Answer Key

Hands-On Lab 1-2
Think and Discuss

1. Add the exponents to get 5^{120}.
2. Subtract the exponents to get 5^{80}.
3. An exponent is defined as a repeated factor.
4. 3^8 because $(3^4)^2$ means $(3^4) \cdot (3^4)$.

Try This

1. 4^8
2. 6^5
3. 3^8
4. 5^3
5. 2^5
6. 7^1
7. 4^{12}
8. 2^{16}
9. 5^6

Hands-On Lab 1-4
Activity

59,000; 57,000; 1.7%

438,000; 432,000; 0.7%

1. $\frac{1000}{58{,}000} \approx 0.017 \times 100 = 1.7\%$
2. $\frac{3000}{435{,}000} \approx 0.007 \times 100 = 0.7\%$

Think and Discuss

1. Because 1000 is a larger percent of 58,000 than 1000 is of 152,000.
2. Because 5000 is a smaller percent of 435,000 than 1000 out of 58,000.
3. Because the ratios of the errors to the size of the populations are the same.
4. Larger errors don't necessarily mean larger relative errors, and smaller errors don't necessarily mean smaller relative errors.
5. An error on its own may seem small but is actually large compared to the total amount. At the same time, an error may seem large but actually is small compared to the total amount.

Try This

1. 0.4%
2. Answers will vary.
3. Answers will vary.

Hands-On Lab 1-9
Activity

$6x$; 5

x^2; $3x$; 4

Think and Discuss

1. The Commutative Property of Addition
2. Both terms are represented by the same size tile: 2 rectangles plus 3 rectangles is 5 rectangles.
3. Think $2x + 3x = (2 + 3)x$, or $5x$.

Try This

1.



2. $x^2 + 3x + 1$
3. $6x + 6$
4. $x^2 + 4x + 7$
5. $3x^2 + 4x + 1$

Hands-On Lab 1-10
Think and Discuss

1. The values of both sides of the equals sign would not be the same and the equation would be false.

Try This

1. 13
2. 6
3. 2
4. 22

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Answer Key

Hands-On Lab Recording Sheet 1-11
Think and Discuss

1. subtraction; division
2. Answers will vary.

Try This

1. $x = 4$
2. $n = 8$
3. $r = 8$
4. $n = 5$
5. $y = 7$
6. $r = 4$
7. $w = 2$
8. $p = 3$

Hands-On Lab Recording Sheet 2-2
Think and Discuss

1. Yes; $8 + (-3)$ and $-3 + 8$ will give the same answer. Addition is a Commutative operation.
2. negative
3. positive
4. The sign of the answer is the same as the sign of the number that is farther from zero. $7 + (-3) = 4$, $-7 + 3 = -4$.

Try This

1. -3
2. -9
3. -4
4. 2
5. $4 + (-5)$
6. $3 + (-3)$
7. $4 + (-1)$
8. $2 + (-4)$

Hands-On Lab Recording Sheet 2-3
Think and Discuss

1. Show 5 red chips paired with yellow chips. Then take away the 5 yellow chips.
2. No. Each zero pair remaining equals zero.
3. No. $2 - 3$ can be modeled with 2 yellow chips plus one zero pair of a red chips and a yellow chip. Then 3 yellow chips are taken away, leaving 1 red chip. $3 - 2$ is modeled by taking 2 yellow chips from 3 yellow chips, leaving 1 yellow chip.
4. Sample answer: If two integers with the same sign are subtracted, subtract the unsigned numbers. If the first number has a larger unsigned value, the answer has the same sign as the first number. If not, the answer has the same sign as the number being subtracted: $3 - 2 = 1$; $2 - 3 = -1$; $-3 - (-2) = -1$; $-2 - (-3) = 1$; If two numbers with different signs are subtracted, add the unsigned numbers. The sign of the answer is the same as the sign of the first number: $3 - (-2) = 5$; $-2 - 3 = -5$; $2 - (-3) = 5$

Try This

1. 2
2. -2
3. 1
4. -1
5. -1
6. -3
7. 2
8. 2
9. 10

Hands-On Lab Recording Sheet 2-4
Activity 1
Think and Discuss

1. The sign is positive; the sign is negative; the sign is positive.
2. $1 \bullet 2$; $-1 \bullet (-12)$; $2 \bullet 6$; $-2 \bullet (-6)$; $3 \bullet 4$; $(-3) \bullet (-4)$

Try This

1. -20
2. -6
3. -6

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4. −10
5. Kathy spent $6.00.

Activity 2
Think and Discuss

1. The sign is a positive; the sign is a negative; the sign is a negative.
2. Both involve grouping numbers.

Try This

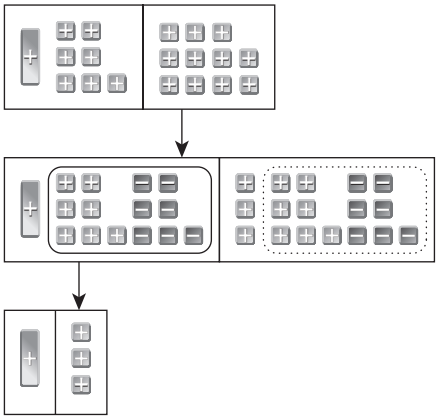
1. −3
2. −3
3. −4
4. −2
6. Each activity costs $6.00.

Hands-On Lab Recording Sheet 2-5
Think and Discuss

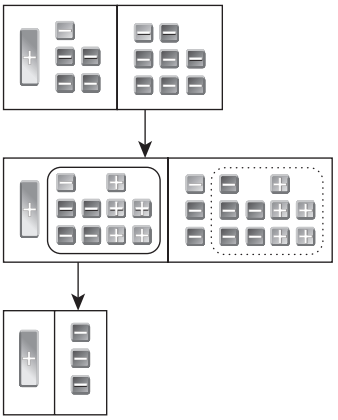
1. Subtraction, Addition.
2. Replace *x* with the solution: one side should equal the other side.
3. Subtracting a positive number is the same as adding the negative of that number.

Try This

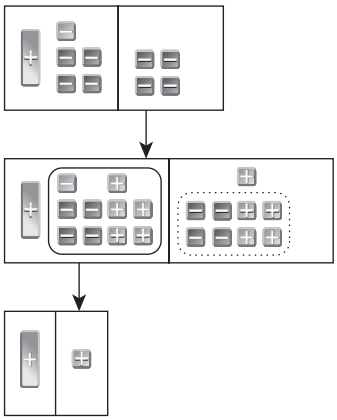
1.



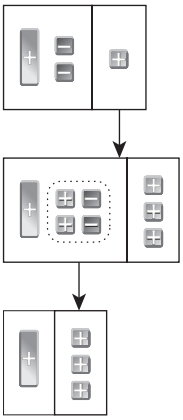
2.



