Lesson 1: Understand equal groups of as multiplication.

Date: 5/6/13

1. Fill in the blanks to make true statements.

   a. 3 groups of five = _________
      3 fives = _________
      \(3 \times 5 = \)_________

   b. \(3 + 3 + 3 + 3 + 3 = \)_________
      5 groups of three = _________
      \(5 \times 3 = \)_________

   c. \(6 + 6 + 6 + 6 = \)_________
      \(\) groups of six = _________
      \(4 \times \)_____ = _________

   d. \(4 + \)_____ + _____ + _____ + _____ + _____ = _________
      6 groups of _______ = _________
      \(6 \times \)_____ = _________
Lesson 1 Problem Set

2. The picture below shows 2 groups of apples. Does the picture below show $2 \times 3$? Explain why or why not.

3. Draw a picture to show $2 \times 3 = 6$.

4. Caroline, Brian and Marta want to share a box of chocolates so that they each get the same amount. Circle the chocolates below to show 3 groups of 4. Then write addition and multiplication sentences to represent the problem.
1. The picture below shows 4 groups of 2 slices of watermelon. Write repeated addition and multiplication sentences to represent the picture.

\[2 + ____ + ____ + ____ = ________\]

\[4 \times _____ = ________\]

2. Draw a picture to show \(3 + 3 + 3 = 9\). Then write a multiplication sentence to represent the picture.
Use the arrays below to answer each set of questions.

1. a. How many rows of cars are there? __________
   b. How many cars are there in each row? __________

2. a. What is the number of rows? __________
   b. What is the number of objects in each row? __________

3. a. There are 4 spoons in each row. How many spoons are in 2 rows? __________
   b. Write a multiplication fact to describe the array. __________

4. a. There are 5 rows of triangles. How many triangles are in each row? __________
   b. Write a multiplication fact to describe the total number of triangles. __________
5. The dots below show 2 groups of 5.

   a. Redraw the circles as an array that shows 2 rows of 5.

   b. Compare the drawing to your array. Write at least 1 reason why they are the same and 1 reason why they are different.

6. Emma collects rocks. She arranges them in 4 rows of 3. Draw Emma’s array to show how many rocks she has altogether. Then write a multiplication sentence to describe the array.

7. Joshua helps his father organize cans of food in the cupboard. He makes an array with the cans and thinks, “My cans show $5 \times 3$!” Make a drawing that shows how many cans are in Joshua’s array.
1. a. There are 4 rows of stars. How many stars are in each row? __________
   
   b. Write a multiplication fact to describe the total number of stars. _______________

2. Judy collects seashells. She arranges them in 3 rows of 6. Draw Judy’s array to show how many seashells she has all together. Then write a multiplication sentence to describe the array.
Lesson 3

Problem Set

NYS COMMON CORE MATHEMATICS CURRICULUM

Lesson 3 Problem Set 3•1

Name __________________________________________ Date __________________________

Solve numbers 1–4 using the pictures provided for each problem.

1. There are 5 flowers in each bunch. How many flowers are in 4 bunches?
   
   a. Number of groups: ________  Size of each group: _____________
   
   b. 4 × 5 = __________
   
   c. There are ________ flowers altogether.

2. There are ______ candies in each box. How many candies are in 6 boxes?
   
   a. Number of groups: ________  Size of each group: _____________
   
   b. 6 ×__________ = ___________
   
   c. There are ________ candies altogether.

3. There are 4 oranges in each row. How many oranges are there in _____ rows?
   
   a. Number of rows: ___________  Size of each row: __________
   
   b. ___________ × 4 = ___________
   
   c. There are ________ oranges altogether.
Lesson 3 Problem Set

4. There are _______ loaves of bread in each row. How many loaves of bread are there in 5 rows?
   
   a. Number of rows: ___________          Size of each row: ____________
   
   b. ___________ × ___________ = ___________
   
   c. There are ________ loaves of bread altogether.

5. a. Write a multiplication sentence for the array shown below.

   X X X
   X X X
   X X X
   X X X
   X X X

   b. Draw a number bond for the array where each part represents the amount in one row.

