Math in Focus
The Singapore Approach

Extra Practice

Author
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Lesson 1.1  Numbers to 10,000,000

Fill in the table headings. Write *Tens, Hundreds, Ten Thousands, or Hundred Thousands*. Then write the number in word form and in standard form.

1. | Thousands | Ones  |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   a. The number in word form is __________________________

   __________________________

   b. The number in standard form is __________________________

Write each number in standard form.

2. Twenty-eight thousand, one hundred ninety-nine
3. Ninety thousand, thirty-eight
4. Four hundred twelve thousand, six hundred three
5. Eight hundred thousand, five
6. Five hundred seven thousand, seven hundred
7. Six hundred thousand, six hundred
Write each number in word form.

8. 50,680

9. 255,430

10. 199,303

11. 872,900

12. 305,072

Use all the digits given to form 6-digit whole numbers. Do not start with the digit 0.

8 6 0 3 7 4

13. The least possible number: _________

14. The greatest possible number: _________

15. The least odd number: _________

16. The greatest odd number: _________

17. A number less than four hundred thousand: _________
Fill in the table headings. Write *Tens, Hundreds, Ten Thousands, Hundred Thousands, or Millions*. Then write the number in word form and in standard form.

18.

<table>
<thead>
<tr>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 4 4 4 6</td>
<td>3 7 5</td>
</tr>
</tbody>
</table>

a. The number in word form is

b. The number in standard form is

Write each number in standard form.

19. Nine million, two hundred seventy thousand, fifty
20. Six million, eighty-four thousand, one hundred one
21. Seven million, six thousand, eight hundred ninety-nine
22. Four million, five hundred two thousand, fifteen
23. Five million, fifty thousand, six hundred two
24. Eight million, four hundred thousand, eighty-five
25. Three million, seven hundred three
Write each number in word form.

26. 8,808,429

27. 3,002,566

28. 5,970,103

29. 2,050,060

30. 4,700,900

Use all the digits given to form 7-digit whole numbers. Do not start with the digit 0.

5 9 0 2 6 1 3

31. The least even number: __________

32. A number with 9 in the thousands place and 5 in the hundreds place: __________

33. A number greater than 2,000,000 but less than 5,000,000: __________

34. An even number greater than 6,000,000: __________
Lesson 1.2  Place Value

Write the value of each digit in the correct box.

1.

\[
\begin{array}{ccccccc}
9 & 2 & 5 & 0 & 3 & 8 \\
\text{ } & \text{ } & \text{ } & \text{ } & \text{ } & \text{ }
\end{array}
\]

Complete.

In 290,357:

2. the digit 9 is in the _______________ place.

3. the value of the digit 9 is _______________.

4. the digit 9 stands for _______________.

Write the place value of the digit 6 in each number.

<table>
<thead>
<tr>
<th>Number</th>
<th>Place Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. 263,148</td>
<td></td>
</tr>
<tr>
<td>6. 312,685</td>
<td></td>
</tr>
<tr>
<td>7. 609,453</td>
<td></td>
</tr>
</tbody>
</table>
Write the value of the digit 5 in each number.

<table>
<thead>
<tr>
<th>Number</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td>145,032</td>
</tr>
<tr>
<td>9.</td>
<td>870,526</td>
</tr>
<tr>
<td>10.</td>
<td>502,461</td>
</tr>
</tbody>
</table>

Fill in the blanks.

11. In 980,541, the digit ______________ is in the ten thousands place.

12. In 439,602, the digit 3 is in the ______________ place.

13. In 750,482, the digit 7 is in the ______________ place.

14. In 862,059, the digit 6 stands for ______________.

   It is in the ______________ place.

15. In 423,086, the digit ______________ is in the hundreds place.

   Its value is ______________.

Fill in the blanks.

16. \(314,562 = 300,000 + \underline{\underline{14}} + 4,000 + 500 + 60 + 2\)

17. \(790,258 = \underline{790} + 90,000 + 200 + 50 + 8\)

18. \(804,576 = 800,000 + \underline{\underline{4576}} + 500 + 70 + 6\)

19. \(200,000 + 4,000 + 800 + 90 + 1 = \underline{200,991}\)

20. \(500,000 + 70,000 + 30 = \underline{570,030}\)

21. \(300,000 + 6,000 + 10 = \underline{306,010}\)
Write the value of each digit in the correct box.

22. 

Fill in the blanks.

23. In 8,963,750, the digit _________ is in the ten thousands place.
   Its value is _________.

24. In 4,102,635, the digit 4 is in the ____________ place.

Fill in the blanks.

25. \(5,903,780 = 5,000,000 + 900,000 + 3,000 + \underline{\quad} \)

26. \(4,728,750 = 4,000,000 + \underline{\quad} + 700 + 50 \)

27. \(6,000,000 + 80,000 + 5,000 + 300 + 23 = \underline{\quad} \)

28. \(2,000,000 + 700,000 + 500 + 8 = \underline{\quad} \)
Read the clues to find each number.

29. It is a 7-digit number.
   It has a digit 0.
   The greatest digit is in the hundred thousands place.
   The value of the digit 1 is $1,000,000$.
   The digit 6 stands for $6,000$.
   The value of the digit 5 is 5 ones.
   The digit 8 has a value greater than 700 but less than 1,000.
   The value of the digit 7 is 7 ten thousands.

   The number is ____________.

30. It is a 6-digit number.
   The least digit is in the thousands place.
   The greatest digit is in the ones place.
   The digit in the tens place is 5 less than the digit in the ones place.
   The digit in the hundred thousands place is greater than the digit in the tens place but is less than 6.
   The digit in the ten thousands place is twice the digit in the tens place.
   The digit 2 stands for 200.

   The number is ____________.
Lesson 1.3  Comparing Numbers to 10,000,000

Circle the greater number.

1.  95,867  or  123,087
2.  625,689  or  625,897
3.  4,306,582  or  4,314,356

Circle the least number.

4.  32,409  320,409  32,049
5.  788,420  798,630  786,980  785,900  799,380

Arrange the numbers in order from least to greatest.

7.  283,500  2,583,000  2,385,000  197,500  1,795,000

8.  8,764,500  8,476,900  8,746,800  895,390  8,593,800

Arrange the numbers in order from greatest to least.

9.  5,296,000  594,287  2,890,670  980,576  5,298,053

10. 3,003,500  303,500  390,300  2,900,800  3,900,100
What is the next number in each pattern? Fill in the blanks.

11. 476,270 477,270 478,270 ...
   a. 477,270 is ____________ more than 476,270.
   b. 478,270 is ____________ more than 477,270.
   c. ____________ more than 478,270 is ____________
   d. The next number in the pattern is ____________.

12. 4,500,000 4,480,000 4,460,000 ...
   a. 4,480,000 is ____________ less than 4,500,000.
   b. 4,460,000 is ____________ less than 4,480,000.
   c. ____________ less than 4,460,000 is ____________
   d. The next number in the pattern is ____________.

Find the rule. Then complete each number pattern.

13. 405,600 605,600 805,600 _______ _______
   Rule: ________________________________

14. 980,800 965,800 950,800 _______ _______
   Rule: ________________________________

15. 5,241,200 5,291,200 5,341,200 _______ _______
   Rule: ________________________________

16. 1,458,900 1,358,800 1,258,700 _______ _______
   Rule: ________________________________
Lesson 1.4  Rounding and Estimating

Round to the nearest thousand.

1. 3,687 ________ 2. 28,480 ________
3. 725,390 ________ 4. 299,710 ________

Round each number to the nearest thousand. Then estimate the sum or difference.

5. 9,867 + 4,655 6. 9,978 − 2,361

Estimate the sum or difference by using front-end estimation with adjustment.

7. 5,974 + 6,459 8. 3,999 − 2,499
Round each 4-digit number to the nearest thousand. Then estimate each product.

9. 7,390 × 8
10. 8,589 × 9

Estimate the quotient. Give your answer to the nearest hundred.

11. 3,725 ÷ 4
12. 3,898 ÷ 8

13. 6,199 ÷ 7
14. 5,562 ÷ 9
Solve.

15. On Saturday, 2,832 tourists visited the zoo. On Friday, 1,475 tourists visited the zoo. Estimate the number of tourists who visited the zoo on the two days by first rounding the numbers to the nearest thousand.

16. A fireworks festival attracted a total of 4,342 visitors from Saturday to Friday. The number of visitors who went to the festival was about the same every day. Estimate the number of visitors who went to the festival on Monday.
Solve.

The selling price of a digital camera was $1,499. Kumar sold 4 such cameras.

17. Estimate his total sales by first rounding the price of each camera to the nearest thousand dollars.

18. Estimate his total sales by first rounding the price of each camera to the nearest hundred dollars.

19. Find Kumar's actual total sales. Is your answer to Exercise 17 or 18 a better estimate?
Put on Your Thinking Cap!

Complete each pattern.

1. 150,000 155,000 160,000 180,000 _______ 225,000
2. 78,000 39,000 19,500 _______ 4,875
3. 15,000 30,000 90,000 360,000 _______ 10,800,000
4. 32,000 8,000 4,000 _______ 500 125
5. 12,000 36,000 18,000 54,000 _______ 81,000

Solve.

6. Karen opens a book and notes the page numbers of the facing pages. The product of the two numbers is 600. What are the page numbers of the facing pages?
You are a Number Investigator. You have two cases for investigation. Find the numbers using the clues.

7. **Case 1**

   It is a 7-digit even number. There is no repetition of digits. 
   The digit 5 is in the thousands place. 
   The greatest digit is in the millions place. 
   The digit in the hundred thousands place is twice the digit in the hundreds place. 
   The digit in the hundreds place is twice the digit in the ones place. 
   The digit in the tens place is 2 less than the digit in the millions place. 
   The value of the digit in the ten thousands place is zero.

   The number is __________.

8. **Case 2**

   It is a 6-digit number. There is no repetition of digits. 
   It is divisible by 5 and is more than 300,000. 
   The digit in the hundreds place is 3 more than the digit in the ones place. 
   The digit in the ten thousands place is 3 times the digit in the hundred thousands place. 
   The digit in the thousands place is half the value of the digit in the hundreds place. 
   The difference between the digits in the tens place and in the thousands place is 2.

   The number is __________.
CHAPTER 2 Whole Number Multiplication and Division

Lesson 2.1 Using a Calculator
Use your calculator in this lesson.

Add.

1. 3,857 + 2,684 =
2. 5,729 + 2,865 =
3. 1,898 + 4,573 =
4. 2,948 + 4,676 =

Subtract.

5. 4,216 - 1,678 =
6. 5,042 - 1,857 =
7. 26,111 - 12,935 =
8. 108,123 - 15,987 =

Multiply.

9. 268 × 94 =
10. 479 × 58 =
11. 1,579 × 48 =
12. 36,450 × 28 =

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Divide.

13. \( 6,356 \div 7 = \) 

14. \( 6,344 \div 8 = \) 

15. \( 2,632 \div 47 = \) 

16. \( 5,796 \div 69 = \) 

17. \( 15,696 \div 36 = \) 

18. \( 322,077 \div 98 = \) 

Use your calculator to solve this question.

19. **Step 1** Write any whole number between 100 and 999.  
**Step 2** Multiply the number by 11.  
**Step 3** Then multiply the product by 91.

Repeat the three steps by choosing another number in Step 1. What do you notice about the answers?
Lesson 2.2  Multiplying by Tens, Hundreds or Thousands

Multiply.

1. 38 × 10 = ____
2. 746 × 10 = ____
3. 624 × 10 = ____
4. 857 × 10 = ____
5. 758 × 10 = ____
6. 680 × 10 = ____

Find the missing factors.

7. 681 × ____ = 6,810
8. ____ × 10 = 1,900
9. 453 × ____ = 4,530
10. 1,905 × ____ = 19,050
11. ____ × 10 = 64,000
12. ____ × 10 = 808,000

Fill in the blanks.

13. 56 × 80 = (56 × ____ ) × 10

= ____ × 10

= ____

14. 756 × 40 = (756 × ____ ) × 10

= ____ × 10

= ____

15. 680 × 50 = (680 × ____ ) × 10

= ____ × 10

= ____
16. \(857 \times 60 = (\quad \times \quad) \times 10\)
   
   \[= \quad \times 10\]
   
   \[= \quad\]

Multiply.

17. \(38 \times 40\)  
18. \(572 \times 80\)

19. \(490 \times 30\)  
20. \(375 \times 70\)

Multiply.

21. \(47 \times 100 = \quad\)  
22. \(325 \times 100 = \quad\)

23. \(168 \times 100 = \quad\)  
24. \(231 \times 1,000 = \quad\)

25. \(192 \times 1,000 = \quad\)  
26. \(759 \times 1,000 = \quad\)
Fill in the blanks.

27. \(386 \times ______ = 38,600\)

28. \(_______ \times 100 = 712,000\)

29. \(623 \times ______ = 623,000\)

30. \(816 \times ______ = 81,600\)

31. \(_______ \times 1,000 = 7,910,000\)

32. \(_______ \times 1,000 = 5,200,000\)

Fill in the blanks.

33. \(24 \times 600 = (24 \times ______) \times 100\)
   \[= _______ \times 100\]
   \[= _______\]

34. \(108 \times 400 = (108 \times ______) \times 100\)
   \[= _______ \times 100\]
   \[= _______\]

35. \(160 \times 500 = (160 \times ______) \times 100\)
   \[= _______ \times 100\]
   \[= _______\]

36. \(37 \times 3,000 = (37 \times ______) \times 1,000\)
   \[= _______ \times 1,000\]
   \[= _______\]
37. \[103 \times 8,000 = (103 \times \underline{\text{__________}}) \times 1,000\]
   \[= \underline{\text{__________}} \times 1,000\]
   \[= \underline{\text{__________}}\]

38. \[325 \times 4,000 = (325 \times \underline{\text{__________}}) \times 1,000\]
   \[= \underline{\text{__________}} \times 1,000\]
   \[= \underline{\text{__________}}\]

Multiply.

39. \[209 \times 700\]
40. \[146 \times 9,000\]

Round the 2-digit numbers to the nearest ten, the 3-digit numbers to the nearest hundred, and the 4-digit numbers to the nearest thousand. Then estimate the product.

41. \[458 \times 87 \text{ rounds to } \underline{\text{__________}} \times \underline{\text{__________}} = \underline{\text{__________}}\]
42. \[54 \times 349 \text{ rounds to } \underline{\text{__________}} \times \underline{\text{__________}} = \underline{\text{__________}}\]
43. \[3,629 \times 512 \text{ rounds to } \underline{\text{__________}} \times \underline{\text{__________}} = \underline{\text{__________}}\]
44. \[2,433 \times 651 \text{ rounds to } \underline{\text{__________}} \times \underline{\text{__________}} = \underline{\text{__________}}\]
Lesson 2.3  Multiplying by 2-digit Numbers

Multiply. Estimate to check if your answers are reasonable.

