operation to get another true equality.

b. **Write this down:** When we divide a number by 1, we get the same number.
   1. For example: 8 ÷ 1 = 8

c. **Write this down:** When we divide a number (except 0) by itself, we get 1.
   1. For example: 24 ÷ 24 = 1

IV) Dividing 0 by a Number

a. **Write this down:** When we divide 0 by any number (except 0), we get 0.
   1. For example: 0 ÷ 4 = 0
   2. But we cannot divide by 0!

Key Problems for Practice

1. The dividend is 24. The divisor is 4. How much greater than the quotient is the dividend?

2. Evaluate these expressions:

   a. 18 x 0

   b. 25 x 0

   c. 36 x 0

   d. 2 x 0

3. Evaluate these expressions:

   a. 18 x 1

   b. 1 x 48

   c. 15 x 1

   d. 1 x 17

4. The dividend is 26. The divisor is 26. What is the quotient?

5. Which of the following expressions are equal to 0?

   a. 48 ÷ 48 -1

   b. 9 x 1 + 4

   c. (22 – 3) x 0

   d. 17 x (24-24)

The Multiplication and Division Table

Objective 35 Curriculum Highlights

Related TEKS

3.4D, 3.4E, 3.4F, 3.4K, 3.5B

Related Student Expectations

- Maintains or enriches representing multiplication facts by using a variety of approaches
- Maintains or enriches recalling facts to multiply up to 10 by 10 with automaticity
- Maintains or enriches recalling the corresponding division facts
- Maintains or enriches solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches representing one-step multiplication problems within 100 using arrays
- Maintains or enriches representing one-step multiplication problems within 100 using strip diagrams
- Maintains or enriches representing one-step division problems within 100 using arrays
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- Maintains or enriches solving one-step multiplication problems within 100 using strip diagrams
- Maintains or enriches solving one-step division problems within 100 using arrays
- Maintains or enriches solving one-step division problems within 100 using strip diagrams
- Maintains or enriches determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10

Foundational RM Prerequisites

- Multiplication Properties of 1 and 0

Vocabulary

multiplication table

Key Theory Material

I) Multiplying with the Multiplication Table

a. You've seen individual multiplication tables many times. Now, we can put them all together.

b. The multiplication table is a system of rows and columns that shows results of all of our multiplication facts:

	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

c. To multiply with the multiplication table, simply find the row that corresponds to your first factor and trace it to the column that corresponds to your second factor.

d. For example, to solve the problem 5 x 8,
   1. We find the 5-row
   2. Then we find the 8-column

3. The product of 5 and 8 is where the row and column meet.
4. 5 x 8 =40

e. Except for 1, all products are on the table twice because the factors are on both sides of the table.

II) Dividing with the Multiplication Table

a. We can use the multiplication table to divide because division is related to multiplication.
b. To divide with the multiplication table, simply find the column that corresponds to the factor you know, then find the dividend in that column and trace it over to its corresponding row. This is the quotient.
c. For example, to solve the problem 35 ÷ 5,
   1. We find the 5-column
   2. Then we find 35 in this column
   3. Then we find the row number that corresponds to 35.
   4. 35 ÷ 5 = 7.

Key Problems for Practice

1. Look at the table. Find this quotient: $49 \div 7 = 7$.

	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

2. Choose the expressions with equal products. Use the table for help.

   a. 3×8

   b. 4×6

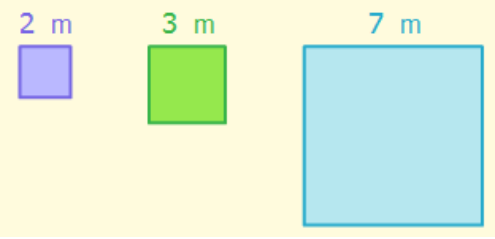
   c. 3×7

   d. 6×4

3. Multiply half of 6 by 8, and then divide the result by 4.

4. A boat can hold up to 6 people. One of them is the captain. The others are passengers. What's the smallest number of boats it will take to get 30 passengers across the river?