6. Draw an array using factors 2 and 3. Then show a number bond where each part represents the amount in one row.
Name ________________________________  Date ________________

Draw an array that shows 5 rows of 3 squares. Then show a number bond where each part represents the amount in one row.
<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Divide 14 flowers into 2 equal groups. There are _______ flowers in each group.</td>
<td>2.</td>
<td>Divide 28 books into 4 equal groups. There are _______ books in each group.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3.</td>
<td>Divide 30 apples into ______ equal groups. There are ________ apples in each group.</td>
<td>4.</td>
<td>Divide ______ cups into _______ equal groups. There are _______ cups in each group. 12 ÷ 2 = __________</td>
<td></td>
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<tr>
<td>5.</td>
<td>There are ________ toys in each group. 15 ÷ 3 = __________</td>
<td>6.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Lesson 4: Understand the meaning of the unknown as the size of the group in division.
7. Audrina has 24 colored pencils. She puts them in 4 equal groups. How many colored pencils are in each group?

There are _______ colored pencils in each group.

\[ 24 \div 4 = \_\_\_\_ \]

8. Charlie picks 20 apples. He divides them equally between 5 baskets. Draw the apples in each basket.

There are ___________ apples in each basket.

\[ 20 \div \_\_\_\_ = \_\_\_\_ \]

9. Chelsea collects butterfly stickers. The picture shows how she placed them in her book. Write a division sentence to show how she equally grouped her stickers.

There are ____________ butterflies in each row.

\[ \_\_\_\_ \div \_\_\_\_ = \_\_\_\_ \]
1. There are 16 glue sticks for the class. The teacher divides them into 4 equal groups. Draw the number of glue sticks in each group.

There are ___________ glue sticks in each group.

\[16 \div \underline{\phantom{1}} = \underline{\phantom{1}}\]

2. Draw a picture to show \(15 \div 3\). Then complete the division sentence.

\[15 \div 3 = \underline{\phantom{1}}\]
Lesson 5:
Understand the meaning of the unknown as the number of groups in division.

Name ___________________________ Date ________________

1. Divide 6 tomatoes into groups of 3.

Divide 6 tomatoes into groups of 3.

There are _________ groups of 3 tomatoes.

6 ÷ 3 = 2

2. Divide 8 lollipops into groups of 2.

Divide 8 lollipops into groups of 2.

There are ______ groups.

8 ÷ 2 = _______

3. Divide 10 stars into groups of 5.

Divide 10 stars into groups of 5.

10 ÷ 5 = ______

4. Divide the shells to show 12 ÷ 3 = ________ where the unknown represents the number of groups.

Divide the shells to show 12 ÷ 3 = ______

How many groups are there? ________
5. Rachel has 9 crackers. She puts 3 crackers in each bag. Circle the crackers to show Rachel’s bags.

   ![Crackers](image)

   a. Write a division sentence where the answer represents the number of Rachel’s bags.

   b. Draw a number bond to show Rachel’s crackers.

6. Jameisha has 16 wheels to make toy cars. She uses 4 wheels for 1 car.
   a. Use a count-by to find the number of cars Jameisha can build. Make a drawing to match your counting.

   b. Write a division sentence to represent the problem.
1. Divide 12 triangles into groups of 6.

\[ 12 \div 6 = \_ \_ \_ \_ \]

2. Spencer buys 20 strawberries to make smoothies. Each smoothie needs 5 strawberries. Use a count-by to find the number of smoothies Spencer can make. Make a drawing to match your counting.
1. Rick puts 15 tennis balls into cans. Each can holds 3 balls. Circle groups of 3 to show the balls in each can.

Rick needs _______ cans.  

_____ × 3 = 15

15 ÷ 3 = _______

2. Rick uses 15 tennis balls to make 5 equal groups. Draw to show how many tennis balls are in each group.

There are _______ tennis balls in each group.  

5 × _______ = 15

15 ÷ 5 = _______

3. Use an array to model Problem 1.

a) _______ × 3 = 15

15 ÷ 3 = _______

The number in the blanks represents: ____________________________.

b) 5 × _______ = 15

15 ÷ 5 = _______

The number in the blanks represents: ____________________________.
4. Deena makes 21 jars of tomato sauce on her farm. She puts 7 jars in each box to sell at the supermarket. How many boxes does Deena need?

\[ 21 \div 7 = \_\_\_\_\_\_ \]

\[ \_\_\_\_ \times 7 = 21 \]

What is the meaning of the unknown factor and quotient? ________________________________

5. The teacher gives the problem \[ 4 \times \_\_\_\_ = 12 \]. Charlie finds the answer by writing and solving \[ 12 \div 4 = \_\_\_\_\_\_. \] Explain why Charlie’s method works.

6. The blanks in Problem 5 represent the size of the groups. Draw an array to represent the number sentences.
1. Cesar arranges 12 notecards into rows of 6 for his presentation. Draw an array to represent the problem.

\[ 12 \div 6 = \underline{\hspace{1cm}} \]

\[ \underline{\hspace{1cm}} \times 6 = 12 \]

What do the unknown factor and quotient represent? ____________________________
Lesson 7

Demonstrate the commutativity of multiplication and practice related facts by skip-counting objects in array models.