1.  $46 \times 80$  
2.  $53 \times 90$

3.  $49 \times 46$  
4.  $58 \times 52$

5.  $37 \times 63$  
6.  $65 \times 47$

7.  $86 \times 43$  
8.  $96 \times 84$
Multiply. Estimate to check if your answers are reasonable.

9. \( 763 \times 40 \)

10. \( 370 \times 60 \)

11. \( 495 \times 27 \)

12. \( 856 \times 56 \)

13. \( 1,268 \times 39 \)

14. \( 1,046 \times 93 \)

15. \( 1,203 \times 78 \)

16. \( 3,108 \times 24 \)
Lesson 2.4  Dividing by Tens, Hundreds, or Thousands

Divide.

1.  $7,200 \div 10 = \underline{\hspace{1cm}}$
2.  $2,800 \div 10 = \underline{\hspace{1cm}}$
3.  $23,000 \div 10 = \underline{\hspace{1cm}}$
4.  $680,000 \div 10 = \underline{\hspace{1cm}}$

Fill in the blanks.

5.  $2,320 \div 10 = \underline{\hspace{1cm}}$
6.  $\underline{\hspace{1cm}} \div 10 = 160$
7.  $24,000 \div \underline{\hspace{1cm}} = 2,400$
8.  $84,000 \div \underline{\hspace{1cm}} = 8,400$
9.  $\underline{\hspace{1cm}} \div 10 = 398$
10.  $\underline{\hspace{1cm}} \div 10 = 5,500$

Fill in the blanks.

11.  $9,300 \div 30 = (9,300 \div \underline{\hspace{1cm}}) \div 3$
    $= \underline{\hspace{1cm}} \div 3$
    $= \underline{\hspace{1cm}}$

12.  $9,500 \div 50 = (9,500 \div 10) \div \underline{\hspace{1cm}}$
    $= \underline{\hspace{1cm}} \div \underline{\hspace{1cm}}$
    $= \underline{\hspace{1cm}}$
13. \[ 126,000 \div 60 = (126,000 \div 10) \div \underline{\quad} \]
   \[ = \underline{\quad} \div \underline{\quad} \]
   \[ = \underline{\quad} \]

Divide.

14. \[ 60,000 \div 40 \]
15. \[ 372,000 \div 60 \]

16. \[ 486,000 \div 90 \]
17. \[ 267,400 \div 70 \]

Divide.

18. \[ 4,800 \div 100 = \underline{\quad} \]
19. \[ 35,700 \div 100 = \underline{\quad} \]
20. \[ 79,000 \div 1,000 = \underline{\quad} \]
21. \[ 350,000 \div 1,000 = \underline{\quad} \]

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Fill in the blanks.

22. $19,200 \div 100 = \underline{\hspace{2cm}}$

23. $\underline{\hspace{2cm}} \div 100 = 2,750$

24. $77,000 \div \underline{\hspace{2cm}} = 770$

25. $930,000 \div \underline{\hspace{2cm}} = 930$

26. $\underline{\hspace{2cm}} \div 1,000 = 514$

27. $\underline{\hspace{2cm}} \div 100 = 6,800$

Fill in the blanks.

28. $13,500 \div 300 = (13,500 \div \underline{\hspace{2cm}}) \div 3$

   $= \underline{\hspace{2cm}} \div 3$

   $= \underline{\hspace{2cm}}$

29. $85,000 \div 500 = (85,000 \div 100) \div \underline{\hspace{2cm}}$

   $= \underline{\hspace{2cm}} \div \underline{\hspace{2cm}}$

   $= \underline{\hspace{2cm}}$

30. $840,000 \div 400 = (840,000 \div \underline{\hspace{2cm}}) \div 4$

   $= \underline{\hspace{2cm}} \div 4$

   $= \underline{\hspace{2cm}}$

31. $924,000 \div 6,000 = (924,000 \div \underline{\hspace{2cm}}) \div 6$

   $= \underline{\hspace{2cm}} \div 6$

   $= \underline{\hspace{2cm}}$
Name: _______________________________  Date: __________________

32. \( 981,000 \div 9,000 = (981,000 \div 1,000) \div _________ \)
    \[ = \frac{981}{1} \div \frac{9}{1} = \frac{981}{9} \]

33. \( 756,000 \div 7,000 = (756,000 \div ________) \div 7 \)
    \[ = \frac{756}{1} \div 7 = \frac{756}{7} \]

34. \( 12,400 \div 400 \)

35. \( 456,000 \div 3,000 \)

Estimate each quotient.

36. \( 775 \div 42 \) rounds to \( \frac{775}{40} \) \( \div \frac{42}{40} = \frac{775}{42} \)

37. \( 6,599 \div 497 \) rounds to \( \frac{6,600}{500} \) \( \div \frac{500}{500} = \frac{6,600}{500} \)

38. \( 8,977 \div 298 \) rounds to \( \frac{9,000}{300} \) \( \div \frac{298}{300} = \frac{9,000}{298} \)

39. \( 4,090 \div 15 \) rounds to \( \frac{4,090}{15} \) \( \div \frac{15}{15} = \frac{4,090}{15} \)
Lesson 2.5  Dividing by 2-digit Numbers

Divide.

1. $80 \div 20$
2. $100 \div 18$
3. $130 \div 43$
4. $620 \div 52$
5. $198 \div 23$
6. $240 \div 34$
7. $624 \div 29$
8. $831 \div 45$
Estimate the quotient. Then divide.

9. \(3,160 \div 40\)  
10. \(3,250 \div 50\)  

11. \(2,566 \div 24\)  
12. \(3,129 \div 38\)  

13. \(4,163 \div 42\)  
14. \(1,986 \div 51\)  

15. \(1,300 \div 49\)  
16. \(1,170 \div 61\)
Lesson 2.6  Order of Operations

Find the value of each expression. Record each step.

1. \[60 - 20 + 70 = \]
   Step 1
   Step 2

2. \[200 \div 5 \times 7 = \]
   Step 1
   Step 2

3. \[100 - 135 \div 3 + 27 = \]
   Step 1
   Step 2
   Step 3

4. \[80 + 108 \div 9 \times 10 = \]
   Step 1
   Step 2
   Step 3

5. \[42 \times 10 - 72 \div 8 = \]
   Step 1
   Step 2
   Step 3
Find the value of each expression. Record each step.

6. \[ 90 \times (38 - 18) \div 100 = \]
   
   Step 1
   
   Step 2
   
   Step 3

7. \[ (100 - 80 \div 2) - 15 \times 4 = \]
   
   Step 1
   
   Step 2
   
   Step 3
   
   Step 4

Find the value of each expression. State the order of operations.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. [ 34 \times 3 \div 6 = ]</td>
<td>[ \times \div ]</td>
</tr>
<tr>
<td>9. [ 184 + 27 \times 3 = ]</td>
<td></td>
</tr>
<tr>
<td>10. [ 100 \div 68 + 37 \times 4 = ]</td>
<td></td>
</tr>
<tr>
<td>11. [ 19 \times 4 + 84 \div 6 = ]</td>
<td></td>
</tr>
<tr>
<td>12. [ 7 + 47 \times 8 \div 4 - 28 = ]</td>
<td></td>
</tr>
<tr>
<td>13. [ 30 - (45 - 17) = ]</td>
<td></td>
</tr>
<tr>
<td>14. [ 7 \times (14 + 26) \div 8 = ]</td>
<td></td>
</tr>
<tr>
<td>15. [ (73 + 27) - 136 \div 4 = ]</td>
<td></td>
</tr>
</tbody>
</table>
Lesson 2.7  Real-World Problems: Multiplication and Division (Part 1)

Solve. Show your work.

1. A fruit seller buys 1,456 apples and packs them equally into boxes of 56 each. He sells each box for $18. How much money does he collect if he sells all the apples?

2. Mrs. Brandon had 230 soft toys. She kept 50 soft toys and distributed the rest equally to 15 children to sell for charity. Each toy was sold for $20. How much money did each child collect?
3. There are 641 boys and 490 girls in Greenland School. Each child makes 8 origami art pieces for classroom decorations. All the origami art pieces are then distributed equally among 58 classrooms. How many origami art pieces are in each classroom?

4. Tina collects 487 seashells and Wayne collects 345. After giving 40 seashells to Calvin, they put the remainder equally into 36 boxes. How many seashells are in each box?

5. The table shows the booking fee for a squash court in a community club.

<table>
<thead>
<tr>
<th>Time</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>From 9 a.m. to 5 p.m.</td>
<td>$4 per hour</td>
</tr>
<tr>
<td>After 5 p.m.</td>
<td>$7 per hour</td>
</tr>
</tbody>
</table>

Edwin booked a squash court from 4 p.m. to 8 p.m. How much did Edwin pay for the squash court?
Lesson 2.7  Real-World Problems: Multiplication and Division (Part 2)

Solve. Show your work.

1. Three times as many children as adults attended a concert on Saturday. An adult's ticket cost $7 and a child's ticket cost $3. The theater collected a total of $6,000. How many people bought tickets?

2. Mrs. Daniel pays $324 for a handbag and 3 pairs of shoes. The handbag costs half as much as the 3 pairs of shoes combined. Find the cost of the handbag.
3. Mr. Jacob is 55 years old and Tony is 7 years old. In how many years will Mr. Jacob be 4 times as old as Tony?

4. The cost of 5 similar digital cameras and 3 similar video cameras is $3,213. Each video camera costs 4 times as much as each digital camera. John buys a digital camera and a video camera. How much does he pay?
5. Anne, Ryan and Joel collect empty cans for recycling. They collect a total of 1,925 cans. Anne collects half as many cans as Ryan. Joel collects twice as many cans as Ryan. How many cans does Joel collect?

6. David and Joseph have a total of 328 marbles. Matthew and David have 176 marbles. Joseph has 5 times as many marbles as Matthew. How many marbles does David have?
7. The library has a total collection of 2,630 books. The number of non-fiction books is 240 fewer than the number of fiction books but 190 more than the number of picture books. How many books of each type are there in the library?

8. The total length of 4 blue banners and 5 yellow banners is 49 meters. The total length of 2 blue banners and 1 yellow banner is 17 meters. All banners of the same color have the same length. Find the length of each blue banner.
9. At the local clothing store, 3 similar shirts and 4 similar jackets cost $360, and 1 shirt and 3 jackets cost $220. Find the cost of each shirt.

10. James bought a few hamsters. For each day after the first day of the week, the hamsters ate 20 grams of food more than the previous day. The hamsters grew fast, finishing 1,260 grams of food in the first week. How much food did the hamsters eat on the first day?
11. Ann had $198 more than her sister. After their mother gave Ann $20 and her sister $60, Ann had twice as much money as her sister. How much money did Ann have at first?

12. There were 7 times as many marbles in Box A as in Box B. After Joyce transferred 294 marbles from Box A to Box B, both boxes had the same number of marbles. How many marbles were there in Box A at first?
Put on Your Thinking Cap!

Solve. Show your work.

1. In a mathematics quiz, 20 problems are given. 5 points are given for each correct answer and 2 points are deducted for each incorrect answer. Ashley scores 51 points. How many correct answers does she have?

2. The product of two consecutive even numbers is 624. What is the greater number? (Consecutive even numbers are even numbers placed one after another in an unbroken sequence. For example, 2, 4, 6, 8 or 10, 12, 14.)
3. Use a calculator to multiply.
   
   \[ 24 \times 11 = \underline{\phantom{0}} \]
   
   \[ 35 \times 11 = \underline{\phantom{0}} \]
   
   \[ 72 \times 11 = \underline{\phantom{0}} \]
   
   \[ 69 \times 11 = \underline{\phantom{0}} \]
   
   \[ 58 \times 11 = \underline{\phantom{0}} \]
   
   \[ 76 \times 11 = \underline{\phantom{0}} \]
   
   What do you notice about the answers? Find a shortcut to the answers without using a calculator.

4. Aaron and Benga have a total of 976 trading cards. Benga has 7 times as many cards as Aaron. How many cards should Benga give Aaron so that Aaron will have 3 times as many cards as Benga?
5.  There were 149 angelfish and goldfish in an aquarium. There were twice as many guppies as angelfish. After selling 35 goldfish, there are half as many goldfish as angelfish. How many fish are left in the aquarium?

6.  Sophia buys an equal number of oranges and pears for a party. The oranges are bought at a price of 7 for $2 and the pears are bought at a price of 5 for $3. She pays $33 more for the pears than for the oranges.
   a. How much does Sophia pay in all?
   b. How many oranges and pears does she buy altogether?
7. Marit and Jennifer had an equal number of crackers. Each day, Marit ate 12 crackers and Jennifer ate 6 more crackers than Marit. When Jennifer had 24 crackers left, Marit had 96 crackers left. How many crackers did each of them have at first?

8. Robert and Damien had the same amount of money. Each day, Robert spent $4 and Damien spent $6. When Damien had $12 left, Robert had 4 times as much money left as Damien. How much money did each boy have at first?
9. For every 5 highlighters that Agnes buys, she gets 1 free. If Agnes needs 80 highlighters, what is the least number of highlighters she has to buy?

10. Benita has three ropes measuring 54 centimeters, 108 centimeters, and 189 centimeters. She cuts all of them into equal pieces. The length of each piece is the longest possible length she can cut.
   a. What is the length of each piece of cut rope?
   b. How many pieces of cut rope does Benita get?
11. Jessica and her mother return from shopping with 14 packages. They park the car in the parking lot, which is 120 meters away from their house. Then they make several trips to bring the packages into their house. Jessica’s mother can carry 3 packages at a time and Jessica can carry 2. Given that they always walk together and the least possible number of trips is made, find the total distance covered by both of them.

12. Form the greatest and least possible products by filling in each box with one of these digits:

\[
\begin{array}{cccc}
2 & 3 & 4 & 5 \\
& & & 6 \\
\end{array}
\]

For each product, use each digit only once.

**Greatest Product**

\[
\begin{array}{ccc}
\_ & \_ & \_ \\
\times & & \\
\_ & \_ & \\
\end{array}
\]

**Least Product**

\[
\begin{array}{ccc}
\_ & \_ & \_ \\
\times & & \\
\_ & \_ & \\
\end{array}
\]
Lesson 3.1  Adding Unlike Fractions

Find two equivalent fractions for each fraction.

1. \( \frac{1}{4} = \quad = \quad \)
2. \( \frac{2}{3} = \quad = \quad \)
3. \( \frac{4}{9} = \quad = \quad \)
4. \( \frac{5}{5} = \quad = \quad \)
5. \( \frac{6}{7} = \quad = \quad \)
6. \( \frac{6}{10} = \quad = \quad \)

Shade and label each model to show the fractions. Then complete the addition sentence.