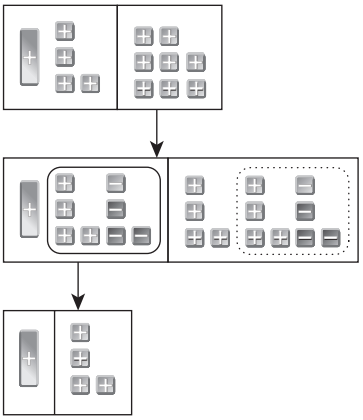
3.



4.

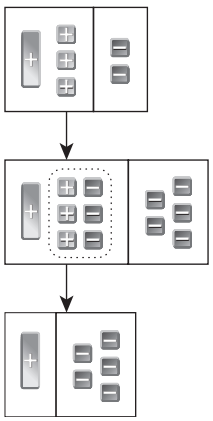


5.

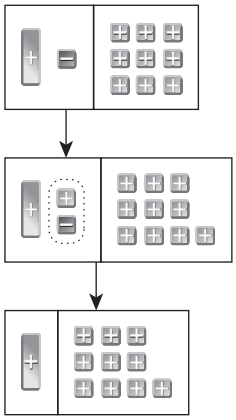


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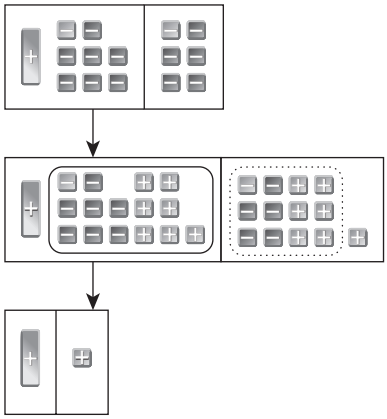
6.



7.



8.



Hands-On Lab 2-6
Activity

1. Possible answer: A number is divisible by 2 if it ends in 0, 2, 4, 6, or 8. 84 and 50 are divisible by 2.
2. Possible answer: A number is divisible by 3 if the sum of its digits is divisible by 3. 75 and 240 are divisible by 3.
3. Possible answer: A number is divisible by 5 if it ends in 0 or 5. 95 and 120 are divisible by 5.
4. Possible answer: A number is divisible by 8 if the last three digits form a number divisible by 8. 136 and 2,400 are divisible by 8.
5. Possible answer: A number is divisible by 9 if the sum of its digits is divisible by 9. 333 and 909 are divisible by 9.

Think and Discuss

1. Possible answer: Yes, since all even numbers end in 0, 2, 4, 6, or 8, all even numbers are divisible by 2.
2. Answer: No, the sum of the digits must be divisible by 3 for the number to be divisible by 3. The number 13 is not divisible by 3.

Try This

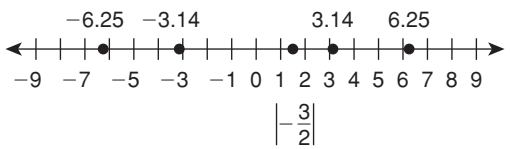
1. 64; 65
2. 96; 97
3. 124; 125
4. 105; 106
5. 144; 146
6. 408; 412
7. 765; 762
8. 110; 115

Possible answers:

9. 1,230
10. 1,245
11. 4,905
12. 2,916
13. 1,056
14. 396

Hands-On Lab 2-11
Activity

1–3.



4. −14.8 and 14.8

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Answer Key

Think and Discuss

1. Distance can never be negative.
2. True; a number and its opposite are the same distance from 0 on the number line, but on opposite sides of 0. For example, -5 and 5 are both 5 units away from 0, but on opposite sides.
3. There are two points on the number line that are a distance of 14.8 units from 0.

Try This

1. 10.01
2. 7.14
3. $\sqrt{2}$
4. 6
5. 8.61
6. $\frac{6}{8}$
7. 2 or -2
8. $\sqrt{5}$ or $-\sqrt{5}$
9. $6\frac{7}{12}$ or $-6\frac{7}{12}$
10. 4 or -4

Hands-On Lab Recording Sheet 3-3 Activity 1

1. a. 0.002
   b. 0.33
   c. 0.5
   d. 4.4
2. a. 1
   b. 0.88
   c. 1.05
   d. 0.72

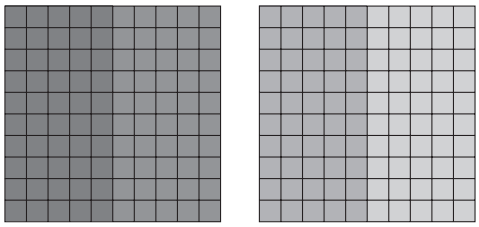
Think and Discuss

1. You can use only whole blocks, not partial blocks.

Try This

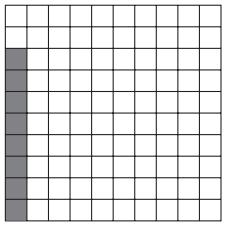
1. 2

Show your work.



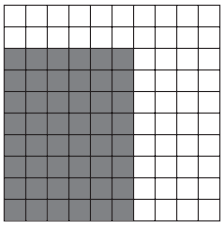
2. 0.08

Show your work.



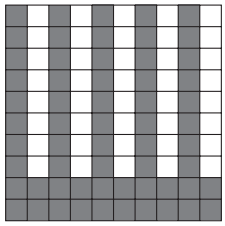
3. 0.48

Show your work.



4. 0.615

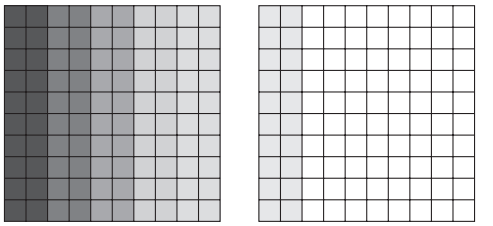
Show your work.



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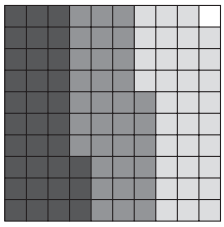
5. 1.2

Show your work.



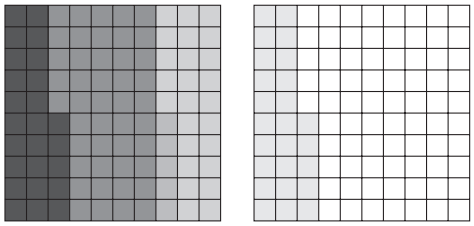
6. 0.99

Show your work.



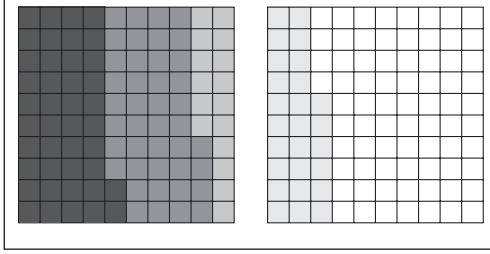
7. 1.25

Show your work.