Date: 5/6/13

**Problem Set**

NYS COMMON CORE MATHEMATICS CURRICULUM

Name __________________________ Date __________________

1. a. Count by 2 six times.
   
   _____, _____, _____, _____, _____, _____

   b. Draw an array that matches your count-by.

   c. Write a multiplication sentence that represents the total number of objects in your array.

   _____ × _____ = ________

2. a. Count by 6 two times.
   
   _____, _____

   b. Draw an array that matches your count-by.

   c. Write a multiplication sentence that represents the total number of objects in your array.

   _____ × _____ = ________

3. a. Compare your work in Problems 1 and 2. Turn your paper as you study the arrays to look at them in different ways.

   b. Why are the factors in your multiplication sentences in a different order?

4. Count by the unit (the number in word form) the number of times indicated. Write the multiplication sentence that matches your count by. The first one is done for you.

   a. 6 twos: 6 × 2 = 12
   
   b. 2 sixes:
   
   c. 7 twos:

   d. 2 sevens:
   
   e. 9 twos:

   f. 2 nines:

   g. 11 twos:
   
   h. 2 twelves:

Bonus Questions:

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5. Write and solve a different multiplication sentence to describe each array.

6. Ms. Nenadal writes $2 \times 7 = 7 \times 2$ on the board. Do you agree or disagree? Draw arrays to help explain your thinking.

7. Find the missing factor to make each number sentence true.

8. Jada gets 2 new packs of erasers. Each pack has 6 erasers in it.
   a. Draw an array to show how many erasers Jada has altogether.
   b. Write and solve a multiplication sentence to describe the array.
   c. Use the commutative property to write and solve a different multiplication sentence for the array.
Do you agree or disagree with the statement in the box? Draw arrays and use skip-counting to explain your thinking.

2 × 5 = 5 × 2
Lesson 8: Demonstrate the commutativity of multiplication and practice related facts by skip-counting objects in array models.

Date: 5/6/13

1. Count by 3 five times.
   ______, _______, _______, _______, ________
   ______, _______, _______, _______, ________

   b. Draw an array that matches your count-by.

2. Count by 5 three times.
   ______, _______, _______, ________
   ______, _______, _______, ________

   b. Draw an array that matches your count-by.

3. Write multiplication expressions below to represent your arrays in Problems 1 and 2. Use the commutative property to make the equation true.
   ______ × _______ = _______ × _______

   Problem 1
   Problem 2

4. Count by the unit (the number in word form) the number of times indicated. Write the multiplication sentence that matches your count by. The first one is done for you.
   a. 2 threes: __2 × 3 = 6__
   b. 3 twos: _________
   c. 3 fours: _________
   d. 4 threes: _________
   e. 3 sevens: _________
   f. 7 threes: _________
   g. 3 nines: _________
   h. 9 threes: _________
   i. 10 threes: _________

5. Find the unknowns that make the number sentences true. Then draw a line to match facts that are related.
   a. 3 + 3 + 3 + 3 + 3 = _________
   b. 3 × 9 = _________
   c. 7 threes + 1 three = _________
   d. 3 × 8 = _________
   e. _________ = 5 × 3
   f. 27 = 9 × _________
6. Isaac picks 3 tangerines from his tree every day for 7 days.
   a. Use circles to draw an array that represents the tangerines Isaac picks.
   
   b. How many tangerines does Isaac pick in 7 days? Write and solve a multiplication sentence.
   
   c. Isaac decides to pick 3 tangerines every day for 3 more days. Draw ‘x’s to show the new tangerines on the array in part A.
   
   d. Write and solve a multiplication sentence to find the total number of tangerines Isaac picks.

   a. How much money does Sarah spend if she buys 3 bottles of soap?

   __________ × __________ = $________

   b. How much money does she spend if she buys 6 bottles of soap?