7. \( \frac{2}{3}, \frac{1}{4} \)

\[
\begin{array}{cccccc}
\square & \square & \square & \square & \square & \square \\
\end{array}
\]

\[
\frac{2}{3} + \frac{1}{4} = \quad + \quad = \quad 
\]

8. \( \frac{2}{5}, \frac{1}{2} \)

\[
\begin{array}{cccccc}
\square & \square & \square & \square & \square & \square \\
\end{array}
\]

\[
\frac{2}{5} + \frac{1}{2} = \quad + \quad = \quad 
\]
Estimate each sum by rounding the fractions to 0, 1/2, or 1. Then find the actual sum. Express each sum in simplest form.

9. \( \frac{2}{5} + \frac{3}{8} \)

10. \( \frac{1}{3} + \frac{1}{10} \)

11. \( \frac{7}{10} + \frac{3}{4} \)

12. \( \frac{4}{5} + \frac{2}{3} \)

13. \( \frac{7}{8} + \frac{1}{6} \)

14. \( \frac{6}{7} + \frac{3}{4} \)
Lesson 3.2  Subtracting Unlike Fractions

Fill in the blanks.

1. Rewrite the two fractions as like fractions with the same denominator.

\[ \times \quad \times \]
\[ \frac{4}{5} = \quad \frac{1}{2} = \]

Using the equivalent fractions, complete the model and the subtraction sentence.

\[ \frac{4}{5} - \frac{1}{2} = \]

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2. Rewrite the two fractions as like fractions with the same denominator. Then complete the model and the subtraction sentence.

\[
\frac{4}{9} = \quad \frac{1}{6} =
\]

\[
\frac{4}{9} - \frac{1}{6} = \quad - \quad =
\]

Estimate each difference by rounding the fractions to 0, \(\frac{1}{2}\), or 1. Then find the actual difference. Express each difference in simplest form.

3. \(\frac{4}{5} - \frac{1}{3}\)  
4. \(\frac{3}{4} - \frac{2}{3}\)

5. \(\frac{8}{9} - \frac{7}{8}\)  
6. \(\frac{7}{12} - \frac{1}{4}\)

7. \(\frac{5}{6} - \frac{3}{8}\)  
8. \(\frac{8}{9} - \frac{1}{2}\)
Lesson 3.3  Fractions, Mixed Numbers, and Division Expressions

Look at each model. Then write each division expression as a fraction and as a mixed number if appropriate.

1. 

\[
3 \div 5 = \frac{\square}{\square}
\]

2. 

\[
5 \div 2 = \frac{\square}{\square} = \frac{\square}{\square}
\]
Write each division expression as a fraction or mixed number in simplest form.

3. \( 3 \div 25 \)

4. \( 4 \div 38 \)

5. \( 54 \div 7 \)

6. \( 48 \div 9 \)

Express each fraction as a mixed number in simplest form.

7. \( \frac{18}{4} \)

8. \( \frac{20}{6} \)

9. \( \frac{44}{8} \)

10. \( \frac{42}{9} \)
Lesson 3.4  Expressing Fractions, Mixed Numbers, and Division Expressions as Decimals

Rewrite each fraction as a decimal.

1. $\frac{9}{10}$

2. $\frac{4}{5}$

3. $\frac{3}{20}$

4. $\frac{9}{25}$

5. $\frac{23}{10}$

6. $\frac{5}{10}$

7. $\frac{11}{4}$

8. $\frac{18}{5}$
Express each division expression as a decimal.

9. \( 17 \div 25 \)

10. \( 15 \div 4 \)

Express each mixed number as a decimal.

11. \( 2\frac{3}{5} \)

12. \( 3\frac{7}{8} \)

13. \( 4\frac{7}{20} \)

14. \( 5\frac{3}{4} \)

Solve. Show your work.

15. Rayza buys 6 similar notebooks for $15. How much does she pay for each notebook?
Lesson 3.5  Adding Mixed Numbers

Add. Express each sum in simplest form.

1. $3\frac{3}{8} + 2\frac{1}{2}$
2. $1\frac{1}{3} + 3\frac{1}{12}$

3. $1\frac{2}{3} + 3\frac{7}{8}$
4. $1\frac{5}{9} + 1\frac{3}{4}$

5. $2\frac{11}{12} + 4\frac{7}{8}$
6. $3\frac{2}{3} + 2\frac{7}{10}$
Estimate each sum by rounding to the nearest half or whole number.

7. \[ \frac{4}{5} + 1 \frac{1}{2} \]
8. \[ 4 \frac{3}{4} + 5 \frac{7}{10} \]

9. \[ 1 \frac{3}{8} + 2 \frac{1}{7} \]
10. \[ 2 \frac{2}{3} + 4 \frac{5}{7} \]

11. \[ 3 \frac{7}{12} + 2 \frac{5}{6} \]
12. \[ 9 \frac{2}{9} + 10 \frac{2}{11} \]
Lesson 3.6 Subtracting Mixed Numbers

Subtract. Express each difference in simplest form.

1. \(3\frac{8}{9} - 1\frac{1}{3}\)

2. \(5\frac{5}{6} - 4\frac{7}{12}\)

3. \(4\frac{1}{4} - 1\frac{9}{10}\)

4. \(6\frac{1}{8} - 1\frac{11}{12}\)

5. \(2\frac{1}{3} - 1\frac{5}{7}\)

6. \(4\frac{2}{9} - 2\frac{5}{6}\)
Estimate each difference by rounding to the nearest half or whole number.

7. \(\frac{3}{2} - \frac{1}{3}\)

8. \(10\frac{1}{2} - 5\frac{4}{5}\)

9. \(7\frac{1}{6} - 6\frac{5}{8}\)

10. \(3\frac{1}{2} - 1\frac{5}{9}\)

11. \(4\frac{3}{7} - 2\frac{1}{4}\)

12. \(5\frac{9}{10} - 4\frac{5}{11}\)
Lesson 3.7  Real-World Problems: Fractions and Mixed Numbers

Solve. Show your work.

1. It takes 28 minutes to play 8 songs on a radio. Every song is played for the same length of time. How long does it take to play 1 song? Express your answer as
   a. a mixed number
   b. a decimal

2. At a parade, $\frac{1}{4}$ of the participants have red hair, $\frac{1}{6}$ of them have brown hair, and the rest of the participants have black hair. What fraction of the participants have black hair?
3. Rashan buys $3 \frac{7}{10}$ pounds of flour and Diego buys $2 \frac{3}{4}$ pounds of flour. They use $4 \frac{3}{5}$ pounds of flour to bake bread. How much flour is left? Express your answer as a decimal.

4. Maria uses $2 \frac{3}{4}$ meters of cloth to make a dress and $\frac{5}{8}$ meter less cloth to make a blouse. How much cloth does she use in all? Express your answer as a decimal.
5. A carton contains $\frac{8}{9}$ liters of apple juice. Rosalia drinks $\frac{1}{6}$ liter of the juice every day. How much apple juice is left in the carton after a week?

6. Leena bakes a loaf of bread. She eats $\frac{1}{8}$ of the loaf and gives $\frac{1}{6}$ of it to each of her 3 friends. What fraction of the loaf of bread is left?
7. Thomas reads \( \frac{2}{9} \) of a book on Monday and \( \frac{1}{5} \) of it on Tuesday. He reads twice as many pages on Wednesday as on Tuesday. What fraction of the book is not read?

8. In a day, Jamal spent \( 1 \frac{2}{3} \) hours watching television, \( 1 \frac{4}{5} \) hours taking an afternoon nap, and \( \frac{7}{8} \) hour helping his mother with housework.
   a. How much time did Jamal spend on watching television and helping with housework?
   b. How much more time did Jamal spend taking the nap than helping with housework?
9. Madison buys \(2\frac{3}{5}\) pounds of meat. Her neighbor buys \(\frac{3}{4}\) pound more meat than Madison. How many pounds of meat do they buy altogether?

10. Box A weighs \(1\frac{7}{10}\) pounds. Box B weighs \(\frac{1}{4}\) pound less than Box A. What is the total weight of the two boxes?
11. The length of a storeroom is $4\frac{3}{5}$ meters. The storeroom's width is $\frac{3}{4}$ meter shorter than its length. What is the perimeter of the storeroom?

12. John poured $2\frac{1}{2}$ liters of water into a tank. Then he poured out $3\frac{2}{5}$ liters of water from the tank, leaving $4\frac{1}{5}$ liters of water in the tank. How much water was in the tank at first?
Put on Your Thinking Cap!

Solve. Show your work.

1. Two ropes, P and Q, are each cut into 3 equal pieces. Each piece cut from rope Q is \( \frac{2}{5} \) meter longer than each piece cut from rope P. If rope P is 2 meters long, what is the length of rope Q?

2. Lionel has \( \frac{3}{4} \) as much money as Gary. Gary has \( \frac{1}{3} \) as much money as Vivian. How many times Lionel’s amount of money is Vivian’s amount of money?
3. Andrew found that \( \frac{4}{5} \) of his savings is equal to \( \frac{1}{2} \) of Malik’s savings. What fraction of Malik’s savings is Andrew’s savings?

4. Find the value of:

\[
\frac{1}{100} + \frac{2}{100} + \frac{3}{100} + \cdots + \frac{97}{100} + \frac{98}{100} + \frac{99}{100}
\]
5. Find the value of:
\[ \frac{1}{99} + \frac{2}{99} + \frac{3}{99} + \cdots + \frac{8}{99} + \frac{9}{99} + \frac{10}{99} \]

6. Find the value of:
\[ \frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \cdots + \frac{1}{28 \times 29} + \frac{1}{29 \times 30} \]
7. In a class where there are as many girls as boys, $\frac{2}{5}$ of the boys and $\frac{1}{2}$ of the girls went to a fun fair. What fraction of the students in the class did not go to the fun fair?

8. Alvin has some marbles in a box. He keeps $\frac{1}{3}$ of them and gives the remainder to Joyce and Sean. Joyce gets $\frac{5}{6}$ of the remainder. What fraction of the marbles does Sean get?
Lesson 4.1  Product of Proper Fractions

Look at the diagram. Then complete.

1. \[ \frac{1}{2} \text{ of } \frac{3}{5} = \]

\[ \] \times \[ \]

\[ = \]

Complete.

2. \[ \frac{3}{4} \text{ of } \frac{5}{7} = \]

\[ \] \times \[ \]

\[ = \]
Multiply. Express each product in simplest form:

3. \( \frac{5}{6} \) of \( \frac{9}{11} \)

4. \( \frac{7}{10} \) of \( \frac{5}{9} \)

5. \( \frac{7}{8} \times \frac{10}{14} \)

6. \( \frac{8}{9} \times \frac{9}{10} \)

7. \( \frac{3}{5} \times \frac{4}{12} \)

8. \( \frac{5}{7} \times \frac{7}{10} \)
Lesson 4.2  Real-World Problems: Multiplication with Proper Fractions

Solve. Show your work.

1. Tian has 56 paper clips. He gives $\frac{3}{4}$ of them to Joe. Joe gives $\frac{2}{7}$ of what he receives to Rahul. How many paper clips does Rahul get?

2. Tony is given $\frac{9}{10}$ hour to mow a lawn. He only uses $\frac{2}{3}$ of the given time to mow the lawn. How much time is left?
3. Keith spends $\frac{1}{6}$ of his savings on a magazine and $\frac{2}{5}$ of the remainder on a storybook. What fraction of his savings is left?

4. There are some caps in a box. $\frac{1}{6}$ of them are red, $\frac{1}{3}$ are blue, and $\frac{3}{7}$ of the remainder are green. If there are 27 green caps, how many caps are there altogether?
5. Lily receives 30 messages on her cell phone. Of those messages, \( \frac{1}{5} \) are picture messages and \( \frac{7}{8} \) of the remainder are text messages. How many text messages does she receive?

6. Sam makes some bread rolls. He gives \( \frac{2}{5} \) of the bread rolls to his neighbor and \( \frac{4}{9} \) of the remainder to his cousin. He has 15 bread rolls left. How many bread rolls does Sam make?
7. Anne has 24 more cards than Devi. Anne finds that \( \frac{3}{5} \) of Devi’s cards are equal to \( \frac{1}{2} \) of her cards. How many cards does Anne have?

8. Roxanne has \( \frac{1}{2} \) as many beads as Sherie. The number of beads Sherie has is \( \frac{4}{5} \) that of Marcos. Marcos has 165 beads. How many more beads does Marcos have than Roxanne?
9. Ken spends \( \frac{1}{5} \) of his money on a dictionary. He gives $21 to his brother and has \( \frac{1}{2} \) of his money left. How much money does Ken have left?

10. Victoria spends \( \frac{5}{9} \) of her money on a flan and two chicken pies. Each chicken pie costs \( \frac{1}{6} \) as much as the flan. Victoria has $24 left.
   a. How much does Victoria spend?
   b. How much does the flan cost?
11. Melody has 98 stickers. She gives $\frac{2}{7}$ of them to her sister and $\frac{3}{5}$ of the remainder to her brother. If she wants to increase her collection of stickers to twice what she had originally, how many more stickers must Melody buy?

12. Jacky bakes some biscuits. He keeps $\frac{3}{7}$ of the biscuits in container A, $\frac{5}{8}$ of the remainder in container B, and the rest in container C. There are 21 more biscuits in container A than in container C. How many biscuits does Jacky bake?
Lesson 4.3  Product of an Improper Fraction and a Proper or Improper Fraction

Multiply. Express each product in simplest form.

1. \( \frac{7}{4} \times \frac{9}{14} \)
2. \( \frac{8}{5} \times \frac{3}{4} \)

3. \( \frac{14}{9} \times \frac{6}{7} \)
4. \( \frac{9}{7} \times \frac{5}{6} \)

5. \( \frac{9}{8} \times \frac{4}{7} \)
6. \( \frac{7}{5} \times \frac{9}{14} \)
Multiply. Express each product in simplest form.

7. \( \frac{9}{5} \times \frac{10}{3} \)  
8. \( \frac{17}{12} \times \frac{9}{4} \)

9. \( \frac{7}{3} \times \frac{12}{5} \)  
10. \( \frac{14}{6} \times \frac{8}{7} \)

11. \( \frac{10}{7} \times \frac{14}{9} \)  
12. \( \frac{13}{10} \times \frac{15}{8} \)
Lesson 4.4  Product of a Mixed Number and a Whole Number

Multiply. Express each product in simplest form.

1. \(3\frac{4}{5} \times 2\)

2. \(2\frac{3}{4} \times 8\)

3. \(2\frac{1}{6} \times 4\)

4. \(21 \times 1\frac{6}{7}\)

5. \(40 \times 2\frac{5}{8}\)

6. \(6 \times 3\frac{4}{9}\)
Multiply. Express each product in simplest form.

7. \( \frac{2}{3} \times 17 \)  
8. \( \frac{3}{7} \times 16 \)

9. \( \frac{5}{9} \times 12 \)  
10. \( 18 \times \frac{7}{8} \)

11. \( 14 \times \frac{3}{10} \)  
12. \( 9 \times \frac{5}{6} \)
Lesson 4.5  Real-World Problems: Multiplication with Mixed Numbers

Solve. Show your work.