8. 1.26

Show your work.



Activity 2

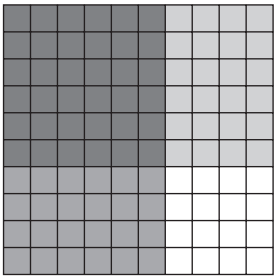
1. a. 0.12
   b. 0.01
   c. 0.04
   d. 0.02

Think and Discuss

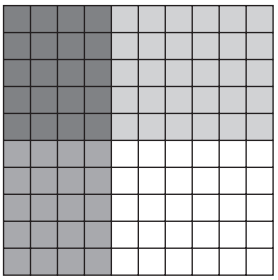
1. First shade 5 rows one color, and then shade 5 columns a second color. The answer is the region that was shaded twice.
2. Shade the number of squares for the decimal as many times as the whole number.

Try This

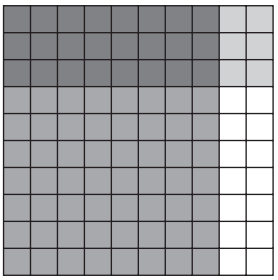
1. 0.36



2. 0.2



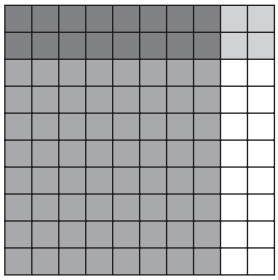
3. 0.24



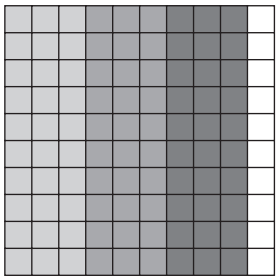
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Answer Key

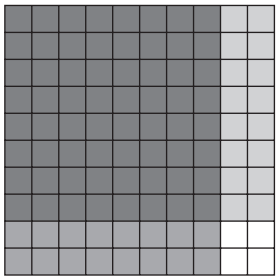
4 0.16



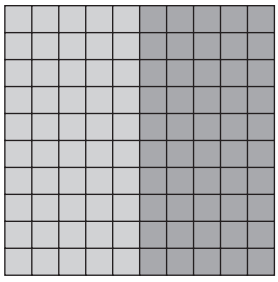
5. 0.9



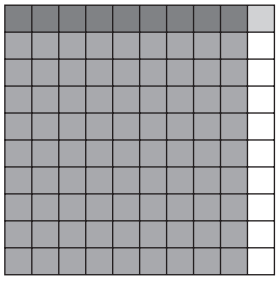
6. 0.64



7. 1



8. 0.09



Hands-On Lab Recording Sheet 3-4
Think and Discuss

1. Possible answer: Division is not commutative. The divisor tells you how many groups to break the dividend into. If you switch a divisor and a dividend, you will get a different answer. For example, $0.8 \div 0.2 = 4$; but $0.2 \div 0.8 = 0.25$
2. Possible answer: In division by a whole number, the divisor tells you how many groups to separate the dividend into. In division by a decimal, the divisor tells you the size of the groups to separate the dividend into. The quotient is how many groups you have.

Try This

1. 0.2
2. 0.15
3. 3
4. 1.5
5. 0.5
6. 0.45
7. 3
8. 2

Hands-On Lab Recording Sheet 3-8

1. a. $\frac{2}{3}$
   b. $\frac{3}{4}$
   c. $\frac{5}{12}$
   d. $\frac{3}{5}$
2. a. $\frac{5}{6}$
   b. $\frac{3}{4}$
   c. $\frac{1}{2}$
   d. $\frac{5}{12}$
3. a. $1\frac{1}{2}$
   b. $1\frac{1}{6}$

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c. $1\frac{1}{12}$

d. $1\frac{1}{8}$

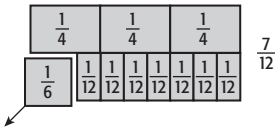
4. a. $\frac{1}{3}$

b. $\frac{1}{12}$

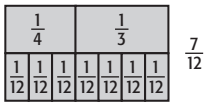
c. $\frac{1}{6}$

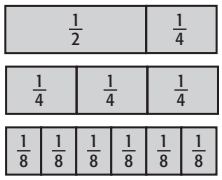
d. $\frac{1}{12}$

Think and Discuss

1. 

Possible answer: Model $\frac{3}{4}$. Place a $\frac{1}{6}$ bar beneath bars that show $\frac{3}{4}$, and find which fraction fills the remaining space. The fraction that fits is $\frac{7}{12}$.

2. 

3. 

Try This

1. 1
2. $\frac{5}{6}$
3. $\frac{5}{12}$
4. $\frac{11}{12}$
5. $\frac{1}{12}$
6. $\frac{1}{4}$
7. $\frac{7}{12}$
8. $\frac{5}{12}$
9. $\frac{7}{8}$ pizza
10. $\frac{1}{12}$ mile

Hands-On Lab Recording Sheet 3-10
Activity 1
Think and Discuss

1. Possible answer: Yes, multiplication is commutative, so both models will have the same parts shaded. The only difference in the models will be the orientation, or placement, of the shaded parts.
2. Possible answer: Suppose you have 2 fraction factors: factor A, $\frac{2}{3}$, and factor B, $\frac{1}{5}$. The product is less than factor B because a part of a part must be less than the original part. The product is less than factor A because you are finding $\frac{2}{3}$ of a part, rather than $\frac{2}{3}$ of a whole.

Try This

1. $\frac{1}{4}$
2. $\frac{1}{2}$
3. $\frac{5}{24}$
4. $\frac{1}{3}$

Activity 2
Think and Discuss

1. Possible answer: No, division is not commutative. The 2 models will show different groupings and different quotients.
2. Possible answer: The quotient is greater than the dividend. You are finding how many fractional parts are in the whole, or the dividend.

Try This

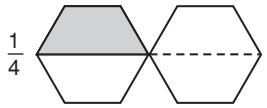
1. $\frac{7}{2}$ or $3\frac{1}{2}$
2. $\frac{8}{3}$ or $2\frac{2}{3}$
3. $\frac{3}{2}$ or $1\frac{1}{2}$

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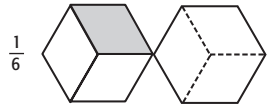
4. $\frac{17}{3}$ or $5\frac{2}{3}$

Hands-On Lab 3-10 Activity

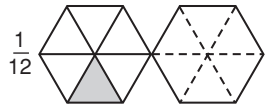
1. a.