   __________ × __________ = $______
Name ______________________________________ Date _______________________

1. Mary Beth organizes stickers on a page in her sticker book. She arranges them in 3 rows and 4 columns. Draw an array to show Mary Beth’s stickers.

   a. Use your array to write a multiplication sentence to find Mary Beth’s total number of stickers.

   b. Label your array to show how you skip-count to solve your multiplication sentence.

   c. Use what you know about the commutative property to write a different multiplication sentence for your array.
Lesson 9 Problem Set

Name ________________________________ Date __________________

1. The team organizes soccer balls into 2 rows of 5. The coach adds 3 rows of 5 soccer balls. Complete the number sentences to describe the total array.

   a. \((5 + 5) + (5 + 5 + 5) = \) ___________

   b. 2 fives + _____ fives = ___________ fives

   c. _______ × 5 = ____________

2. \(7 \times 2 = \) ______

   \(5 \times 2 = \) __

   \(2 \times 2 = \) __

3. \(9 \times 2 = \) ______

   \(10 \times 2 = \) __

   \(1 \times 2 = \) __

   \(20 - \) _______ = 18

   \(9 \times 2 = \) __________
   a. Draw an array that represents Matthew’s cards using an x to show each card.
   b. Solve the multiplication sentence to find Matthew’s total number of cards.  $4 \times 3 = \_\_\_\_\$

5. Matthew adds 2 more rows. Use circles to show his new cards on the array in part 4a.
   a. Write and solve a multiplication sentence to represent the circles you added to the array.
      $\_\_\_\_\_ \times 3 = \_\_\_\_\$
   b. Add the totals from the multiplication facts in 4b and 5a to find Matthew’s total cards.
      $\_\_\_\_\_ + \_\_\_\_\_ = 18$
   c. Write the multiplication sentence that shows Matthew’s total number of cards.
      $\_\_\_\_\_ \times \_\_\_\_\_ = 18$
1. Mrs. Stern roasts cloves of garlic. She places 10 rows of two cloves on a baking sheet.

Write a multiplication sentence to describe the number of cloves Mrs. Stern bakes.

\[ \square \times \square = \square \]

2. When the garlic is roasted, Mrs. Stern uses some for a recipe, leaving 2 rows of two garlic cloves on the pan.

a. Complete the number sentence below to show how many garlic cloves she uses.

\[ \square \text{ twos} - \square \text{ twos} = \square \text{ twos} \]

b. \[ 20 - \square = 16 \]

c. Write a multiplication sentence to describe the number of garlic cloves she uses.

\[ \square \times 2 = \square \]
1. \(7 \times 3 = (5 \times 3) + (2 \times 3) = \) ________

\[
\begin{array}{c}
\hline
\text{Block 1: } \left(\begin{array}{c}
\text{Block 2: } \left(\begin{array}{c}
\end{array}\right)
\end{array}\right)
\hline
\end{array}
\]

\( (5 \times 3) = 15 \)

\( (2 \times 3) = \) ________

\( (5 \times 3) + (2 \times 3) = 15 + \) ________

\( 15 + \) ________ = ________

2. \(8 \times 3 = (4 \times 3) + (4 \times 3) = \) ______

\[
\begin{array}{c}
\hline
\text{Block 1: } \left(\begin{array}{c}
\text{Block 2: } \left(\begin{array}{c}
\end{array}\right)
\end{array}\right)
\hline
\end{array}
\]

\( (______ \times 3) = \) ______

\( (______ \times 3) = \) ______

\( (4 \times 3) + (4 \times 3) = \) ________ + ________

\( \) ________ \( \times \) 3 = ________
3. Ruby is making a photo album. She puts 3 pictures in each row.

   a. Use the multiplication sentences on the left. Draw arrays to show the photos on the upper and lower parts of Ruby’s album page.

   b. Ruby calculates the total number of pictures as shown below. Use the array you drew to help explain her calculation.

   \[
   5 \times 3 = 6 + 9 = 15
   \]
Lesson 10 Exit Ticket

1. $6 \times 3 = \underline{\hspace{2cm}}$

   \[ \begin{array}{c}
   \text{\hspace{1cm}} \\
   (4 \times 3) = \underline{\hspace{2cm}} \\
   \hspace{2cm} \\
   (2 \times 3) = \underline{\hspace{2cm}} \end{array} \]

   \( (4 \times 3) + (2 \times 3) = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \)

   \( 6 \times 3 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \)

   \( \underline{\hspace{2cm}} \times 3 = \underline{\hspace{2cm}} \)

2. $7 \times 3 = \underline{\hspace{2cm}}$

   \[ \begin{array}{c}
   \text{\hspace{1cm}} \\
   (\_ \times 3) = \underline{\hspace{2cm}} \\
   \hspace{2cm} \\
   (\_ \times 3) = \underline{\hspace{2cm}} \end{array} \]

   \( (\_ \times 3) + (2 \times 3) = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \)

   \( 7 \times 3 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} \)

   \( \underline{\hspace{2cm}} \times 3 = \underline{\hspace{2cm}} \)
Lesson 11: Model division as the unknown factor in multiplication using arrays and tape diagrams.