1. The Smith family drinks $1\frac{4}{5}$ liters of apple juice each day. The apple juice is packed in 2-liter bottles. How many bottles does Mrs. Smith need to buy every week?

2. Lily uses $1\frac{3}{4}$ meters of ribbon to make a knot. She wants to make 9 similar knots for her cousins. How many meters of ribbon does Lily need? Round your answer to the nearest meter.
3. Puppy A is \( \frac{3}{4} \) as heavy as puppy B. Puppy C is twice as heavy as puppy A. If the weight of puppy B is 8 pounds, find the weight of puppy C.

4. A flowerbed is \( 3 \frac{3}{4} \) meters long and 2 meters wide. Uncle James wants to build a border around the flowerbed. The width of the border is \( \frac{1}{2} \) meter. The cost of building the border is $20 per square meter. How much does Uncle James have to pay to have the border built?
Lesson 4.6  Dividing a Fraction by a Whole Number

Shade parts of the model to show the division expression. Then fill in the blanks.

1. \( \frac{2}{3} \div 4 \)

\[ \text{ is shaded.} \]

\( \frac{2}{3} \div 4 = \) 

Divide. Draw a model to help you.

2. \( \frac{1}{6} \div 2 \)
Divide. Draw a model to help you.

3. \( \frac{8}{9} \div 8 \)

Divide. Express each answer in simplest form.

4. \( \frac{4}{5} \div 6 \)  

5. \( \frac{7}{8} \div 21 \)

6. \( \frac{9}{10} \div 3 \)  

7. \( \frac{5}{6} \div 15 \)
Solve. Show your work.

8. A bottle contains $\frac{5}{12}$ liter of paint. Mr. Jacobs pours all the paint equally into 5 pots. How much paint is there in each pot?

9. During lunch, $\frac{1}{2}$ of a loaf of bread is shared equally among 5 girls. What fraction of the loaf of bread does each girl have?
10. A string of length \( \frac{9}{10} \) meter is cut into 6 equal pieces. What is the total length of 2 of the pieces?

11. Peggy had a bag of nuts. She ate \( \frac{1}{5} \) of the nuts and gave the remaining nuts to 3 friends equally. What fraction of the nuts did each friend get?
Lesson 4.7   Real-World Problems: Multiplication and Division with Fractions

Solve. Show your work.

1. Maria and Farida had 250 beads altogether. After Maria used 18 beads to make a bracelet and Farida gave away \(\frac{2}{5}\) of her beads, they have the same number of beads left. How many beads did Maria have at first?

2. Paul has \(\frac{2}{3}\) as many postcards as Shawn. The number of postcards Shawn has is \(\frac{3}{5}\) of the number of postcards Tim has. If the three boys have 280 postcards altogether, how many more postcards does Tim have than Paul?
3. There are 1,800 students in a school, and 540 of them do not take part in sports activities. Of these students who do not take part, \( \frac{5}{9} \) are girls. There are \( \frac{2}{3} \) as many girls as boys in the school. How many boys take part in sports activities?

4. Daniel and William have some marbles. Daniel finds that \( \frac{2}{5} \) of the number of marbles he has is \( \frac{4}{5} \) the number of marbles William has. William has 195 marbles. How many marbles does Daniel have?
5. Katherine and Shally had $288 altogether. Katherine gave \( \frac{1}{3} \) of her share to Shally and their father gave $68 to Shally. They now have the same amount of money. How much money did Shally have at first?

6. Class A folds 160 fewer paper cranes than class B and \( \frac{2}{3} \) as many paper cranes as class C. Class B folds 92 more paper cranes than class C. How many paper cranes does class B fold?
7. Devi and her brother had the same amount of money. After Devi spent \( \frac{2}{5} \) of her money and her brother spent \( \frac{3}{10} \) of his money, they had $78 left altogether. How much did they spend altogether?

8. Emily and Sarah had a total of $80. After Sarah spent \( \frac{1}{3} \) of her money and Emily spent $17, Emily had twice as much money as Sarah. How much more money did Emily have than Sarah at first?
9. At the fair, 220 balloons are given to 40 children, \( \frac{3}{5} \) of whom are girls. Each boy receives the same number of balloons. Each girl receives twice as many balloons as each boy. How many more balloons do all the girls receive than all the boys?

10. In a piggy bank, \( \frac{3}{7} \) of the number of coins are quarters and the rest are nickels. The total value of the nickels is $12. How many coins are in the piggy bank?
11. After saving \( \frac{2}{7} \) of his paycheck for the month, Mr. Donovan has $1,335 left to spend. Mrs. Spencer saves \( \frac{3}{8} \) of her paycheck. Both of them save the same amount of money. How much is Mrs. Spencer's paycheck?

12. Susie bought 5 kilograms of flour and 4 kilograms of sugar for $12. If \( \frac{3}{4} \) kilogram of flour cost as much as \( \frac{3}{5} \) kilogram of sugar, find the cost of 1 kilogram of sugar.
Put on Your Thinking Cap!

Solve. Show your work.

1. Mrs. Tan spent $\frac{5}{8}$ of her savings on a microwave oven and a refrigerator. Of the amount she spent, $\frac{4}{7}$ was used to pay for the refrigerator. The refrigerator cost $280 more than the microwave oven. How much was Mrs. Tan’s savings at first?

2. Reena and Pauline have some bookmarks. If Reena gives Pauline 28 bookmarks, they will have the same number of bookmarks. If Pauline gives Reena 35 bookmarks, she will have $\frac{1}{3}$ of what Reena has. How many bookmarks does Reena have?
3. Jane had $\frac{3}{4}$ as much money as Kerrie. After spending $203, Jane had $\frac{1}{6}$ as much money as Kerrie. How much money did Kerrie have?

4. There were 120 students in the town library. $\frac{3}{5}$ of them were girls. Some girls then left the library. The number of girls remaining in the library is $\frac{4}{7}$ of all of the remaining students. How many girls left the library?
5. There were \( \frac{3}{5} \) as many adults as children on a bus. At the next stop, 6 adults and 6 children boarded the bus. As a result, there are \( \frac{2}{3} \) as many adults as children on the bus. How many people were on the bus at first?

6. In a box, \( \frac{2}{5} \) of the counters were red and the rest were blue. After putting another 48 blue counters into the box, \( \frac{3}{4} \) of the counters are blue. How many counters were in the box at first?
7. There were \( \frac{5}{6} \) as many apples as oranges at a fruit stand. After \( \frac{1}{2} \) of the apples and \( \frac{3}{8} \) of the oranges were sold, a total of 120 apples and oranges are left at the stand. How many apples and oranges were there at the stand at first?

8. Noah bought a jigsaw puzzle. On the first day, he fit \( \frac{2}{5} \) of the pieces of the puzzle together. On the second day, he put another 300 pieces into the puzzle. As a result, the number of the pieces left to put in the puzzle is \( \frac{7}{13} \) of the number of pieces already in the puzzle. How many pieces does the jigsaw puzzle consist of?
9. Samuel and Pat had a total of 720 stamps at first. Samuel gave \(\frac{1}{4}\) of his stamps to Pat. In return, Pat gave \(\frac{1}{3}\) of her total number of stamps to Samuel. They then had an equal number of stamps each. How many stamps did Samuel have at first?
10. Pails A, B, and C contain some water. These steps are taken:

**Step 1** $\frac{1}{4}$ of the water in pail A is poured into pail B.

**Step 2** $\frac{1}{4}$ of the water in pail B is poured into pail C.

**Step 3** $\frac{1}{4}$ of the water in pail C is poured into pail A.

In the end, all the pails contain 18 gallons of water each. Find the amount of water in each pail at first.
Lesson 5.1  Using Letters as Numbers

Write an expression for each situation.

1. Add 8 to \( w \)
2. Subtract 10 from \( a \)

3. Sum of \( p \) and \( \frac{3}{4} \)
4. Subtract \( 6y \) from 5

5. Multiply 6 by \( g \)
6. Divide \( 3k \) by 2

7. 4 times as many as \( h \)
8. 12 less than \( 5s \)

9. 8 more than \( 7b \)
10. Divide \( 5d \) by 4
Evaluating Expressions

Evaluating Expressions for \( m = 4 \).

11. \( 11 - m \)  
12. \( m + 9 \)

Evaluating Expressions for \( k = 8 \).

13. \( 3k + 7 \)  
14. \( 12 + 6k \)

15. \( 30 - 2k \)  
16. \( 7k - 19 \)

Evaluating Expressions for \( y = 6 \).

17. \( \frac{y + 8}{2} \)  
18. \( \frac{y + 9}{3} \)

19. \( \frac{5y + 20}{5} \)  
20. \( \frac{8y}{3} - 7 \)
Write an expression for each situation.

21. Each box of crayons costs $x$ dollars. How much does Mrs. Smith pay for 5 boxes of crayons?

22. Alyssa has $6p$ dollars. Her brother has 15 dollars. How much more money does Alyssa have than her brother?

23. Mrs. Estrada has $5m$ liters of milk. Her family drinks 2 liters each day. How much milk is left after a week?
24. Gary has $3y$ comics. Shaun has 8 comics. They share their comics equally. How many comics does each of them have?

25. Evan bought $k$ bottles of pasta sauce at $\$4$ each. He gave $\$10$ to the cashier. How much change did he receive?
26. At a bookstore, 8 similar books cost $y$ dollars. What is the cost of 3 such books?

27. John has $y$ stickers. He keeps 20 stickers for himself and gives the remainder to his two sisters equally. How many stickers does each sister get?
28. Kenny has \( m \) guppies and 10 angelfish. He buys another 20 guppies and 30 angelfish. How many fish does Kenny have now?

29. A string of length \( g \) inches is cut into two pieces. One piece is 10 inches longer than the other. Find the length of the shorter piece.
Lesson 5.2  Simplifying Algebraic Expressions

Simplify each expression.

1.  \( g + g + g \)

2.  \( 4w + 6w \)

3.  \( 8a - 3a \)

4.  \( 15b - 7b \)

5.  \( 16h - 7h - 2h \)

6.  \( 20k - 6k - 8k \)

7.  \( 9d - 5d + 7d \)

8.  \( 17n + 6n - 8n \)
Simplify each expression.

9. $5x + 7x - 4$
10. $6 + 7g + 3g$

11. $8n + 5 - 4n$
12. $8d - 5 + 7d - 9d$

13. $3 + 8k + 9 - 5k$
14. $10w + 11 - 3w - 8$

15. $10 + 5h - 6 + 8h$
16. $11 + 7m - 6 - 4m$

17. $8 + 12s - 7 - 9s + 4$
18. $5n + 10 + 8n - 9n + 3$
Lesson 5.3  Inequalities and Equations

Complete with $>$, $<$, or $=$.

1. For $k = 4$, $3k \bigcirc 15$.
2. For $k = 5$, $7k \bigcirc 35$.

3. For $k = 6$, $6k \bigcirc 30$.
4. For $k = 10$, $8k \bigcirc 50$.

Complete with $>$, $<$, or $=$ for $w = 7$.

5. $2w - 5 \bigcirc 6$
6. $4w + 3 \bigcirc 36$

7. $5w - 8 \bigcirc 20$
8. $20 - 2w \bigcirc 6$
Solve each equation.

9. \(4n = 28\)  
10. \(3d + 5 = 17\)

11. \(10w - 18 = 42\)  
12. \(42 + 6h = 84\)

13. \(7m - 35 = 5 + 2m\)  
14. \(4k + 44 = 10k - 10\)
Lesson 5.4  Real-World Problems: Algebra

Solve. Show your work.

1. Joan is $y$ years old. Her father is 4 times as old as she is and 28 years older than her brother.
   a. Find, in terms of $y$, the age of Joan’s brother.
   b. If $y = 12$, how old is her brother?

2. Mr. Tyler wants to rent a car for $n$ days. The car rental company charges a fixed fee of $120 and an extra $18 for each day of rental.
   a. Find, in terms of $n$, the cost of renting the car.
   b. If $n = 8$, find the cost of renting the car.
3. Kenneth has $5. He spends $g$ cents every day. How much money does he have left after one week?
   a. Express your answer in cents.
   b. Express your answer in dollars.

4. The total age of Amelia, Bernard, and Cindy is $10w$ years. Amelia is $2w$ years old. Bernard is as old as Cindy.
   a. Express Cindy’s age in terms of $w$.
   b. If $w = 4$, how old is Cindy?
5. Patrick buys 3 model planes for $p$ dollars each and Amanda buys 2 model planes for $36$.
   a. How much does Patrick pay for the model planes?
   b. Find the value of $p$ so that Patrick and Amanda pay the same amount of money for the model planes.

6. Nancy has $(4k + 6)$ meters of ribbon. Kevin has $(6k - 2)$ meters of ribbon.
   a. If $k = 5$, who has the shorter ribbon?
   b. For what value of $k$ will they have the same length of ribbon?
7. Mr. Anderson earns $50b$ dollars a month. Each month he spends $28b$ dollars and saves the rest. He saves more than he spends. Do you agree?

8. Anne has $p$ game cards. Benny has 3 times as many game cards as Anne. Colin has 30 game cards. What is the least value of $p$ so that Anne and Benny together have more game cards than Colin?
Put on Your Thinking Cap!

Solve. Show your work.

1. A box of crackers has a mass of $p$ kilograms. When empty, the box has a mass of 200 grams. What is the total mass of the crackers in 5 such boxes? Express your answer in kilograms.

2. A printing company charges a fixed fee of $30 for printing wedding cards and an extra $2 for printing each card. Mr. Johnson wants to print $x$ wedding cards.
   a. How much money will Mr. Johnson pay in terms of $x$?
   b. If Mr. Johnson wants to print 200 cards, how much will he have to pay?
3. Lena has 80 stickers. She gives $5m$ stickers to her friends and shares the remaining stickers equally with her 2 brothers.
   a. How many stickers does she give each brother in terms of $m$?
   b. If $m = 4$, how many stickers does each brother get?

4. Tom's monthly allowance is $k$ dollars. Jerry's monthly allowance is 3 times as much as Tom's monthly allowance. Danny's monthly allowance is $20$ more than Jerry's monthly allowance.
   a. What is their total monthly allowance in terms of $k$?
   b. If Tom's monthly allowance is $18$, find their total monthly allowance.
Answers

Chapter 1

Lesson 1.1

1.

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<tr>
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<th>Hundred Thousands</th>
<th>Ten Thousands</th>
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</table>

  a. three hundred fifty-six thousand, four hundred one
  b. 356,401

2. 28,199  3. 90,038
4. 412,603  5. 800,005
6. 507,700  7. 600,600
8. Fifty thousand, six hundred eighty
9. Two hundred fifty-five thousand, four hundred thirty
10. One hundred ninety-nine thousand, three hundred three
11. Eight hundred seventy-two thousand, nine hundred
12. Three hundred five thousand, seventy-two
13. 304,678  14. 876,430
15. 304,687  16. 876,403
17. Answers vary.
   Samples: 306,748; 346,780; 387,406
18.