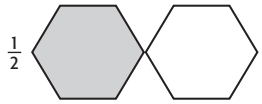
b.



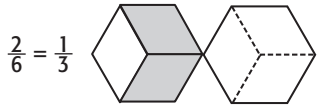
c.



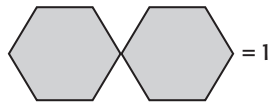
d.



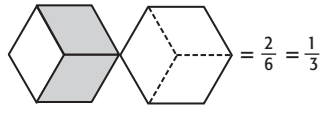
e.



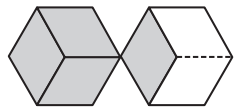
2. a. 1;



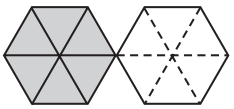
b. $\frac{1}{3}$;

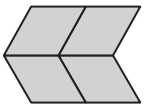


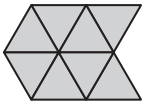
c. $\frac{2}{3}$;



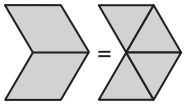
d. $\frac{6}{12} = \frac{1}{2}$;



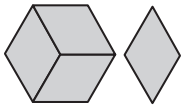




3. a.

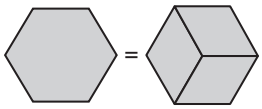


b.



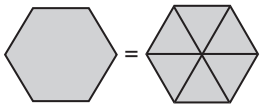
$\frac{1}{2}$ of $\frac{2}{3}$ is $\frac{1}{3}$.

c.



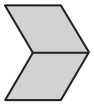
$\frac{1}{3}$ of $\frac{1}{2}$ is $\frac{1}{6}$.

d.



$\frac{5}{6}$ of $\frac{1}{2}$ is $\frac{5}{12}$.

4. a.



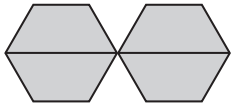
It takes 2 pattern blocks representing $\frac{1}{6}$ to cover $\frac{1}{3}$ exactly.

b.

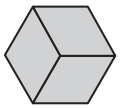


It takes 6 pattern blocks representing $\frac{1}{12}$ to cover $\frac{1}{2}$ exactly.

c.



d.



It takes 3 pattern blocks representing $\frac{1}{6}$ to cover $\frac{1}{2}$ exactly.

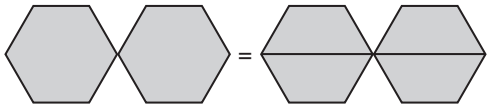
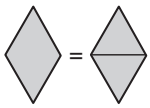
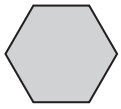
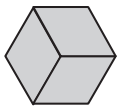
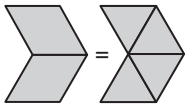
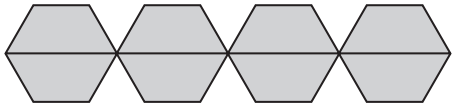
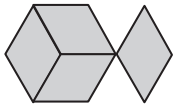
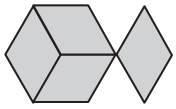
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Answer Key

Think and Discuss

1. No, the order of the factors differs so the models differ.
2. $\frac{1}{2}$; $\frac{1}{6}$; $\frac{1}{3}$
3. $\frac{1}{12}$; $\frac{1}{6}$; $\frac{1}{4}$; $\frac{1}{3}$; $\frac{1}{2}$; Fractions with lesser denominators represent greater numbers.

Try This

1.  $\frac{3}{4}$ of 1 is $\frac{3}{4}$.
2.  $\frac{1}{2}$ of $\frac{1}{6}$ is $\frac{1}{12}$.
3.  It takes 1 pattern block representing $\frac{1}{2}$ to cover $\frac{1}{2}$ exactly.
4.  $\frac{2}{3}$ of $\frac{3}{6}$ is $\frac{2}{6}$, or $\frac{1}{3}$.
5.  $\frac{3}{4}$ of $\frac{1}{3}$ is $\frac{3}{12}$, or $\frac{1}{4}$.
6.  It takes 8 pattern blocks
7.  $\frac{1}{4}$ of $\frac{2}{3}$ is $\frac{1}{6}$.
8.  It takes 4 pattern blocks representing $\frac{1}{6}$ to cover $\frac{2}{3}$ exactly.
9. $\frac{1}{6}$ hour

Hands-On Lab 3-11
Think and Discuss

1. Write each number as the product of expressions with exponents and bases that are prime numbers. Then rewrite the division as the product of the first number times the reciprocal of the divisor.
2. $\frac{2^3}{2^4} = \frac{2 \cdot 2 \cdot 2}{2 \cdot 2 \cdot 2 \cdot 2}$, which is equal to $\frac{2}{2} \cdot \frac{2}{2} \cdot \frac{2}{2} \cdot \frac{1}{2}$, or $1 \cdot 1 \cdot 1 \cdot \frac{1}{2}$. The denominator has the greatest exponent. So, $\frac{2^3}{2^4} = \frac{1}{2^{4-3}}$.

Try This

1. $\frac{2}{3}$
2. $\frac{3}{2}$ or $1\frac{1}{2}$
3. $\frac{22}{9}$ or $2\frac{4}{9}$
4. $\frac{4}{25}$
5. 30
6. $\frac{5}{6}$
7. $\frac{14}{9}$ or $1\frac{5}{9}$
8. $\frac{14}{9}$ or $1\frac{5}{9}$
9. $\frac{1}{6}$
10. $\frac{5}{4}$ or $1\frac{1}{4}$
11. $\frac{15}{16}$
12. $\frac{5}{4}$ or $1\frac{1}{4}$
13. $\frac{2}{3}$
14. 2
15. $\frac{25}{11}$ or $2\frac{3}{11}$
16. 3

Hands-On Lab 4-3
Activity

1. only one
2. For most balls, the ratio will be about the same.
3. For most balls, $b = 0.8 \times d$.

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Answer Key

Think and Discuss

1. 110; 165; 220; 275
2. 60; 70; 80; 90; 100

Try This

1. 255 m
2. $d = 17t$
3. a. yes
   b. no
   c. yes

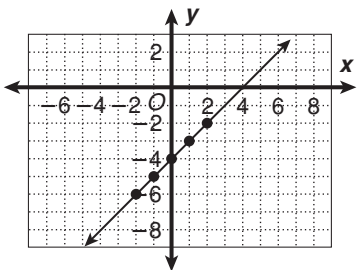
Hands-On Lab 4-4 Activity

10; 13; The graph and the table both show that everytime X increases by 1, Y increases by 3.

Think and Discuss

1. a. y would increase by 300.
   b. y would decrease by 150.
2. If x decreased by 20, y would decrease by 60.