Name ______________________________ Date __________________

1. Mrs. Prescott has 12 oranges. She puts 2 oranges in each bag. How many bags does she have?
   
a. Draw an array where each column shows a bag of oranges.

   _______ ÷ 2 = _______

   b. Redraw the oranges in each bag as a unit in the tape diagram. The first unit is done for you. As you draw, label the diagram with known and unknown information from the problem.

   ![Tape Diagram]

2. Mrs. Prescott arranges 18 plums into 6 bags. How many plums are in each bag? Model the problem with both an array and a labeled tape diagram. Show each column as the number of plums in each bag.

   There are _______ plums in each bag.
3. Fourteen shopping baskets are stacked equally in 7 piles. How many baskets are in each pile? Model the problem with both an array and a labeled tape diagram. Show each column as the number of baskets in each pile.

4. In the back of the store, Mr. Prescott packs 24 bell peppers equally into 8 bags. How many bell peppers are in each bag? Model the problem with both an array and a labeled tape diagram. Show each column as the number of bell peppers in each bag.

5. Olga saves $2 a week to buy a toy car. The car costs $16. How many weeks will it take her to save enough to buy the toy?
Ms. McCarty has 18 stickers. She puts 2 stickers on each homework paper. How many homework papers does she have? Model the problem with both an array and a labeled tape diagram.
Lesson 12: Interpret the quotient as the number of groups or the number of objects in each group using units of 2.

Name _____________________________  Date ______________________

1. There are 8 birds at the pet store. 2 birds are in each cage. Circle to show how many cages there are.

   \[ 8 \div 2 = \underline{\underline{\quad}} \]
   
   There are ______ cages of birds.

2. The pet store sells 10 fish. They equally divide the fish into 5 bowls. Draw fish to find the number in each bowl.

   \[ \underline{\underline{\quad}} \times 5 = 10 \]

   There are ______ fish in each bowl.

3. Match.

   Interpret the quotient as the number of groups or the number of objects in each group using units of 2.

   1. \[ 10 \div 2 \]
   2. \[ 16 \div 2 \]
   3. \[ 18 \div 2 \]
   4. \[ 14 \div 2 \]
   5. \[ 12 \div 2 \]
4. Laina buys 14 meters of ribbon. She cuts her ribbon into 2 equal pieces. How many meters long is each piece? Label the tape diagram to represent the problem, including the unknown.

Each piece is _________ meters long.

5. Roy eats 2 cereal bars every morning. Each box has a total of 12 bars. How many days will it take Roy to finish 1 box?

6. Sarah and Esther equally share the cost of a present. The present costs $18. How much does Sarah pay?
Lesson 12 Exit Ticket

Name ______________________________ Date __________________

There are 14 mints in 1 box. Cecilia eats 2 mints each day. How many days does it take Cecilia to eat 1 box of mints? Draw and label a tape diagram to solve.

It takes Cecilia _______ days to eat 1 box of mints.
1. Complete the related expressions.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Quotient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 3 = 3</td>
<td>1 ÷ 3 = 1</td>
</tr>
<tr>
<td>2 x 3 = 6</td>
<td>2 ÷ 3 = 2</td>
</tr>
<tr>
<td>3 x 3 = 9</td>
<td>3 ÷ 3 = 3</td>
</tr>
<tr>
<td>4 x 3 = ___</td>
<td>4 ÷ 3 = 4</td>
</tr>
<tr>
<td>5 x 3 = ___</td>
<td>5 ÷ 3 = 5</td>
</tr>
<tr>
<td>6 x 3 = ___</td>
<td>6 ÷ 3 = 2</td>
</tr>
<tr>
<td>7 x 3 = ___</td>
<td>7 ÷ 3 = 2</td>
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<tr>
<td>8 x 3 = ___</td>
<td>8 ÷ 3 = 2</td>
</tr>
<tr>
<td>9 x 3 = ___</td>
<td>9 ÷ 3 = 3</td>
</tr>
<tr>
<td>10 x 3 = ___</td>
<td>10 ÷ 3 = 3</td>
</tr>
</tbody>
</table>

2. Mr. Lawton picks tomatoes from his garden. He divides the tomatoes into bags of 3.

a. Circle to show how many bags he packs. Then skip-count to show the total number of tomatoes.

b. Draw and label a tape diagram to represent the problem.

   __________ ÷ 3 = __________

   Mr. Lawton packs ______ bags of tomatoes.
3. Camille buys a sheet of stamps that measures 15 centimeters long. Each stamp is 3 centimeters long. How many stamps does Camille buy? Draw and label a tape diagram to solve.