<table>
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<th>Ten Thousands</th>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
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  a. six million, two hundred four thousand, three hundred thirteen
  b. 6,204,313

26. Eight million, eight hundred eight thousand, four hundred twenty-nine
27. Three million, two thousand, five hundred sixty-six
28. Five million, nine hundred seventy thousand, one hundred three
29. Two million, fifty thousand, sixty
30. Four million, seven hundred thousand, nine hundred
31. 1,023,596
32. Answers vary.
   Samples: 3,629,501; 3,269,510; 3,029,561
33. Answers vary.
   Samples: 3,902,615; 3,260,519; 3,150,269
34. Answers vary.
   Samples: 6,903,512; 6,935,012; 9,052,136

Lesson 1.2

1.

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<td>20,000</td>
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<td>5,000</td>
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<td>30</td>
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<td>8</td>
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</tbody>
</table>

2. ten thousands  3. 90,000
4. 90,000  5. ten thousands
6. hundreds  7. hundred thousands
8. 5,000  9. 500
10. 500,000  11. 8
12. ten thousands  13. hundred thousands
14. 60,000; ten thousands
15. 0; 0  16. 10,000
17. 700,000  18. 4,000
19. 204,891  20. 570,030
21. 306,010
Lesson 1.3
1. 123,087
2. 625,897
3. 4,314,356
4. 32,049
5. 785,900
6. 5,468,015
7. 197,500 283,500 1,795,000 2,385,000 2,583,000
8. 895,390 8,476,900 8,593,800 8,746,800 8,764,500
9. 5,298,053 5,296,000 2,890,670 980,576 594,287
10. 3,900,100 3,003,500 2,900,800 390,300 303,500
11. a. 1,000
   b. 1,000
   c. 1,000; 479,270
   d. 479,270
12. a. 20,000
    b. 20,000
    c. 20,000; 4,440,000
    d. 4,440,000
13. 1,005,600; 1,205,600; count on by 200,000
14. 935,800; 920,800; count back by 15,000
15. 5,391,200; 5,441,200; count on by 50,000
16. 1,158,600; 1,058,500; count back by 100,100

Lesson 1.4
1. 4,000
2. 28,000
3. 725,000
4. 300,000
5. 15,000
6. 8,000
7. 12,000
8. 2,000
9. 56,000
10. 81,000
11. 900
12. 500
13. 900
14. 600
15. 2,832 rounds to 3,000.
   1,475 rounds to 1,000.
   3,000 + 1,000 = 4,000
   The estimated number of tourists was 4,000.
16. 4,342 ÷ 7 is about 4,200 ÷ 7 = 600.
   The estimated number of visitors on Monday was 600.
17. 4 × $1,000 = $4,000
   His estimated total sales was $4,000.
18. 4 × $1,500 = $6,000
   His estimated total sales was $6,000.
19. 4 × $1,499 = $5,996
   His actual total sales was $5,996. Answers vary;
   Exercise 17 is easier to calculate; Exercise 18 gives
   an estimate that is closer to the actual total sales.

Put on Your Thinking Cap!
Thinking skill: Identifying patterns and relationships
Strategy: Look for pattern
1. 200,000
2. 9,750
3. 1,800,000
4. 1,000
5. 27,000
6. Thinking skill: Comparing
   Strategy: Use guess and check
   Solution: Estimate the number. Then guess
   and check your answers.
   20 × 20 = 400, 30 × 30 = 900
   600 is between 400 and 900 so the two
   numbers are greater than 20 but less than 30.
   24 × 25 = 600
   The page numbers are 24 and 25.
7. Thinking skill: Comparing
   Strategy: Use guess and check
   Solution: 9,805,472
8. Thinking skill: Comparing
   Strategy: Use guess and check
   Solution: 394,825 or 394,865

**Chapter 2**

**Lesson 2.1**

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<td>5.</td>
<td>2,538</td>
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<td>7.</td>
<td>13,176</td>
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<td>9.</td>
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<td>11.</td>
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<td>13.</td>
<td>908</td>
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<td>15.</td>
<td>56</td>
<td>16.</td>
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<tr>
<td>17.</td>
<td>436</td>
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19. Answers vary.
   Samples: \(679 \times 11 \times 91 = 679,679\);
   \(189 \times 11 \times 91 = 189,189\). The answer will
   be the 3-digit number repeated.

**Lesson 2.2**

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<td>31.</td>
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<td>6; 144; 14,400</td>
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35. | 5; 800; 80,000 | 36. | 3; 111; 111,000 |
37. | 8; 824; 824,000 | 38. | 4; 1,300; 1,300,000 |
39. | 146,300 | 40. | 1,314,000 |
41. | 500; 90; 45,000 | 42. | 50; 300; 15,000 |
43. | 4,000; 500; 2,000,000 | 44. | 2,000; 700; 1,400,000 |

**Lesson 2.3**

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**Lesson 2.4**

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<td>11.</td>
<td>10; 930; 310</td>
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<td>6; 12,600; 6; 2,100</td>
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<td>26.</td>
<td>514,000</td>
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<td>100; 135; 45</td>
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<td>30.</td>
<td>100; 8,400; 2,100</td>
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<td>9; 981; 9; 109</td>
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<td>34.</td>
<td>31</td>
<td>35.</td>
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<tr>
<td>36.</td>
<td>800; 40; 20</td>
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<tr>
<td>38.</td>
<td>9,000; 300; 30</td>
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Lesson 2.5

1. 4
2. 5 R 10
3. 3 R 1
4. 11 R 48
5. 8 R 14
6. 7 R 2
7. 21 R 15
8. 18 R 21

9. Estimated quotient = 80
    Actual quotient = 79
10. Estimated quotient = 60
    Actual quotient = 65
11. Estimated quotient = 100
    Actual quotient = 106
12. Estimated quotient = 80
    Actual quotient = 82
13. Estimated quotient = 100
    Actual quotient = 99
14. Estimated quotient = 40
    Actual quotient = 38
15. Estimated quotient = 30
    Actual quotient = 26
16. Estimated quotient = 20
    Actual quotient = 19

Lesson 2.6

1. 110
    Step 1 60 − 20 = 40
    Step 2 40 + 70 = 110
2. 280
    Step 1 200 ÷ 5 = 40
    Step 2 40 × 7 = 280
3. 82
    Step 1 135 ÷ 3 = 45
    Step 2 100 − 45 = 55
    Step 3 55 + 27 = 82
4. 200
    Step 1 108 ÷ 9 = 12
    Step 2 12 × 10 = 120
    Step 3 80 + 120 = 200
5. 411
    Step 1 42 × 10 = 420
    Step 2 72 ÷ 8 = 9
    Step 3 420 − 9 = 411
6. 18
    Step 1 38 − 18 = 20
    Step 2 90 × 20 = 1,800
    Step 3 1,800 ÷ 100 = 18

7. 0
    Step 1 80 ÷ 2 = 40
    Step 2 100 − 40 = 60
    Step 3 15 × 4 = 60
    Step 4 60 − 60 = 0

<table>
<thead>
<tr>
<th>Operation</th>
<th>Order</th>
</tr>
</thead>
<tbody>
<tr>
<td>× 3 ÷ 6 = 17</td>
<td>× ÷</td>
</tr>
<tr>
<td>184 + 27 × 3 = 265</td>
<td>× +</td>
</tr>
<tr>
<td>100 − 68 + 37 × 4 = 180</td>
<td>× −</td>
</tr>
<tr>
<td>19 × 4 + 84 ÷ 6 = 90</td>
<td>× ÷</td>
</tr>
<tr>
<td>7 + 47 × 8 ÷ 4 − 28 = 73</td>
<td>× ÷ −</td>
</tr>
<tr>
<td>30 − (45 − 17) = 2</td>
<td>(−) −</td>
</tr>
<tr>
<td>7 × (14 + 26) ÷ 8 = 35</td>
<td>(+) ÷</td>
</tr>
<tr>
<td>(73 + 27) − 136 ÷ 4 = 66</td>
<td>(+) ÷</td>
</tr>
</tbody>
</table>

Lesson 2.7 (Part 1)

1. 1,456 ÷ 56 = 26
    26 × $18 = $468
    He collects $468.
2. 230 − 50 = 180
    180 ÷ 15 = 12
    12 × $20 = $240
    Each child collected $240.
3. 641 ÷ 490 = 1,131
    1,131 × 8 = 9,048
    9,048 ÷ 58 = 156
    There are 156 origami art pieces in each classroom.
4. 487 + 345 = 832
    832 − 40 = 792
    792 ÷ 36 = 22
    There are 22 seashells in each box.
5. $4 + 3 × 7 = $25
    He paid $25.

Lesson 2.7 (Part 2)

1. Cost of tickets for 1 adult and 3 children
   = $7 + 3 × $3
   = $16

<table>
<thead>
<tr>
<th>Adult</th>
<th>Child</th>
<th>Child</th>
<th>Child</th>
</tr>
</thead>
<tbody>
<tr>
<td>$6,000</td>
<td>$16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

   $6,000 ÷ $16 = 375
   375 × 4 = 1,500
   1,500 people bought tickets.
2. Handbag \[ \begin{array}{c} \text{3 pairs of shoes} \\
\end{array} \] \[ \frac{324}{9} = $36 \]
1 unit \[ \frac{324}{9} = $36 \]
3 units \[ 3 \times 36 = $108 \]
The cost of the handbag is $108.

3. Mr. Jacob

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tony</td>
</tr>
</tbody>
</table>

\[ \frac{55 - 7}{3} = 16 \]
16 - 7 = 9
In 9 years, Mr. Jacob will be 4 times as old as Tony.

4. 3 video cameras \[ \begin{array}{c} \text{5 digital cameras} \\
\end{array} \] \[ \frac{3213}{17} = $189 \]
1 unit \[ \frac{3213}{17} = $189 \]
5 units \[ 5 \times 189 = $945 \]
He pays $945.

5. Anne

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ryan</td>
</tr>
</tbody>
</table>

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Joel</td>
</tr>
</tbody>
</table>

7 units \[ 1,925 \]
1 unit \[ 1,925 \]
4 units \[ 4 \times 275 = 1,100 \]
Joel collects 1,100 cans.

6. David

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Joseph</td>
</tr>
</tbody>
</table>

\[ \frac{328}{176} = 18 \]
4 units \[ \frac{328}{176} = 18 \]
1 unit \[ 152 \]
176 - 38 = 138
David has 138 marbles.

7. Fiction

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-fiction</td>
</tr>
</tbody>
</table>

\[ \frac{240}{190} = 2.4 \]
3 units \[ \frac{2,630 - 240 - 190 - 190}{3} = 2,010 \]
1 unit \[ \frac{2,010}{3} = 670 \]
670 + 190 = 860
860 + 240 = 1,100
There are 670 picture books, 860 non-fiction books, and 1,100 fiction books.

8. 3 yellow banners

\[ \begin{array}{c} \text{1 yellow banner} \\
\text{1 blue banner} \\
\end{array} \] \[ \frac{49 - 17}{3} = 5 \]
Length of 1 yellow banner = \[ \frac{15}{3} = 5 \]
Length of 1 blue banner = \[ \frac{17 - 5}{2} = 6 \]
The length of each blue banner is 6 meters.


\[ \begin{array}{c} \text{S} \\
\text{J} \\
\end{array} \] \[ \frac{360}{5} = $60 \]
Cost of 3 shirts and 9 jackets
\[ = 3 \times 220 = 660 \]
Cost of 5 jackets = \[ \frac{660}{5} = 132 \]
Cost of 1 jacket = \[ \frac{660}{5} = 132 \]
Cost of 1 shirt = \[ \frac{220 - (60 \times 3)}{40} = 40 \]
The cost of each shirt is $40.

10. Day  | Amount More Than First Day (g)
1      | 20
2      | 20
3      | 20
4      | 20
5      | 20
6      | 20
7      | 20
Total  | 420
\[ \frac{1,260 - 420}{7} = 120 \]
The hamsters eat 120 grams of food on the first day.

11. Ann

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sister</td>
</tr>
</tbody>
</table>

\[ \frac{198}{2} = 99 \]
1 unit \[ 198 \]
\[ \frac{198 + 20 - 60}{2} = 99 \]
\[ \frac{158 \times 2 - 20}{2} = 296 \]
Ann had $296 at first.
12. Box A  
Box B  

3 units  $294$
1 unit  $294 \div 3 = 98$
7 units  $7 \times 98 = 686$

There were 686 marbles in Box A at first.

Put on Your Thinking Cap!

1. Strategy: Use guess and check
Solution:

<table>
<thead>
<tr>
<th>No. of correct answers</th>
<th>No. of incorrect answers</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>5</td>
<td>75 - 10 = 65</td>
</tr>
<tr>
<td>14</td>
<td>6</td>
<td>70 - 12 = 58</td>
</tr>
<tr>
<td>13</td>
<td>7</td>
<td>65 - 14 = 51</td>
</tr>
</tbody>
</table>

She has 13 correct answers.

2. Strategy: Use guess and check
Solution: Estimate the number. Then guess and check your answer.

$20 \times 20 = 400$
$30 \times 30 = 900$

624 is between 400 and 900. So the two numbers are greater than 20 but less than 30.

The last digit of the product 624 is 4
$4 \times 6 = 24$.
$24 \times 26 = 624$

The greater number is 26.

3. Thinking skill: Identifying patterns and relationships
Strategy: Look for pattern
Solution: 264; 385; 792; 759; 638; 836

There is a pattern in the answers. To find the answers without using a calculator, follow these steps:

**Step 1** Separate the digits of the first factor.
For example, $69 \times 11$ $\rightarrow$ $6\ 9$.

**Step 2** Add the digits of the first factor.
For example, $6 + 9 = 15$.

**Step 3** Put the ones digit of the sum from Step 2 between the digits in Step 1.
For example, 659.

**Step 4** Add the tens digit of the sum from Step 2 to the hundreds digit of the number in Step 3.
For example, 759.

4. Thinking skill: Comparing
Strategies: Use a model, Use before-after concept
Solution:

<table>
<thead>
<tr>
<th>Before:</th>
<th>After:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaron</td>
<td></td>
</tr>
<tr>
<td>Benga</td>
<td>$976$</td>
</tr>
</tbody>
</table>

8 units  $\rightarrow$ 976
1 unit  $\rightarrow$ 976 $\div$ 8 = 122
5 units  $\rightarrow$ 5 $\times$ 122 = 610

Benga should give Aaron 610 cards.