5. What is the perimeter of the square with the greatest side length?



Multiplication within 100 Beyond the Table

Objective 36 Curriculum Highlights

Related TEKS

3.4D, 3.4E, 3.4F, 3.4G, 3.4K, 3.5B

Related Student Expectations

- Fully covers using strategies to multiply a two-digit number by a one-digit number
- Fully covers using algorithms, including the standard algorithm, to multiply a two-digit number by a one-digit number
- Maintains or enriches representing multiplication facts by using a variety of approaches
- Maintains or enriches recalling facts to multiply up to 10 by 10 with automaticity
- Maintains or enriches recalling the corresponding division facts
- Maintains or enriches solving one-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving one-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving two-step problems involving multiplication within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
- Maintains or enriches solving two-step problems involving division within 100 using strategies based on objects; pictorial models, including arrays, area models, and equal groups; properties of operations; or recalling of facts
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- Maintains or enriches solving two-step multiplication and division problems within 100 using equations

- Maintains or enriches determining the total number of objects when equally-sized groups of objects are combined or arranged in arrays up to 10 by 10

Foundational RM Prerequisites

- Multiplication Properties of 1 and 0

Vocabulary

N/A

Key Theory Material

I) Multiplying and Dividing by 10

a. Multiplication by 10
   1. 1 x 10 = 10
   2. 2 x 10 = 20
   3. 3 x 10 = 30
   4. 4 x 10 = 40
   5. 5 x 10 = 50
   6. 6 x 10 = 60
   7. 7 x 10 = 70
   8. 8 x 10 = 80
   9. 9 x 10 = 90
   10. 10 x 10 = 100

b. **Write this down:** To multiply a number by 10, just put a 0 at its end.
   1. 4 x 10 = 40
   2. 10 x 10 = 100

c. **Write this down:** To divide a round number by 10, remove a 0 from its end.
   1. 40 ÷ 10 = 4
   2. 100 ÷ 10 = 10

II) Multiplying a Round Number by a One-Digit Number

a. Let's find 20 x 4.
   1. 20 x 4 = 2 *tens* x 4 = 8 *tens* = 80

b. **Write this down:** To multiply a round number by a one-digit number:
   1. Multiply, ignoring the zero.
   2. Put the zero at the end.
      (i) 20 x 3 = 60
      (ii) 40 x 2 = 80

III) Multiplying a Two-Digit Number by a One-Digit Number

a. **Write this down:** To multiply a sum by a number, we can:
   1. Multiply each summand by the number.
   2. Add the results.
   3. (7 +2) x 3 = 7 x 3 + 2 x 3 = 21 + 6 = 27

b. Or, to multiply a sum by a number, we can:
   1. Find the sum.
   2. Multiply the sum by the number.
   3. For example: (7 + 2) x 3 = 9 x 3= 27

c. To multiply a two-digit number by a one-digit number, split the two-digit number into its tens value and its ones value. Then multiply the tens value by the one-digit number and the ones value by the one-digit number and add your two results.

d. **Write this down:**

1. $12 \times 4 = (10 + 2) \times 4 = 10 \times 4 + 2 \times 4$
   $= 40 + 8 = 48$

2. Think: $12 = 10 + 2$

e. **Write this down:**

1. $26 \times 3 = (20 + 6) \times 3 = 20 \times 3 + 6 \times 3$
   $= 60 + 18 = 78$

2. Think: $26 = 20 + 6$

Key Problems for Practice

1. The Math Pirate put 40 coins in 4 pockets. Each pocket has the same number of coins. How many coins are in 3 pockets?

2. Evaluate the expressions 9×10 and $50 \div 10$.

3. Evaluate the expression in two ways:

   a. $(4 + 8) \times 3 = \square \times 3 = \square$

   b. $(4 + 8) \times 3 = 4 \times 3 + \square \times 3 = \square$

4. The divisor is 26. The quotient is 2. The dividend is what?

5. Evaluate the expression $5 \times 20 - 36$.