Camille buys ________ stamps.

4. Thirty third-graders go on a field trip. They are equally divided into 3 vans. How many students are in each van?

5. Some friends spend $24 altogether on frozen yogurt. Each person pays $3. How many people buy frozen yogurt?
Name ______________________________ Date __________________

1. Andrea has 21 apple slices. She uses 3 apple slices to decorate 1 pie. How many pies does Andrea make? Draw and label a tape diagram to solve.

2. There are 24 soccer players on the field. They form 3 equal teams. How many players are on each team?
1. Skip-count by fours. Match the answers to the appropriate multiplication problem.

4 8
2. Mr. Schmidt replaces each of the 4 wheels on 7 cars. How many wheels does he replace? Draw and label a tape diagram to solve.

Mr. Schmidt replaces ___________wheels altogether.

3. Trina makes 4 bracelets. Each bracelet has 6 beads. Draw and label a tape diagram to show the total number of beads Trina uses.

4. Find the total number of sides on 5 rectangles.
Arthur has 4 boxes of chocolates. Each box has 6 chocolates inside. How many chocolates does Arthur have altogether? Draw and label a tape diagram to solve.
1. Label the tape diagrams and complete the equations. Then draw an array to represent the problems.

   a. $2 \times 4 = \underline{\hspace{2cm}}$

   b. $\underline{\hspace{2cm}} \times 4 = \underline{\hspace{2cm}}$

   c. $\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = 28$

   $\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = 28$
2. Draw and label 2 tape diagrams to model how the statement in the box is true. \[ 4 \times 6 = 6 \times 4 \]

3. Grace picks 4 flowers from her garden. Each flower has 8 petals. Draw and label a tape diagram to show how many petals there are in total.

4. Michael counts 8 chairs in his dining room. Each chair has 4 legs. How many chair legs are there altogether?
Lesson 15 Exit Ticket

Name ____________________________  Date ______________________

Draw and label 2 tape diagrams to show that $4 \times 3 = 3 \times 4$. Use your diagrams to explain how you know.
Lesson 16: Use the distributive property as a strategy find related multiplication facts.

Name ___________________________  Date _________________________

1. Label the array. Then fill in the blanks below to make the statements true.

   a. \(6 \times 4 = \) 
      \[
      \begin{array}{c}
      \includegraphics[width=0.3\textwidth]{array1.png}
      \end{array}
      \]
      \((5 \times 4) = \) 20
      \((1 \times 4) = \)
      \[
      \frac{(6 \times 4)}{= (5 \times 4) + (1 \times 4)}
      \]
      \[
      \frac{= 20 + }{= }\]

   b. \(7 \times 4 = \) 
      \[
      \begin{array}{c}
      \includegraphics[width=0.3\textwidth]{array2.png}
      \end{array}
      \]
      \((5 \times 4) = \)
      \((2 \times 4) = \)
      \[
      \frac{(7 \times 4)}{= (5 \times 4) + (2 \times 4)}
      \]
      \[
      \frac{= + }{= _{28}}\]

   c. \(8 \times 4 = \) 
      \[
      \begin{array}{c}
      \includegraphics[width=0.3\textwidth]{array3.png}
      \end{array}
      \]
      \((5 \times 4) = \)
      \((\_ \times 4) = \)
      \[
      \frac{(8 \times 4)}{= (5 \times 4) + (\_ \times 4)}
      \]
      \[
      \frac{= + }{= }\]

   d. \(9 \times 4 = \) 
      \[
      \begin{array}{c}
      \includegraphics[width=0.3\textwidth]{array4.png}
      \end{array}
      \]
      \((5 \times 4) = \)
      \((\_ \times 4) = \)
      \[
      \frac{(9 \times 4)}{= (5 \times 4) + (\_ \times 4)}
      \]
      \[
      \frac{= + }{= }\]
2. Match the equal expressions.

\[
(5 \times 4) + (3 \times 4) = (5 \times 4) + (4 \times 4) = (5 \times 4) + (1 \times 4)
\]

3. Nolan draws the array below to find the answer to the multiplication fact \(4 \times 10\). He says, "\(4 \times 10\) is just double \(4 \times 5\)!” Explain Nolan’s strategy.

\[
\begin{align*}
9 \times 4 &= 36 \\
8 \times 4 &= 32 \\
6 \times 4 &= 24 \\
7 \times 4 &= 28
\end{align*}
\]
Destiny says, “I can use $5 \times 4$ to find the answer to $7 \times 4$.” Use the array below to explain Destiny’s strategy using words and numbers.

$$7 \times 4 = (5 \times 4) + (2 \times 4)$$

$$= _____ + _____$$

$$= _____$$
1. Use the array to complete the related number sentences.