5. Thinking skill: Comparing
Strategies: Use a model, Use before-after concept
Solution:

<table>
<thead>
<tr>
<th>Fish type</th>
<th>$\rightarrow$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goldfish</td>
<td>$33$</td>
</tr>
<tr>
<td>Angelfish</td>
<td>149</td>
</tr>
<tr>
<td>Guppies</td>
<td>25</td>
</tr>
</tbody>
</table>

3 units $\rightarrow$ 149 $\div$ 35 = 114
1 unit $\rightarrow$ 114 $\div$ 3 = 38
7 units $\rightarrow$ 7 $\times$ 38 = 266

266 fish are left in the aquarium.

6. Thinking skill: Comparing
Strategy: Use guess and check
Solution: Common multiples of 5 and 7 are 35, 70, 105, ...

<table>
<thead>
<tr>
<th>No. of oranges</th>
<th>Cost of oranges</th>
<th>Cost of pears</th>
<th>Difference in amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>$(35 + 7) \times 2\ \times $2 = 10$</td>
<td>$(35 + 3) \times 3\ \times $3 = 21$</td>
<td>$$11$</td>
</tr>
<tr>
<td>70</td>
<td>$(70 + 7) \times 2\ \times $2 = 20$</td>
<td>$(70 + 3) \times 3\ \times $3 = 42$</td>
<td>$$22$</td>
</tr>
<tr>
<td>105</td>
<td>$(105 + 7) \times 2\ \times $2 = 30$</td>
<td>$(105 + 3) \times 3\ \times $3 = 63$</td>
<td>$$33$</td>
</tr>
</tbody>
</table>

a. $\$30 + \$63 = \$93$
Sophia pays $\$93$ in all.
b. $2 \times 105 = 210$
She buys 210 oranges and pears altogether.

7. Thinking skill: Comparing
Strategies: Use a model, Use before-after concept
Solution:

<table>
<thead>
<tr>
<th>Jennifer</th>
<th>Left</th>
<th>Eaten</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mint</td>
<td>Left</td>
<td>Eaten</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© 2009 Marshall Cavendish International (Singapore) Private Limited. Copying is permitted; see page ii. 162  Answers
Difference in number of crackers left
= 96 - 24
= 72
Difference in number of crackers eaten
each day = 6
Number of days = 72 ÷ 6
= 12
12 × 12 + 96 = 240
Each of them had 240 crackers at first.

8. Thinking skill: Comparing
Strategies: Use a model, Use before-after concept
Solution:

<table>
<thead>
<tr>
<th>Robert</th>
<th>Left</th>
<th>Left</th>
<th>Left</th>
<th>Scent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Damien</td>
<td>Left</td>
<td></td>
<td></td>
<td>$12</td>
</tr>
</tbody>
</table>

Difference in amount left = 3 × $12
= $36
Difference in spending in each day
= $6 - $4
= $2
Number of days = $36 ÷ $2
= 18
18 × $6 + $12 = $120
Each boy had $120 at first.

9. Thinking skill: Identifying patterns and
relationships
Solution:
80 ÷ (5 + 1) = 13 R 2
80 - 13 = 67
The least number of highlighters is 67.

10. Thinking skill: Identifying patterns and
relationships
Strategies: Work backward, Use guess and check
Solution:
a. Work backward to find the greatest factor of 54, 108 and 189.
54 = 2 × 27
108 = 4 × 27
189 = 7 × 27
The length of each piece of cut rope is 27 centimeters.
b. 2 + 4 + 7 = 13
Benita gets 13 pieces of cut rope.

11. Thinking skill: Analyzing parts and whole
Strategy: Use a diagram
Solution:

```
120 m
House

Mom (3 packages)
Jessica (2 packages)

Car

10 × 120 = 1,200
```
The total distance covered was 1,200 meters.

12. Thinking skill: Identifying patterns and
relationships
Strategy: Use guess and check
Solution:
Greatest: 542 × 63 = 34,146
Least: 356 × 24 = 8,544

Lesson 3.1
1. Answers vary.
   Samples: \( \frac{2}{8}, \frac{3}{12} \)
2. Answers vary.
   Samples: \( \frac{4}{6}, \frac{6}{9} \)
3. Answers vary.
   Samples: \( \frac{8}{18}, \frac{12}{27} \)
4. Answers vary.
   Samples: \( \frac{6}{10}, \frac{9}{15} \)
5. Answers vary.
   Samples: \( \frac{12}{18}, \frac{14}{21} \)
6. Answers vary.
   Samples: \( \frac{10}{15}, \frac{16}{24} \)
7. \( \frac{3}{5} + \frac{1}{4} = \frac{8}{12} + \frac{3}{12} \)
   \( = \frac{11}{12} \)
8. \( \frac{2}{5} + \frac{1}{2} = \frac{4}{10} + \frac{5}{10} = \frac{9}{10} \)

9. 1; \( \frac{31}{40} \)
10. \( \frac{1}{2}; \frac{13}{30} \)
11. \( 1\frac{1}{2}; \frac{9}{20} \)
12. 2; \( 1\frac{7}{15} \)
13. 1; \( 1\frac{1}{24} \)
14. 2; \( 1\frac{17}{28} \)

Lesson 3.2
1. \( \times 2 \) \( \frac{4}{5} \times 2 = \frac{8}{10} \) \( \times 5 \) \( \frac{1}{2} \times 5 = \frac{5}{10} \)

\( \frac{4}{5} - \frac{1}{2} = \frac{8}{10} - \frac{5}{10} = \frac{3}{10} \)

2. \( \frac{4}{9} \)

\( \frac{4}{9} - \frac{1}{6} = \frac{8}{18} - \frac{3}{18} = \frac{5}{18} \)

3. \( \frac{1}{2}; \frac{7}{15} \)
4. \( \frac{1}{2}; \frac{1}{12} \)
5. 0; \( \frac{1}{72} \)
6. \( \frac{1}{2}; \frac{1}{3} \)
7. \( \frac{1}{2}; \frac{11}{24} \)
8. \( \frac{1}{2}; \frac{7}{18} \)

Lesson 3.3
1. \( \frac{3}{5} \)
2. \( \frac{5}{2}; 2\frac{1}{2} \)
3. \( \frac{3}{25} \)
4. \( \frac{2}{19} \)
5. \( 7\frac{5}{7} \)
6. \( 5\frac{1}{3} \)
7. \( 4\frac{1}{2} \)
8. \( 3\frac{1}{3} \)
9. \( 5\frac{1}{2} \)
10. \( 4\frac{2}{3} \)

Lesson 3.4
1. 0.9
2. 0.8
3. 0.15
4. 0.36
5. 2.3
6. 2.5
7. 2.75
8. 3.6
9. 0.68
10. 3.75
11. 2.6
12. 3.875
13. 4.35
14. 5.75
15. \$15 \div 6 = \$2.50

She pays \$2.50 for each notebook.

Lesson 3.5
1. \( 5\frac{7}{8} \)
2. \( 4\frac{5}{12} \)
3. \( 5\frac{13}{24} \)
4. \( 3\frac{11}{36} \)
5. \( 7\frac{19}{24} \)
6. \( 6\frac{11}{30} \)
7. \( 3\frac{1}{2} \)
8. \( 10\frac{1}{2} \)
9. \( 3\frac{1}{2} \)
10. 7
11. 6\( \frac{1}{2} \)
12. 19

Lesson 3.6
1. \( 2\frac{5}{9} \)
2. \( 1\frac{1}{4} \)
3. \( 2\frac{7}{20} \)
4. \( 4\frac{5}{24} \)
5. \( 1\frac{3}{21} \)
6. \( 1\frac{7}{18} \)
7. 2
8. \( 4\frac{1}{2} \)
9. \( \frac{1}{2} \)
10. 2
11. 2
12. \( 1\frac{1}{2} \)

Lesson 3.7
1. \( a. 28 \div 8 = 3\frac{1}{2} \)
   
   It takes \( 3\frac{1}{2} \) minutes to play 1 song.

   \( b. 3\frac{1}{2} = 3.5 \)
   
   It takes 3.5 minutes to play 1 song.
2. \[
\frac{1}{4} + \frac{1}{6} = \frac{5}{12}
\]
\[
1 - \frac{5}{12} = \frac{7}{12}
\]
7/12 of the participants have black hair.

3. \[
3 \frac{7}{10} + 2 \frac{3}{4} = 6 \frac{9}{20}
\]
\[
6 \frac{9}{20} - 4 \frac{3}{5} = 1 \frac{17}{20} = 1.85
\]
1.85 pounds of flour are left.

4. \[
2 \frac{3}{4} - \frac{5}{8} = 2 \frac{1}{8}
\]
\[
2 \frac{3}{4} + 2 \frac{1}{8} = 4 \frac{7}{8} = 4.875
\]
She uses 4.875 meters of cloth in all.

5. \[
7 \times \frac{1}{6} = \frac{7}{6}
\]
\[
1 \frac{8}{9} - \frac{7}{6} = \frac{13}{18}
\]
\[
\frac{13}{18}
\]
liter of apple juice is left after a week.

6. \[
\frac{1}{8} + \frac{1}{6} + \frac{1}{6} = \frac{5}{8}
\]
\[
1 - \frac{5}{8} = \frac{3}{8}
\]
3/8 of the loaf of bread is left.

7. \[
2 \frac{2}{9} + \frac{1}{6} + \frac{2}{6} = \frac{13}{18}
\]
\[
1 - \frac{13}{18} = \frac{5}{18}
\]
\[
\frac{5}{18}
\]
of the book is not read.

8. a. \[
1 \frac{2}{3} + \frac{7}{8} = 2 \frac{13}{24}
\]
Jamal spent 2 13/24 hours watching television and helping with housework.

b. \[
1 \frac{4}{5} - \frac{7}{8} = \frac{37}{40}
\]
Jamal spent 37/40 hour more on the nap.

9. \[
2 \frac{3}{5} + \frac{3}{4} = 3 \frac{7}{20}
\]
\[
3 \frac{7}{20} + 2 \frac{3}{5} = 5 \frac{19}{20}
\]
They buy 5 19/20 pounds of meat altogether.

10. \[
1 \frac{7}{10} - \frac{1}{4} = 1 \frac{9}{20}
\]
\[
1 \frac{7}{10} + 1 \frac{9}{20} = 3 \frac{3}{20}
\]
The total weight of the two boxes is 3 3/20 pounds.

11. \[
4 \frac{3}{5} - \frac{3}{4} = 3 \frac{17}{20}
\]
\[
4 \frac{3}{5} + 4 \frac{3}{5} + 3 \frac{17}{20} + 3 \frac{17}{20} = 16 \frac{9}{10}
\]
The perimeter of the storeroom is 16 9/10 meters.

12. \[
4 \frac{1}{5} + 3 \frac{2}{5} = 7 \frac{3}{5}
\]
\[
7 \frac{3}{5} - 2 \frac{1}{2} = 5 \frac{1}{10}
\]
There were 5 1/10 liters of water in the tank at first.

Put on Your Thinking Cap!

1. Thinking skill: Comparing

Solution:
Length of each piece of rope P
\[
= \frac{2}{3} \times \frac{2}{3} = \frac{4}{9}
\]
Length of each piece of rope Q
\[
= \frac{2}{3} + \frac{2}{3}
\]
\[
= 1 \frac{1}{15}
\]
Length of rope Q = 1 \frac{1}{15} + 1 \frac{1}{15} + 1 \frac{1}{15}
\[
= 3 \frac{1}{5}
\]
The length of rope Q is 3 1/5 meters.

2. Thinking skill: Comparing

Strategy: Use a model

Solution:
Lionel
Gary
Vivian

Vivian has 12 units of money and Lionel has 3 units.
12 \div 3 = 4
Vivian's amount of money is 4 times Lionel's amount of money.
3. Thinking skill: Comparing
Strategy: Use a model
Solution:
Andrew [ ]
Malik [ ]
Andrew’s savings is \( \frac{5}{8} \) of Malik’s savings.

4. Thinking skill: Identifying patterns and relationships
Strategy: Look for pattern
Solution:
\[
\frac{1}{100} + \frac{2}{100} + \ldots + \frac{49}{100} + \frac{50}{100} + \frac{51}{100} + \ldots + \frac{98}{100} + \frac{99}{100}
\]
The sum of each pair of fractions is 1.
Number of such pairs of fractions
= \( \frac{98}{2} \)
= 49
Value = \( 49 \times \frac{50}{100} \)
= \( 49 \frac{1}{2} \)

5. Thinking skill: Identifying patterns and relationships
Strategy: Look for pattern
Solution:
Look for pairs of numbers that give a sum of 11.
\[
\frac{1}{10} \times 11
\]
= \( \frac{1}{99} \times 55 \)
= \( \frac{5}{9} \)

6. Thinking skill: Identifying patterns and relationships
Strategy: Look for pattern
Solution:
\[
\frac{1}{1 \times 2} + \frac{1}{2 \times 3} = \frac{2}{3}
\]
\[
\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} = \frac{3}{4}
\]
\[
\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \frac{1}{4 \times 5} = \frac{4}{5}
\]
\[
\frac{1}{1 \times 2} + \frac{1}{2 \times 3} + \frac{1}{3 \times 4} + \ldots + \frac{1}{28 \times 29}
\]
\[+ \frac{1}{29 \times 30} = \frac{29}{30} \]

7. Thinking skill: Comparing
Strategy: Use a model
Solution:
\[
\frac{2}{5} = \frac{4}{10}, \frac{1}{2} = \frac{5}{10}
\]
\[
\text{of the students in the class did not go to the fun fair.}
\]

8. Thinking skill: Comparing
Strategy: Use a model
Solution:
\[
\frac{3}{12} = \frac{1}{4}
\]
Sean gets \( \frac{1}{4} \) of the marbles.

Chapter 4

Lesson 4.1

1. \( \frac{1}{2}, \frac{3}{5}, \frac{3}{10} \)
2. \( \frac{3}{4}, \frac{5}{7}, \frac{15}{28} \)
3. \( \frac{15}{22} \)
4. \( \frac{7}{18} \)
5. \( \frac{5}{8} \)
6. \( \frac{4}{5} \)
7. \( \frac{1}{5} \)
8. \( \frac{1}{2} \)

Lesson 4.2

1. \( \frac{2}{7} \times \frac{3}{4} = \frac{3}{14} \)
\[
\frac{3}{14} \times 56 = 12
\]
Rahul gets 12 paper clips.