Try This

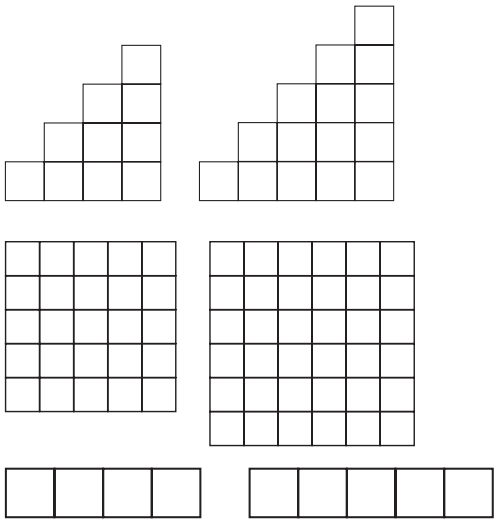
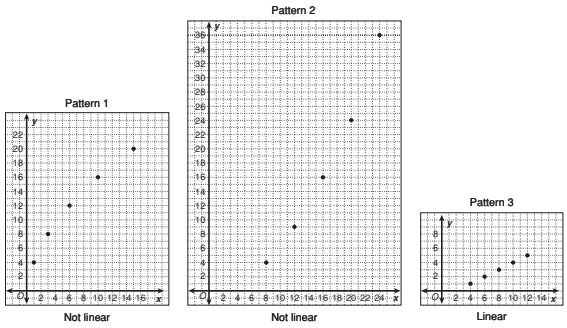
1. a. $y = -5x$
   b. In a week the watch will lose 35 minutes, or −35.
2. 

   b. The value of y increases by 4 when x increases by 4.
3. The value of y is multiplied by 4.

Hands-On Recording Sheet 4-6 Think and Discuss

1. The difference between consecutive y-values, corresponding to consecutive x-values, is constant.
2. No. The difference between consecutive y-values is not constant. Or, the graph is not a straight line.

Try This

2. 
4. 

Pattern 1: 1; 3; 6; 10; 15; 16; 20

Pattern 2: 20; 24; 4; 9; 16; 25; 36

Pattern 3: 10; 12; 1; 2; 3; 4; 5

Hands-On Lab 5-3 Think and Discuss

1. Possible answer: The new proportion is 36 : 54. Dividing each side by 18 yields 2 : 3.

Try This

1. Possible answer: For example, cutting each strip into 2 equal pieces yields a proportion 2 : 8. Cutting each 2 into three pieces and each 8 into four pieces yields a proportion 6 : 32. This proportion can be converted to 1 : 4 by reversing the math of the previous step: (6 • 4) : (32 • 3).

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Answer Key

Hands-On Lab Recording Sheet 5-6
Think and Discuss

1. Possible answer: The number of picas is 6 times the number of inches.
2. $p = 6n$
3. 61

Try This

1. line
2. 36 picas
3. 9 in.
4. 6 in. by 5 in.

Hands-On Lab 5-7
Think and Discuss

1. There are various ways to make the triangle similar. One of the simplest is to cut the vertical leg from 10 squares to 9 squares, draw a line from the vertical endpoint to the horizontal endpoint and cut a new hypotenuse. The vertical and horizontal sides are now in a 3 : 4 ratio like the original.
2. Because all circles are similar. Any circle can be expressed as a ratio of any other circle.

Try This

1. This activity works with virtually all figures except circles. Figures with regular and corresponding sides, such as rectangles, are easier to modify than odd-shaped figures such as trapezoids, and figures with fewer sides and angles are easier than those with many sides.

Hands-On Lab 5-7A
Activity

2; 8

$\frac{8}{2} = \frac{4}{1}$

6 in^2; 54 in^2; $\frac{3}{1}$; $\frac{54}{6} = \frac{9}{1}$; 10 m^2; 22.5 m^2; $\frac{3}{2}$; $\frac{22.5}{10} = \frac{9}{4}$

Think and Discuss

1. The ratio of the areas equals the square of the ratio of the sides.
2. Both the base and the height are multiplied by $\frac{10}{3}$. The area of a rectangle is bh. Therefore, the ratio of the areas is $\frac{10}{3} \times \frac{10}{3} = \frac{100}{9}$.
3. $\frac{6}{1}$

Try This

1. $\frac{1}{2} \cdot 1 \cdot 2 = 1$; $\frac{1}{2} \cdot 3 \cdot 6 = 9$
   1 square unit; 9 square units; $\frac{3}{1}$; $\frac{9}{1}$
2. 2 in^2; 8 in^2; $\frac{2}{1}$; $\frac{8}{2} = \frac{4}{1}$; 12 ft^2; 27 ft^2; $\frac{3}{2}$; $\frac{27}{12} = \frac{9}{4}$
3. The relationships are the same: the ratios of the areas of both triangles and rectangles is the square of their corresponding sides.

Hands-On Lab 5-8
Think and Discuss

1. The new dimensions would be 17 feet by 22 feet.

Try This

1. Students' answers should resemble the drawing on page 60. Be sure they have drawn all items at the same scale of 3 : 1.

Hands-On Lab 5-8A
Activity

$\frac{1}{120}$; $\frac{x}{5} = \frac{1}{120}$; $120x = 5$; $x = \frac{5}{120} = \frac{1}{24}$;
Since 1 yard is 36 inches, $\frac{1}{24}$ yard equals $\frac{1}{24} \cdot 36$, or 1.5 inches.

Think and Discuss

1. The field and the model are similar figures. In similar figures corresponding angles have the same measurement.
2. The comparison would be distorted if you used different units of measurement.

Try This

1. 10 yd
2. 10 feet; 20 feet
4. Answers will vary.

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Answer Key

Hands-On Lab 6-1
Think and Discuss

1. Step 1: Multiply the fraction by 100.

$$\frac{7}{33} \times \frac{100}{1} = \frac{700}{33} = 21.\overline{21} \text{ or } 21.2\%$$

Try This

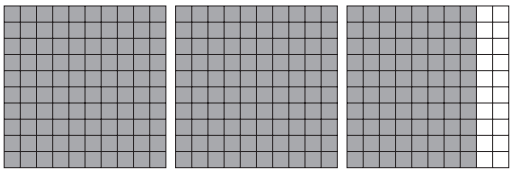
1. $\frac{3}{20}$
2. 62.5%
3. 9

Hands-On Lab Recording Sheet 6-4
Activity 1
Think and Discuss

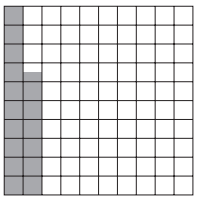
1. To model 36.75%, fill in 36 squares out of 100, plus $\frac{3}{4}$ of one additional square. Model 0.7% by filling in seven-tenths of one square.

Try This

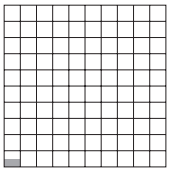
1.