   \(1 \times 4 = \quad 4 \quad \text{ and } \quad 4 \div 4 = 1\)

   \(2 \times 4 = \quad \quad \quad \text{ and } \quad \quad \quad \div 4 = 2\)

   \(\quad \times 4 = 12 \quad \text{ and } \quad 12 \div 4 = \quad \quad \quad \)

   \(\quad \times 4 = 16 \quad \text{ and } \quad 16 \div 4 = \quad \quad \quad \)

   \(\quad \times \quad = 20 \quad \text{ and } \quad 20 \div \quad = \quad \quad \quad \)

   \(\quad \times \quad = 24 \quad \text{ and } \quad 24 \div \quad = \quad \quad \quad \)

   \(\quad \times 4 = \quad \quad \quad \text{ and } \quad \quad \quad \div 4 = \quad \quad \quad \)

   \(\quad \times 4 = \quad \quad \quad \text{ and } \quad \quad \quad \div 4 = \quad \quad \quad \)

   \(\quad \times \quad = \quad \quad \quad \text{ and } \quad \quad \quad \div \quad = \quad \quad \quad \)

   \(\quad \times \quad = \quad \quad \quad \text{ and } \quad \quad \quad \div \quad = \quad \quad \quad \)
2. The baker packs 36 bran muffins in boxes of 4. Draw and label a tape diagram to find the number of boxes he packs.

3. The waitress arranges 32 glasses into 4 equal rows. How many glasses are in each row?

4. Janet paid $28 for 4 notebooks. Each notebook costs the same amount. What is the cost of 2 notebooks?
1. Mr. Thomas organizes 16 binders into stacks of 4. How many stacks does he make? Draw and label a number bond to solve.

2. The chef uses 28 avocados to make 4 batches of guacamole. How many avocados are in 2 batches of guacamole? Draw and label a tape diagram to solve.
Lesson 18: Apply the distributive property to decompose units.

Date: 5/6/13

Name _________________________________

1. \(8 \times 10 = \) __________

   \[5 \text{ tens} \quad \quad 8 \text{ tens}\]

   \[5 \text{ tens} + \boxed{3 \text{ tens}} = 8 \text{ tens}\]

   \[(5 \times 10) + (\boxed{3} \times 10) = \]

   \[50 + \boxed{30} = \boxed{80}\]

   \[8 \times 10 = \boxed{80}\]

2. \(7 \times 4 = \) __________

   \[5 \text{ fours} \quad \quad 7 \text{ fours}\]

   \[5 \text{ fours} + \boxed{2 \text{ fours}} = 7 \text{ fours}\]

   \[(5 \times 4) + (\boxed{2} \times 4) = \]

   \[20 + \boxed{8} = \boxed{28}\]

   \[7 \times 4 = \boxed{28}\]

3. \(9 \times 10 = \) __________

   \[5 \times 10 \quad \quad 9 \times 10\]

   \[5 \text{ tens} + \boxed{4 \text{ tens}} = 9 \text{ tens}\]

   \[(5 \times 10) + (\boxed{4} \times 10) = \]

   \[50 + \boxed{40} = \boxed{90}\]

   \[9 \times 10 = \boxed{90}\]

4. \(10 \times 10 = \) __________

   \[10 \times 10 \quad \quad 10 \times 10\]

   \[\boxed{5 \text{ tens}} + \boxed{5 \text{ tens}} = 10 \text{ tens}\]

   \[(\boxed{5} \times 10) + (\boxed{5} \times 10) = \]

   \[\boxed{50} + \boxed{50} = \boxed{100}\]

   \[10 \times 10 = \boxed{100}\]
5. There are 7 teams in the soccer tournament. 10 children play on each team. How many children are playing in the tournament?

There are _________ children playing in the tournament.

6. What is the total number of sides on 8 triangles?

7. There are 12 rows of bottled drinks in the vending machine. Each row has 10 bottles. How many bottles are in the vending machine?
Dylan used the distributive property to solve a multiplication problem. Look at his work below, write the multiplication problem Dylan solved and complete the number bond.