2. \( 1 - \frac{2}{3} = \frac{1}{3} \)
\[
\frac{1}{3} \times \frac{9}{10} = \frac{3}{10}
\]
\[\frac{3}{10} \text{ hour is left.}\]
3. **Method 1**

<table>
<thead>
<tr>
<th>Magazine</th>
<th>Book</th>
<th>Left</th>
</tr>
</thead>
</table>

\[
\frac{3}{6} = \frac{1}{2} \]

\[
\frac{1}{2} \text{ of his savings are left.} \]

**Method 2**

\[
1 - \frac{1}{6} = \frac{5}{6} \]

\[
\frac{2}{5} \times \frac{5}{6} = \frac{1}{3} \]

\[
1 - \frac{1}{6} - \frac{1}{3} = \frac{1}{2} \]

\[
\frac{1}{2} \text{ of his savings are left.} \]

4. Fraction of caps that are not red or blue

\[
= 1 - \frac{1}{6} - \frac{1}{3} \]

\[
= \frac{1}{2} \]

Fraction of caps that are green

\[
= \frac{3}{7} \times \frac{1}{2} \]

\[
= \frac{3}{14} \]

3 units \(\rightarrow\) 27

1 unit \(\rightarrow\) \[
27 \div 3 = 9 \]

14 units \(\rightarrow\) \[
14 \times 9 = 126 \]

There are 126 caps altogether.

5. \[
1 - \frac{1}{5} = \frac{4}{5} \]

\[
\frac{7}{8} \times \frac{4}{5} = \frac{7}{10} \]

\[
\frac{7}{10} \times 30 = 21 \]

She receives 21 text messages.

6. \[
1 - \frac{2}{5} = \frac{3}{5} \]

\[
\frac{4}{3} \times \frac{3}{5} = \frac{4}{15} \]

\[
\frac{3}{5} - \frac{4}{15} = \frac{5}{15} = \frac{1}{3} \]

1 unit \(\rightarrow\) 15

3 units \(\rightarrow\) \[
3 \times 15 = 45 \]

Sam makes 45 bread rolls.

7. **Method 1**

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<tr>
<th>Devi</th>
<th>Anne</th>
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<tr>
<td>6</td>
<td>24</td>
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\[
6 \times 24 = 144 \]

Anne has 144 cards.

**Method 2**

\[
\frac{4}{5} \times 165 = 132 \]

\[
132 \div 2 = 66 \]

\[
165 - 66 = 99 \]

Marcos has 99 more beads than Roxanne.

8. **Method 1**

<table>
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<tr>
<th>Roxanne</th>
<th>Sharia</th>
<th>Marcos</th>
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\[
5 \text{ units} \rightarrow 165 \]

1 unit \(\rightarrow\) \[
165 \div 5 = 33 \]

3 units \(\rightarrow\) \[
3 \times 33 = 99 \]

Marcos has 99 more beads than Roxanne.

9. \[
\frac{1}{5} = \frac{2}{10} \]

\[
\frac{1}{2} = \frac{5}{10} \]

\[
1 - \frac{1}{5} - \frac{1}{2} = \frac{3}{10} \]

**Dictionary** $21

3 units \(\rightarrow\) $21

1 unit \(\rightarrow\) \[
21 \div 3 = 7 \]

5 units \(\rightarrow\) \[
5 \times 7 = 35 \]

Ken has $35 left.

10. a. **Spent**

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4 units \(\rightarrow\) $24

1 unit \(\rightarrow\) \[
24 \div 4 = 6 \]

5 units \(\rightarrow\) \[
5 \times 6 = 30 \]

She spends $30.

b. **Chicken pie**

$30

8 units \(\rightarrow\) $30

1 unit \(\rightarrow\) \[
30 \div 8 = 3.75 \]

6 units \(\rightarrow\) \[
6 \times 3.75 = 22.50 \]

The flan costs $22.50.
11. **Lesson 4.3**

- **1.** $\frac{1}{8}$
- **2.** $\frac{1}{5}$
- **3.** $\frac{1}{3}$
- **4.** $\frac{1}{14}$
- **5.** $\frac{9}{14}$
- **6.** $\frac{9}{10}$
- **7.** 6
- **8.** $\frac{3}{3}$
- **9.** $\frac{5}{3}$
- **10.** $\frac{2}{9}$
- **11.** $\frac{2}{9}$

12. **Lesson 4.4**

- **1.** $\frac{7}{3}$
- **2.** 22
- **3.** $\frac{8}{3}$
- **4.** 39

**Lesson 4.5**

1. $1\frac{4}{5} \times 7 = 12\frac{3}{5}$
   - $12\frac{3}{5}$ liters are about 13 liters.
   - $13 \div 2 = 6\frac{1}{2}$
   - Mrs. Smith needs to buy 7 bottles every week.

2. $1\frac{3}{4} \times 9 = 15\frac{3}{4}$
   - $15\frac{3}{4}$ meters are about 16 meters.
   - Lily needs 16 meters of ribbon.

3. 箱 A 有 3 个单位比箱 C 多。
   - 3 units $\rightarrow$ 21
   - 1 unit $\rightarrow$ 21 $\div$ 3 = 7
   - 14 units $\rightarrow$ 14 $\times$ 7 = 98
   - Jacky bakes 98 biscuits.

4. Area of flowerbed $= 3\frac{3}{4} \times 2$
   - $= 7\frac{1}{2}$ m$^2$
   - Area of flowerbed with border
     $= (3\frac{3}{4} + \frac{1}{2} + \frac{1}{2}) \times (2 + \frac{1}{2} + \frac{1}{2})$
     $= 4\frac{3}{4} \times 3$
     $= 14\frac{1}{2}$ m$^2$
   - Area of border $= 14\frac{1}{2} - 7\frac{1}{2}$
     $= 6\frac{3}{4}$ m$^2$
   - Cost $= 6\frac{3}{4} \times 20$
     $= 135$
   - Uncle James has to pay $135.
Lesson 4.6

1. \[ \frac{1}{6} \div \frac{1}{6} = \frac{1}{6} \]

2. \[ \frac{5}{12} \div 5 = \frac{1}{12} \]
   There is \( \frac{1}{12} \) liter of paint in each pot.

3. \[ \frac{2}{15} \]

4. \[ \frac{3}{10} \]

5. \[ \frac{1}{24} \]

6. \[ \frac{1}{9} \]

8. \[ \frac{5}{12} \div 5 = \frac{1}{12} \]
   Each girl has \( \frac{1}{10} \) of the loaf of bread.

9. \[ \frac{3}{10} \div 3 = \frac{3}{30} \]
   The total length of 2 of the pieces is \( \frac{3}{10} \) meter.

10. \[ \frac{3}{10} + \frac{3}{20} = \frac{3}{10} \]

11. \[ \frac{4}{5} \div 3 = \frac{4}{15} \]
   Each friend got \( \frac{4}{15} \) of the bag of nuts.

Lesson 4.7

1. \[ \text{Gave away: } 8 \text{ units } \rightarrow 250 - 18 = 232 \]
   1 unit \( \rightarrow 232 \div 8 = 29 \)
   3 \times 29 + 18 = 105
   Maria had 105 beads at first.

Method 1

Method 2

2. Paul

   10 units \( \rightarrow 280 \)
   1 unit \( \rightarrow 280 \div 10 = 28 \)
   3 units \( \rightarrow 3 \times 28 = 84 \)
   Tim has 84 more postcards than Paul.

3. \[ 1 - \frac{5}{9} = \frac{4}{9} \]

   Number of boys who do not take part in sports activities
   \[ = \frac{4}{9} \times 540 \]
   \[ = 240 \]

   Number of boys in school
   \[ = \frac{3}{5} \times 1,800 \]
   \[ = 1,080 \]

   Number of boys who take part in sports activities
   \[ = 1,080 - 240 \]
   \[ = 840 \]

   840 boys take part in sports activities.

4. Daniel

   5 units \( \rightarrow 195 \)
   10 units \( \rightarrow 195 \times 2 = 390 \)
   Daniel has 390 marbles.

5. Shally

   4 units \( \rightarrow 288 + 68 = 356 \)
   1 unit \( \rightarrow 356 \div 4 = 89 \)
   \$89 \div 68 = \$21 \)
   Shally had \$21 at first.

6. Class C

   92

   Class A

   160

   Class B

   1 unit \( \rightarrow 160 - 92 = 68 \)
   2 units \( \rightarrow 2 \times 68 = 136 \)
   136 + 160 = 296
   Class B folds 296 paper cranes.
7. 

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</table>
7 units $\rightarrow$ $203$
1 unit $\rightarrow$ $203 \div 7 = 29$
12 units $\rightarrow$ $12 \times 29 = 348$

Kerrie had $348$.

4. Strategy: Use a model, Use before-after concept
Solution:
Before:
Number of girls $= \frac{3}{5} \times 120 = 72$
Number of boys $= 120 - 72 = 48$

After:

<table>
<thead>
<tr>
<th>Boys</th>
<th>Girls</th>
</tr>
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<tbody>
<tr>
<td></td>
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<tr>
<td>48</td>
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</tbody>
</table>

3 units $\rightarrow$ 48
1 unit $\rightarrow$ $48 \div 3 = 16$
4 units $\rightarrow$ $4 \times 16 = 64$
$72 - 64 = 8$

8 girls left the library.

5. Thinking skill: Comparing
Strategy: Use before-after concept
Solution:
Before:
Adults $\rightarrow$ 3 units $\bigg\rfloor$ Difference
Children $\rightarrow$ 5 units $\bigg\rfloor$ = 2 units

After:
Adults $\rightarrow$ 2 units $\times 2 = 4$ units $\bigg\rfloor$ Difference
Children $\rightarrow$ 3 units $\times 2 = 6$ units $\bigg\rfloor$ = 2 units
4 units $- 3$ units $= 1$ unit
1 unit $\rightarrow$ 6
8 units $\rightarrow$ $8 \times 6 = 48$

48 people were on the bus at first.

6. Strategies: Use a model, Use before-after concept
Solution:
Before:

After:

3 units $\rightarrow$ 48
1 unit $\rightarrow$ $48 \div 3 = 16$
5 units $\rightarrow$ $5 \times 16 = 80$

There were 80 counters in the box at first.

7. Thinking skill: Comparing
Strategy: Use a model, Use before-after concept
Solution:
Before:

<table>
<thead>
<tr>
<th>Apples</th>
<th>Oranges</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

15 units $\rightarrow$ 120
1 unit $\rightarrow$ $120 \div 15 = 8$
26 units $\rightarrow$ $26 \times 8 = 208$

There were 208 apples and oranges at the stand at first.

8. Thinking skill: Comparing
Strategy: Use before-after concept
Solution:
After:

In puzzle $\rightarrow$ 13 units $\bigg\rfloor$ Total $= 20$ units
Not in puzzle $\rightarrow$ 7 units $\bigg\rfloor$ Total $= 20$ units

Before:

In puzzle $\rightarrow$ 2 units $\times 4$
$= 8$ units $\bigg\rfloor$ Total $= 20$ units
Not in puzzle $\rightarrow$ 3 units $\times 4$
$= 12$ units

12 units $- 7$ units $= 5$ units
5 units $\rightarrow$ 300
1 unit $\rightarrow$ $300 \div 5 = 60$
20 units $\rightarrow$ $20 \times 60 = 1,200$

The jigsaw puzzle consists of 1,200 pieces.

9. Thinking skill: Analyzing parts and whole
Strategy: Work backward
Solution:

$$720 \div 2 = 360$$
Each had 360 stamps in the end.

<table>
<thead>
<tr>
<th>Samuel</th>
<th>Pat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finally: 360</td>
<td>360 ((\frac{2}{3}) left)</td>
</tr>
<tr>
<td>Pot to Samuel: 360 $- 180 = 180$, (\frac{2}{3}) left</td>
<td>$360 \div 2 = 180$, 360 (\frac{1}{3}) left</td>
</tr>
<tr>
<td>Samuel to Pot: 180 $\div 3 = 60$, 180 $\div 60 = 240$</td>
<td>540 $- 60 = 480$</td>
</tr>
</tbody>
</table>

Samuel had 240 stamps at first.
10. Thinking skill: Analyzing parts and whole
   Strategy: Work backward
   Solution:

<table>
<thead>
<tr>
<th>Stage</th>
<th>Work</th>
<th>A</th>
<th>B</th>
<th>C</th>
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</thead>
<tbody>
<tr>
<td>Finally</td>
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<td>18</td>
<td>18</td>
<td>18</td>
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<tr>
<td>C to A</td>
<td>Pol C: 18 + 3 x 4 = 24</td>
<td>12</td>
<td>18</td>
<td>24</td>
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<tr>
<td></td>
<td>Pol A: 18 - 6 = 12</td>
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<tr>
<td>B to C</td>
<td>Pol B: 18 + 3 x 4 = 24</td>
<td>12</td>
<td>24</td>
<td>18</td>
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<tr>
<td></td>
<td>Pol C: 24 - 6 = 18</td>
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<tr>
<td>A to B</td>
<td>Pol A: 12 + 3 x 4 = 16</td>
<td>16</td>
<td>20</td>
<td>18</td>
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<td>Pol B: 24 - 4 = 20</td>
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Pail A had 16 gallons of water, pail B had 20 gallons of water and pail C had 18 gallons of water at first.

Difference in quantity eaten each day = 8 - 5
= 3

Number of days = 36 ÷ 3
= 12

Number of cashews = 12 x 8 + 4
= 100

Each child had 100 cashews at first.

Cost of 1 model plane = $52 - $14
= $38

Cost of 1 model car and 1 model plane = $52 + $38
= $90

$834 - 3 x $38 = $720

Number of model cars = $720 ÷ $90
= 8

Number of model planes = 8 + 3
= 11

He buys 11 model planes.

Test Prep for Chapters 1 to 4
11. 2,467,058  12. 710,000
13. 203,485
14. 3,190,500  3,090,500  2,090,500
    319,500  290,500
15. 16  16. 424
17. 4 - 7/12  18. 144
19. 5,925  20. 21/40
21. Mrs. Jones $2,055
     Mr. Graham

3 units -> $2,055
1 unit -> $2,055 ÷ 3 = $685
4 units -> 4 x $685 = $2,740

Mr. Graham had $2,740.

22. Left

<table>
<thead>
<tr>
<th>Cow</th>
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</table>

23. $2 x 7 = 14$
(5m - 14) liter of milk is left.

Difference in quantity left = 4 x 9
= 36

Chapter 5
Lesson 5.1
1. w + 8  2. a - 10
3. p + 3/4  4. 5 - 6y
5. 6g  6. 3k/2
7. 4h  8. 5s - 12
9. 7b + 8  10. 5d/4
11. 7  12. 13
13. 31  14. 60
15. 14  16. 37
17. 7  18. 5
19. 10  20. 9
21. Mrs. Smith pays 5x dollars.
22. Alyssa has (6p - 15) dollars more than her brother.
23. Each of them has \( \frac{3y + 8}{2} \) comics.
25. \( k \) bottles of pasta sauce cost
   \[ k \times \$4 = \$4k. \]
   He received \( \$ (10 - 4k) \) change.