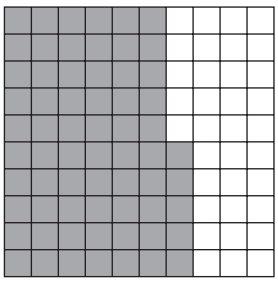
2.



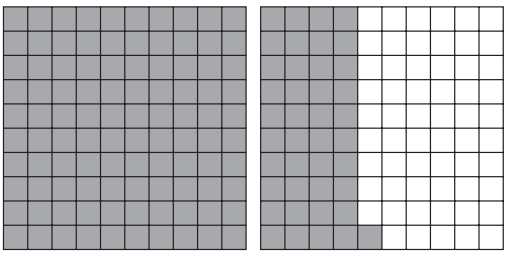
3.



4.



5.

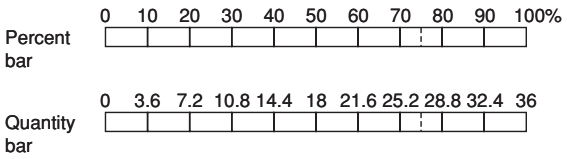


Activity 2
Think and Discuss

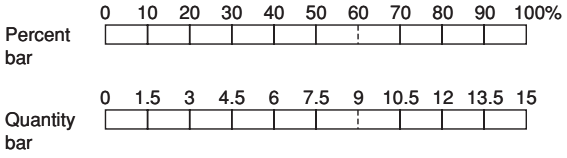
1. Draw a percent bar of 10 equal segments. Label the divisions from 0% to 100%. Draw a quantity bar of the same length underneath; label the endpoints 0 and the number (x). Divide the quantity bar into eighths. Label the corresponding quantities from $\frac{1}{8}x$ to $\frac{7}{8}x$. Look at the percent bar for the percent you wish to find and estimate what quantity lies under it on the quantity bar.
2. Reading the percent bar and the quantity bar required making a judgment by eye as to where numbers fall between the indicated intervals.

Try This

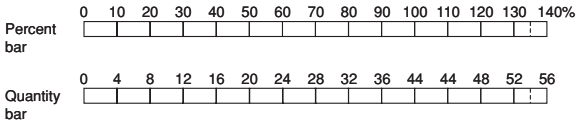
1.



2.

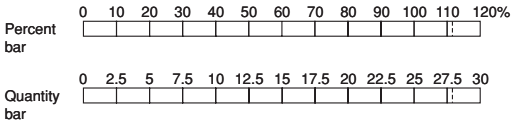


3.

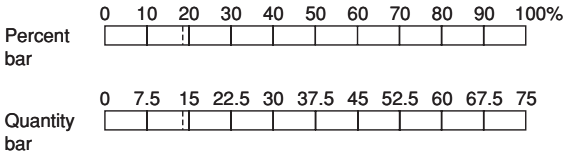


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4.



5.

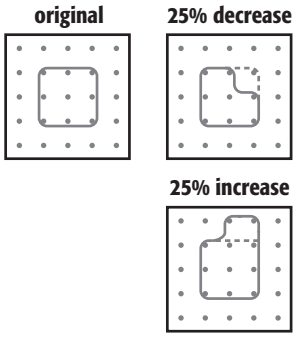


Hands-On Lab 6-6
Think and Discuss

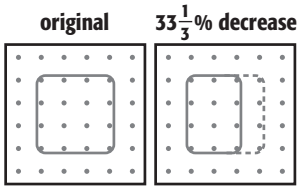
1. To decrease the area of the square by 25%, one-fourth of its area must be removed. So, dividing the square into 4 parts makes it easy to remove one-fourth of the square.
2. 75%
3. a 1-by-5 rectangle since 40% is equivalent to $\frac{2}{5}$
4. 4 : 3, $133\frac{1}{3}$%; this means the new rectangle is 100% plus a additional $33\frac{1}{3}$% of the size of the original square.

Try This

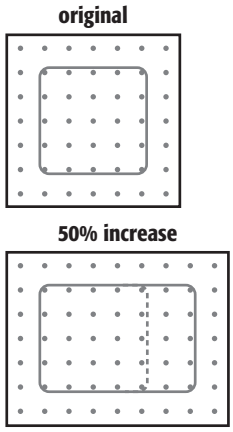
1.



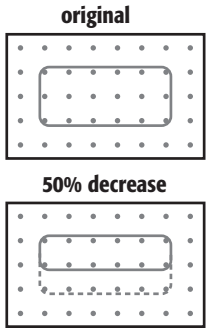
2.



3.



4.



5. A 1-by-10 rectangle; increasing a 1-by-10 rectangle by 10% means adding one-tenth, which is equivalent to one square.
6. 100%

Hands-On Lab 7-1
Activity

42.7%; 3.2%; 54.1%; 100%

Think and Discuss

1. Cumulative frequency is a running total. Relative frequency compares the frequency of a group to the total of the frequencies of all groups.
2. The sum must be 100% because each group is part of a whole. The relative frequency is the percent that each part is of the whole. The whole is 100%.

Try This

1. 1.7%; 0%; 7.5%; 5.2%; 2.2%; 3.2%; 14.5%; 6.7%; 22.2%; 36.7%; 99.9%
2. 100%

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Answer Key

Hands-On Lab 7-2
Think and Discuss

1. If the score that is weighted is greater than the other scores, the weighted average will be greater. If the score that is weighted is less than the other scores, the weighted average will be less.

Try This

1. a. 78
2. weighted average: 91; 95; 86; 84 mean: 93.75; 93.75; 87.5; 82.5
3. If the score that is weighted is less than the other scores, the weighted average will be greater than the mean.
4. a. 8; 30; 4
   b. Enter “4” a total of three times; enter “30” twice; enter “8” once. $4 + 4 + 4 + 30 + 30 + 8 = 80$. $80 \div 6 = 13.3$ average points per game.
   c. Multiply 8 by 1 to get total points; multiply 30 by 2 to get total points; multiply 4 by 3 to get total points; add up the total points and divide by 6.

Hands-On Lab 7-3

The difference between April (26 inches) and January (8 inches) is 18 inches.

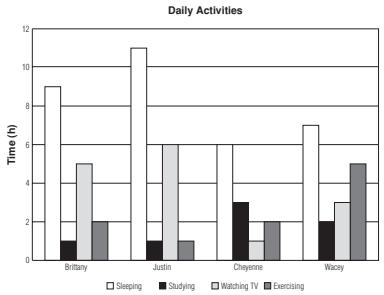
Possible answer: The graph demonstrates visually the increase in rainfall from January to April and the decline thereafter.