Dylan's work:

\[(5 \times 4) + (1 \times 4) = \]

\[20 + 4 = 24\]

\[\square \times \square = \square\]
1. Label the array. Then fill in the blanks below to make statements that are true.

a. $36 ÷ 3 = _____$

\[
\begin{array}{c}
\begin{array}{c}
\includegraphics[height=1cm]{array1.png} \\
(30 ÷ 3) = _____ \\
\hline
(6 ÷ 3) = _____
\end{array}
\end{array}
\]

\[
(36 ÷ 3) = (30 ÷ 3) + (6 ÷ 3)
\]

\[
= 10 + _____
\]

\[
= 12
\]

b. $25 ÷ 5 = _____$

\[
\begin{array}{c}
\begin{array}{c}
\includegraphics[height=1cm]{array2.png} \\
(20 ÷ 5) = _____ \\
\hline
(5 ÷ 5) = _____
\end{array}
\end{array}
\]

\[
(25 ÷ 5) = (20 ÷ 5) + (5 ÷ 5)
\]

\[
= 4 + _____
\]

\[
= _____
\]

c. $28 ÷ 4 = _____$

\[
\begin{array}{c}
\begin{array}{c}
\includegraphics[height=1cm]{array3.png} \\
(20 ÷ 4) = _____ \\
\hline
(_____ ÷ 4) = _____
\end{array}
\end{array}
\]

\[
(28 ÷ 4) = (20 ÷ 4) + (_____ ÷ 4)
\]

\[
= _____ + _____
\]

\[
= _____
\]

d. $32 ÷ 4 = _____$

\[
\begin{array}{c}
\begin{array}{c}
\includegraphics[height=1cm]{array4.png} \\
(_____ ÷ 4) = _____ \\
\hline
(_____ ÷ 4) = _____
\end{array}
\end{array}
\]

\[
(32 ÷ 4) = (_____ ÷ 4) + (_____ ÷ 4)
\]

\[
= _____ + _____
\]

\[
= _____
\]
2. Match the equal expressions.

3. Nell draws the array below to find the answer to the division fact \(24 \div 2\). Explain Nell’s strategy.
Lesson 19 Exit Ticket

NYS COMMON CORE MATHEMATICS CURRICULUM

Complete the equations below to solve $22 \div 2 = \underline{\phantom{0}}$.

$$ (20 \div 2) = \underline{\phantom{0}} $$

$$ (\underline{\phantom{0}} \div 2) = \underline{\phantom{0}} $$

$$ (22 \div 2) = (20 \div 2) + (\underline{\phantom{0}} \div 2) $$

$$ = \underline{\phantom{0}} + \underline{\phantom{0}} $$

$$ = \underline{\phantom{0}} $$
Lesson 20 Problem Set


   a. What is the total cost of the books?
   b. How much does Ted spend altogether?

2. Seven children share 28 silly bands equally.

   a. How many silly bands does each child get?
   b. How many silly bands do 3 children get?
3. Eighteen cups are equally packed into 6 boxes. Two boxes of cups break. How many cups are unbroken?

4. There are 25 blue balloons and 15 red balloons at a party. Five children are given an equal number of each color balloon. How many blue and red balloons does each child get?

5. Twenty-seven pears are packed in bags of 3. Five bags of pears are sold. How many bags of pears are left?
Name ____________________________  Date __________________

1. Thirty-two jellybeans are shared by 8 students.

   a. How many jellybeans will each student get?

   b. How many jellybeans will 4 students get?

2. The teacher has 30 apple slices and 20 pear slices. Five children equally share all of the fruit slices. How many fruit slices does each child get?
1. Jason earns $6 per week for doing all his chores. On the fifth week he forgets to take out the trash so he only earns $4. Write and solve an equation to show how much Jason earns in 5 weeks.

Jason earns___________.

2. Miss Lianto orders 4 packs of 7 markers. After passing out 1 marker to each student in her class, she has 6 left. Label the tape diagram to find how many students are in Miss Lianto’s class.

There are _______ students in Miss Lianto’s class.
3. Orlando buys a box of 18 fruit snacks. Each box comes with an equal amount of strawberry, cherry, and grape flavored snacks. He eats all of the grape flavored snacks first. Draw and label a tape diagram to find how many fruit snacks he has left.

4. Eudora buys 21 m of ribbon. She cuts the ribbon so that each piece measures 3 m in length.
   
a. How many pieces of ribbon does she cut?

b. If Eudora needs a total of 12 pieces of ribbon, how many more pieces of ribbon does she need?
Ms. Egeregor buys 27 books for her classroom library. She buys an equal amount of fiction, nonfiction, and poetry books. She shelves all of the poetry books first. Draw and label a tape diagram to show how many books Ms. Egeregor has left to shelve.