26. The cost of 3 such books is \( \frac{3y}{6} \) dollars.

27. John has \((y - 20)\) stickers for his sisters.
   Each sister gets \( \frac{(y - 20)}{2} \) stickers.

28. Kenny has \((m + 10)\) fish.
   He buys another \((20 + 30) = 50\) fish.
   Kenny has \((m + 60)\) fish now.

29. The shorter piece is \( \left( \frac{9 - 10}{2} \right) \) inches long.

Lesson 5.2

1. \( 3g \)
2. \( 10w \)
3. \( 5a \)
4. \( 8b \)
5. \( 7h \)
6. \( 6k \)
7. \( 11d \)
8. \( 15n \)
9. \( 12x - 4 \)
10. \( 6 + 10g \)
11. \( 4n + 5 \)
12. \( 6d - 5 \)
13. \( 12 + 3k \)
14. \( 7w + 3 \)
15. \( 4 + 13h \)
16. \( 5 + 3m \)
17. \( 5 + 3s \)
18. \( 4n + 13 \)

Lesson 5.3

1. \(< \)
2. \(= \)
3. \(> \)
4. \(> \)
5. \(> \)
6. \(< \)
7. \(> \)
8. \(= \)
9. \(7 \)
10. \(4 \)
11. \(6 \)
12. \(7 \)
13. \(8 \)
14. \(9 \)

Lesson 5.4

1. \( a. \) Joan’s brother is \((4y - 28)\) years old.
   \[ b. \] \( 4 \times 12 - 28 = 20 \)
   Her brother is 20 years old.

2. \( a. \) The cost of renting the car is \( \$(120 + 18n) \).
   \( b. \) \( \$(120 + 18 \times 8) = \$264 \)
   The cost of renting the car is \$264.

3. \( a. \) \$5 = 500 cents
   He spends \( 7g \) cents in one week.
   He has \((500 - 7g)\) cents left.
   \[ b. \] \( 7g \) cents = \( \frac{7g}{100} \) dollars
   He has \( 5 - \frac{7g}{100} \) dollars left.

4. \( a. \) \( 10w - 2w = 8w \)
   \( 8w + 2 = 4w \)
   Cindy’s age is \( 4w \) years.
   \( b. \) If \( w = 4 \),
   \( 4w = 4 \times 4 = 16 \)
   Cindy is 16 years old.

5. \( a. \) Patrick paid \( 3p \) dollars.
   \( b. \) \( 3p = 36 \)
   \[ p = 12 \]
   When \( p = 12 \), Patrick and Amanda pay the
   same amount of money for the model planes.

6. \( a. \) \( 4k + 6 = 4 \times 5 + 6 = 26 \)
   \( 6k - 2 = 6 \times 5 - 2 = 28 \)
   \( 26 < 28 \)
   Nancy has a shorter ribbon.
   \( b. \) \( 6k - 2 = 4k + 6 \)
   \[ 2k = 8 \]
   \[ k = 4 \]
   When \( k = 4 \), they will have the same length of
   ribbon.

7. \( 50b - 28b = 22b \)
   \( 28b > 22b \)
   No, he does not save more than he spends.

8. Benny has \( 3p \) game cards.
   Together Anne and Benny have
   \((p + 3p) = 4p \) game cards.
   If \( 4p > 30 \), then \( p \) must be 8, 9, 10, ... .
   The least value of \( p \) is 8 so that Anne and
   Benny together have more game cards than Colin.

Put on Your Thinking Cap!

1. Thinking skill: Analyzing parts and whole
   Strategy: Solve part of the problem
   Solution:
   \[ 5 \times p = 5p \]
   \[ 200 \text{ g} \times 5 = 1,000 \text{ g} = 1 \text{ kg} \]
   The total mass of the crackers in 5 boxes
   is \((5p - 1)\) kilograms.

2. Thinking skill: Analyzing parts and whole
   Strategy: Solve part of the problem
   Solution:
   \( a. \) Mr. Johnson will pay \( $(2x + 30)$.
   \( b. \) \( 2 \times 200 + 30 = 430 \)
   He will have to pay \$430.
3. Thinking skill: Analyzing parts and whole
   Strategy: Solve part of the problem
   Solution:
   a. The remaining stickers are shared by 3 people.
      She gives each brother \( \frac{80 - 5m}{3} \) stickers.
   b. If \( m = 4 \),
      \( \frac{80 - 5 \times 4}{3} = 20 \)
      Each brother gets 20 stickers.
4. Thinking skill: Analyzing parts and whole
   Strategy: Solve part of the problem
   Solution:
   a. Jerry’s allowance = 3\( k \) dollars
      Danny’s allowance = (3\( k \) + 20) dollars
      \( k + 3k + 3k + 20 = 7k + 20 \)
      Their total monthly allowance is
      \( (7k + 20) \) dollars.
   b. 7 \times $18 + $20 = $146
      Their total monthly allowance is $146.

**Put on Your Thinking Cap!**

1. Thinking skill: Spatial visualization
   Strategy: Simplify the problem
   Solution:
   Area of \( ABC = \frac{1}{2} \times 72 \times 96 \)
   = 3456 in.\(^2\)
   Area of \( ADC = \frac{1}{2} \times 72 \times 48 \)
   = 1728 in.\(^2\)
   Shaded area = 3456 - 1728
   = 1728 in.\(^2\)

2. Thinking skill: Spatial visualization
   Strategy: Simplify the problem
   Solution:
   Area of \( ABCD = 60 \times 60 \)
   = 3600 cm\(^2\)
   Area of \( ABC = \frac{1}{2} \times 60 \times 18 \)
   = 540 cm\(^2\)
   Shaded area = 3600 - 2 \times 540
   = 2520 cm\(^2\)

3. Thinking skill: Spatial visualization
   Strategy: Simplify the problem
   Solution:
   **Method 1**
   Base of 1 triangle = 60 \div 5
   = 12 cm
   Height of 1 triangle = 30 \div 2
   = 15 cm
   Area of 5 triangles = \( 5 \times \frac{1}{2} \times 12 \times 15 \)
   = 450 cm\(^2\)
   Area of remaining paper
   = 60 \times 30 - 450
   = 1350 cm\(^2\)
   **Method 2**
   Since the cut triangles make up a quarter of the paper,
   area of the remaining paper
   = \( \frac{3}{4} \times 60 \times 30 \)
   = 1350 cm\(^2\)

---

**Lesson 6.1**

1. \( AD \)
2. \( BE \)
3. \( CF \)
4. \( QR \)
5. \( PR \)
6. \( PQ \)

---

**Lesson 6.2**

1. 324 in.\(^2\)
2. 1350 cm\(^2\)
3. 346 \( \frac{1}{2} \) ft\(^2\)
4. 962 \( \frac{1}{2} \) m\(^2\)
5. 891 cm\(^2\)
6. 900 in.\(^2\)
7. 1058 cm\(^2\)
8. 1944 ft\(^2\)

---

174. Answers
4. Thinking skill: Spatial visualization
Strategy: Simplify the problem
Solution:
Area of $BCD = \frac{1}{2} \times 24 \times 10$
= 120 cm$^2$
Area of $BDE = \frac{1}{2} \times 26 \times 6$
= 78 cm$^2$
Shaded area = 120 - 78
= 42 cm$^2$

5. Thinking skill: Spatial visualization
Strategy: Simplify the problem
Solution:
Area of $PWTY = 36 \times 28$
= 1,008 ft$^2$
Area of $PVU = \frac{1}{2} \times 24 \times 28$
= 336 ft$^2$
Area of $QWSR = 24 \times 10$
= 240 ft$^2$
Shaded area = 1,008 - 336 - 240
= 432 ft$^2$

7. Thinking skill: Spatial visualization
Strategy: Simplify the problem
Solution:
Shaded area = $\frac{1}{2} \times 12 \times 12$
= 72 cm$^2$

8. Thinking skill: Spatial visualization
Strategy: Simplify the problem
Solution:
Area of 2 triangles = $2 \times \frac{1}{2} \times 24 \times 24$
= 576 in.$^2$
Area of square = $10 \times 10 = 100$ in.$^2$
Unshaded area = 576 - 100 - 100
= 376 in.$^2$

Chapter 7

Lesson 7.1
1. 60 grams
2. 23 : 10; 11 : 60; 60 : 23; 39 : 10; 60 : 10
   (or 6 : 1)
3. a. 4 : 3  b. 5 : 12
4. a. 7 : 20  b. 8 : 5
5. 14 : 15

Lesson 7.2
1. 12
2. 54
3. 56
4. 42
5. 72
6. 7
7. 9
8. 8
9. 2 : 3
10. 5 : 2
11. 7 : 4
12. 3 : 5
13. 8 : 5
14. 11 : 13
15. 2 : 3
16. 4 : 1

Lesson 7.3
1. a. 4 : 5 = 60 : 75
He uses 75 blue tiles.
b. 9 : 4 = 540 : 240
He uses 240 gray tiles.
2. a. 5 : 3 = 30 : 18
The building is 30 meters tall.
b. 5 : 3 = 45 : 27
The shadow will be 27 meters long.

Extra Practice 5A  175
3. 16 - 4 = 12
   18 + 3 = 21
   21 : 12 = 7 : 4

   The ratio of the number of boys to the number of girls is 7 : 4.

4. 2 units → 16 in.
   1 unit → 16 ÷ 2 = 8 in.

   Length = 5 × 8
           = 40 in.

   Width = 3 × 8
         = 24 in.

   Area of rectangle = 40 × 24
                     = 960 in.²

Lesson 7.4
1. 8 : 5
2. \( \frac{8}{5} \)
3. \( \frac{3}{8} \)
4. \( \frac{6}{13} \)
5. \( \frac{2}{3} \) times
6. 3 : 8
7. \( \frac{3}{8} \)
8. \( \frac{2}{3} \) times
9. 77 fish

Lesson 7.5
1. 35; 20
2. 9; 18
3. 28; 36
4. 35; 63
5. 3 : 2 : 5
6. 6 : 3 : 5
7. 3 : 5 : 8
8. 4 : 7 : 8

Lesson 7.6
1. Keisha's age this year = 12 + 3
   = 15 years

   Sarah's age : Keisha's age = 4 : 5 = 12 : 15

   Ratio in 9 years = (12 + 9) : (15 + 9)
                    = 21 : 24
                    = 7 : 8

   The ratio of Sarah's age to Keisha's age in 9 years is 7 : 8.

2. Distance dog runs : Distance cat runs
   = 7 : 4
   7 - 4 = 3
   12 ÷ 3 = 4 times
   4 × 7 = 28

   The dog has to run 28 meters.

3. 4 units → 20 bears
   2 units → 10 bears
   1 unit → 5 bears
   3 units → 5 dolls

   The ratio was 3 : 1.

4. Area of P : Area of Q = 3 : 2 = 12 : 8

   Number of units for the figure
   = 12 + 8 - 5
   = 15

   Number of units for the unshaded part
   = 15 - 5
   = 10
   10 : 15 = 2 : 3

   The ratio is 2 : 3.

Put on Your Thinking Cap!
1. Thinking skill: Analyzing parts and whole

   Strategy: Use a model

   Solution:

   Red
   Blue, Green
   Blue 162
   Green

   3 units → 162
   1 unit → 162 ÷ 3 = 54
   7 units → 7 × 54 = 378
   2 units → 378
   1 unit → 378 ÷ 2 = 189
   3 units → 3 × 189 = 567

   There are 567 ribbons in the basket.

2. Thinking skill: Analyzing parts and whole

   Strategy: Use a model

   Solution:

   Matthew
   Ann $78

   3 units → $78
   1 unit → $78 ÷ 3 = $26
   14 units → 14 × $26 = $364

   They have $364 altogether.
3. Thinking skill: Analyzing parts and whole
   Strategy: Use a model
   Solution:
   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |
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   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |
   6 units  →  18
   1 unit  →  18 ÷ 6 = 3
   16 units  →  16 × 3 = 48
   They have 48 books altogether.

4. Thinking skill: Analyzing parts and whole
   Strategy: Use a model
   Solution:
   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |
   5 units  →  79 + 106 = 185
   1 unit  →  185 ÷ 5 = 37
   11 units  →  11 × 37 = 407
   There were 407 tiles in the box at first.

5. Thinking skill: Analyzing parts and whole
   Strategy: Use a model
   Solution:
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   |   |   |   |   |   |   |   |   |   |   |
   3 units  →  261 + 261 = 522
   1 unit  →  522 ÷ 3 = 174
   2 units  →  2 × 174 = 348
   He had 348 apples at first.

6. Thinking skill: Analyzing parts and whole
   Strategy: Use a model
   Solution:
   a. Method 1
      Andy  [Diagram]
      Bobby  [Diagram]
      The new ratio was 9 : 5.
   b. Method 2
      Andy's collection : Bobby's collection
      = 2 : 5
      = 4 : 10
      (4 + 5) : (10 - 5) = 9 : 5
      The new ratio was 9 : 5.

7. Thinking skill: Analyzing parts and whole
   Strategy: Use a model
   Solution:
   Michael  |  Samuel  |  Royston
   |   |   |   |
   2 units  →  118
   1 unit  →  118 ÷ 2 = 59
   15 units  →  15 × 59 = 885
   There were 885 marbles in the box.

Mid-Year Test

21. 899,300  22. 6,000
23. 84  24. 5
25. 180  26. 160
27. 78  28. 3
29. 8  30. 2
31. 3 : 2  32. 7
33. 13  34. 8
35. 19  36. 455
37. 540  38. 680
39. 112.5
40. Mr. Johnson drives 2 miles farther.
41. [Diagram]

9 units  →  1,350
1 unit  →  1,350 ÷ 9 = 150
4 units  →  4 × 150 = 600
600 green beads are used.
42. Area of triangle $BDC = \frac{1}{2} \times 12 \times 12$
   $= 72 \text{ cm}^2$

Area of square $GEFC = 6 \times 6$
   $= 36 \text{ cm}^2$

Area of triangle $EDF = \frac{1}{2} \times (12 + 6) \times 6$
   $= 54 \text{ cm}^2$

Shaded area $= BDC + GEFC - EDF$
   $= 72 + 36 - 54$
   $= 54 \text{ cm}^2$

43.

17 units $\rightarrow$ 102
1 unit $\rightarrow$ 102 $\div$ 17 $= 6$
8 units $\rightarrow$ $8 \times 6 = 48$
9 units $\rightarrow$ $9 \times 6 = 54$

She made 48 chicken sandwiches and 54 tuna sandwiches.

44. a. Number of red balls $= 48 \div 3$
   $= 16$

Number of white balls $= 30 \div 5$
   $= 6$

Total number of balls $= 16 + 6 + 30 + 48$
   $= 100$

There are 100 balls altogether.

b. $1 - \frac{7}{10} = \frac{3}{10}$

$\frac{3}{10} \times 100 = 30$
30 balls will be left.

45.

a. 2 units $\rightarrow$ 30
1 unit $\rightarrow$ $30 \div 2 = 15$
14 units $\rightarrow$ $14 \times 15 = 210$
They have 210 marbles altogether.

b. $210 \div 3 = 70$
3 units $\rightarrow 3 \times 15 = 45$
$70 - 45 = 25$
25 more marbles must be given to Pete.