Think and Discuss

1. Possible answer: Line graphs, histograms, and stem-and-leaf plots would also be useful for representing this information. A circle graph would not represent this information effectively.
2. Possible answer: The bar graph provides a strong visual representation of each month’s rainfall compared to each other month.

Try This

2.

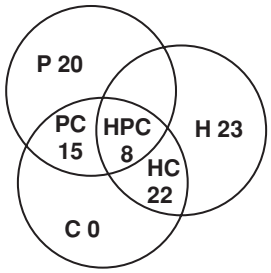


Hands-On Lab Recording Sheet 7-5
Activity 1
Think and Discuss

1. They represent all of the people who play team sports and all of the people who play an instrument.
2. Three circles would overlap to show three data sets. The Venn diagram would have four overlapping areas.

Try This

1. 36
2. 16
3. 39
4.



Activity 2
Think and Discuss

1. There will be 4 individual sets of data and 9 overlapping areas in the movie data in a Venn diagram of 4 data sets.
2. A Venn diagram of student ages might be simply a row of circles.

   14 15 16 17 There would be no overlap, because one does not turn officially the next higher age until the date of birth.

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Answer Key

Try This

1. Check students' work.
2. a. 33

   b. 12

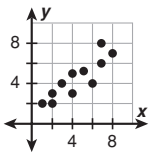
   c. 7

Hands-On Lab 7-8
Think and Discuss

1. Possible answer: The variables shoe size and last two digits of phone number do not appear to form a pattern. There is no relationship between shoe size and the last two digits of phone numbers.
2. Possible answer: There was no pattern.
3. Possible answer: No; the points are not in a line.

Try This

1.



The points on the graph appear to cluster around a straight line slanting up from left to right.

Hands-On Lab 7-9
Activity

1. A circle graph shows the parts of the whole. Here the data do not form any sort of complete total together, so the circle graph does not make sense. A line graph would be more appropriate.
2. A line graph is most suitable for showing changes over time. Here there is no time element. The data items consist of the entire club budget—just the sort of data that should be displayed in a circle graph.

Think and Discuss

1. a. A bar chart compares the smaller and larger numbers with each other. The circle graph compares each data item to some larger whole of which the data item is a part.

   b. A line plot shows items that fall into distinct and mutually exclusive categories. A Venn diagram is most useful to describe a situation where some data items fall into two categories at once.
2. In most cases, you would see no error message. Choosing the right kind of graph requires a judgment that is made by you, not the computer.

Try This

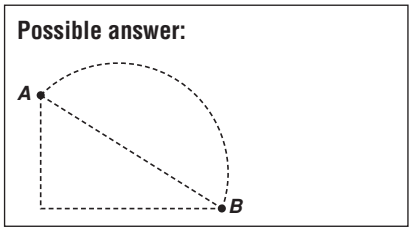
1. Answers will vary.

Hands-On Lab 8-1
Think and Discuss

1. yes
2. yes
3. two
4. three

Try This

1. Check students' drawings. Possible answer:



2. The shortest distance between two points will always be a straight line.

Hands-On Lab 8-2
Think and Discuss

1. Yes; you can use the protractor to find the measurements of the rays that make up the angle. The measurements can then be subtracted to find the actual measurement of the angle.

Try This

1. 120°, obtuse
2. 90°, right
3. 85°, acute

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Answer Key

Hands-On Lab Recording Sheet 8-2
Activity 1
Think and Discuss

1. subtract the measure of $\angle AVB$ from the measure of $\angle AVC$.

Try This

1. 90°
2. 25°
3. 90°

Activity 2
Think and Discuss

1. If an angle pair is complementary, the sum of their measures is 90°. If an angle pair is supplementary, the sum of their measures is 180°.

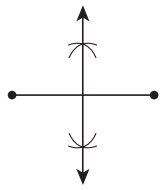
Try This

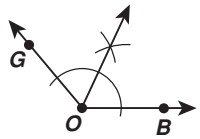
1. 80°, 10°, complementary
2. 40°, 140°, supplementary
3. 53°, 29°, neither
4. 95°, 85°, supplementary
5. The sides that are not adjacent form a straight line.
6. Complementary: ∠1 and ∠2; ∠3 and ∠4; ∠5 and ∠6; ∠8 and ∠7; ∠1 and ∠5; ∠1 and ∠3; ∠1 and ∠7; ∠2 and ∠4; ∠2 and ∠5; ∠2 and ∠8; ∠3 and ∠5; ∠3 and ∠8; ∠4 and ∠6; ∠4 and ∠7; ∠5 and ∠7; ∠6 and ∠8
   Supplementary: ∠12 and ∠9; ∠9 and ∠10; ∠10 and ∠11; ∠11 and ∠12.

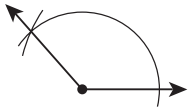
Hands-On Lab Recording Sheet 8-3
Think and Discuss

1. 3 bisectors
2. 22°

Try This

1. 

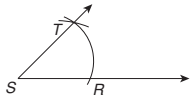
2. 

3. 

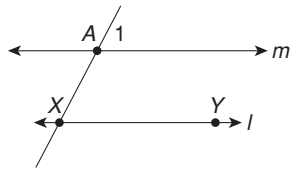
Hands-On Lab 8-3
Activity 1



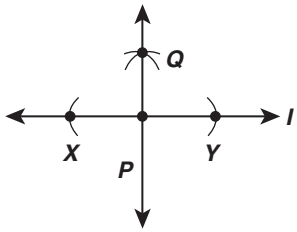
Activity 2



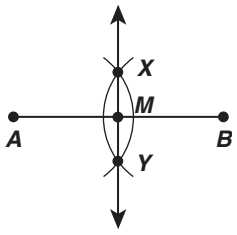
Activity 3



Activity 4



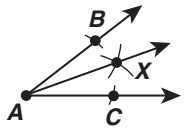
Activity 5



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Answer Key

Activity 6



Try This

Check students' work.

Hands-On Lab 8-3A
Activity

1. 55°; 125°; 125°; 55°; 55°; 125°; 125°; 55°
2. a. interior angles: 3, 4, 5, and 6
   b. exterior angles: 1, 2, 7, and 8
   c. ∠3 and ∠6 have the same measure. ∠4 and ∠5 have the same measure.
   d. They have the same measure.
   e. They have the same measure; ∠2 and ∠6.
   f. Their measures add to 180; ∠2 and ∠5.

Think and Discuss

1. Possible answer: The interior angles are 3, 4, 5, and 6. The exterior angles are 1, 2, 7, and 8. The alternate interior angles are 3 and 6, 4 and 5. The alternate exterior angles are 1 and 8, 2 and 7.
2. 55°, 125°, 55°, 55°, 125°, 125°, 55°
3. All angles measure 90 degrees.

Try This

1. Possible answer: Angle 1 measures 125°. Angles 2, 3, 6, and 7 each have a measure of 55°, since a 55° angle is supplementary to a 125° angle. Angles 4, 5, and 8 each have a measure of 125°.

Hands-On-Lab 8-3B
Activity

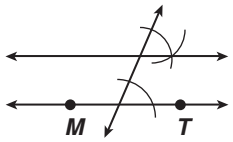
1. They appear to be perpendicular, so they make a 90° angle.
2. They appear to be parallel.

Think and Discuss

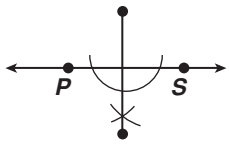
1. Possible answers: Measure one of the angles formed by the intersection of *NO* and *PH*. If the angle is 90° , the lines are perpendicular.
2. If *ST* is perpendicular to *LR*, then angle *USW* is a right angle.

Try This

1.



2.

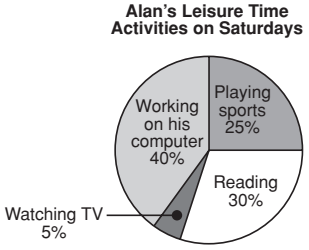


Hands-On Lab Recording Sheet 8-4
Think and Discuss

1. the sum of the percents is 100; the sum of the decimals is 1; the sum of the fractions is 1; the sum of the degrees is 360.
2. Sample answer: Data that are parts of a whole.
3. Sample answer: the measure of each section is that percent, decimal, or fraction of 180°.

Try This

1. Reading: 0.3; $\frac{3}{10}$; 108; Playing Sports: 0.25; $\frac{1}{4}$; 90; Working on Computer: 0.4; $\frac{2}{5}$; 144; Watching TV: 0.05; $\frac{1}{20}$; 18



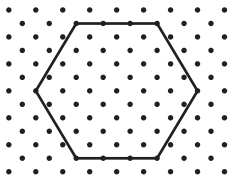
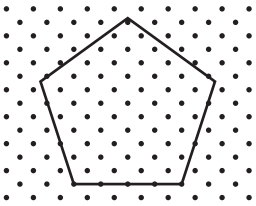
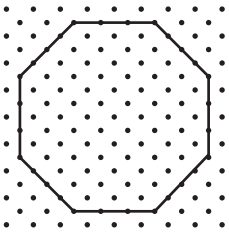
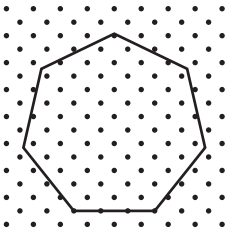
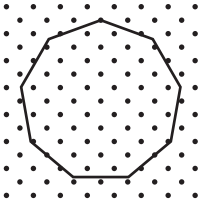
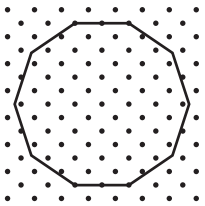
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Answer Key

Hands-On Lab 8-5
Think and Discuss

1. Line segments allow you to draw polygons, because they have straight sides. A circle could not be drawn using this method because it has a curved side.

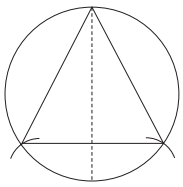
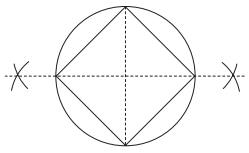
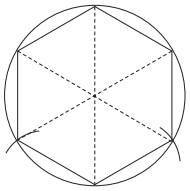
Try This

1. 
2. 
3. 
4. 
5. 
6. 

Hands-On Lab 8-5A
Think and Discuss

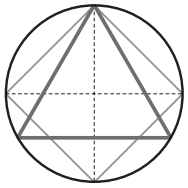
1. Yes, the sides of an equilateral triangle are congruent.
2. No; when bisecting the diameter of a circle, you must use a compass opening that is greater than the radius of the circle.
3. They were all constructed using the same opening on the compass; the radius of the circle and the sides of the hexagon have the same measure.
4. No; each side of a square inscribed in a circle is equal in length to the compass opening used to construct the perpendicular bisector of the diameter, which must be greater than the radius of the circle.

Try This

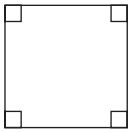
1. 
2. 
3. 

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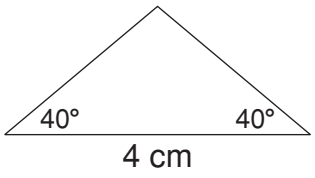
4.

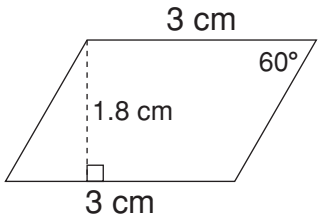


Hands-On Lab 8-5B Activity







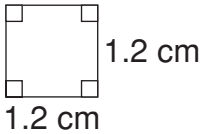


Think and Discuss

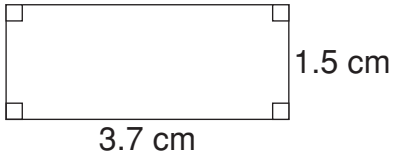
1. Before you can draw anything, you need to know the shape. Without the dimensions, you would not know how big to make the figure.
2. Use the parallel lines of the lined paper as opposite sides of the parallelogram.

Try This

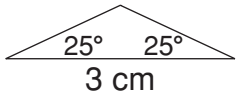
1.



2.

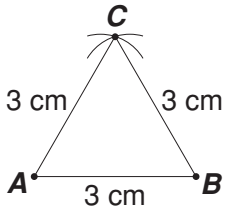


3.



Hands-On Lab 8-6 Activity

1.



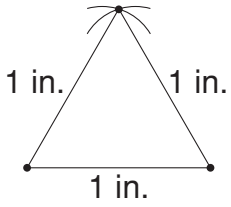
2. Each is 3 cm long.
3. Each is 60°.

Think and Discuss

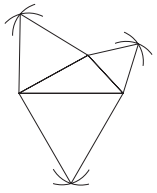
1. The compass opening was set to 3 cm to construct the sides.
2. Use the same construction as for an equilateral triangle. Equilateral triangles have 3 congruent angles.

Try This

1.



2.

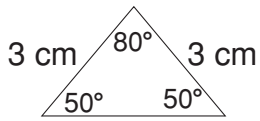


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Answer Key

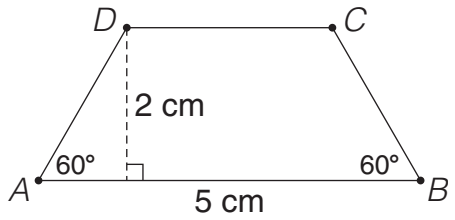
Hands-On Lab 8-8
Activity

1.



This is an isosceles triangle.

2.



It is a trapezoid.

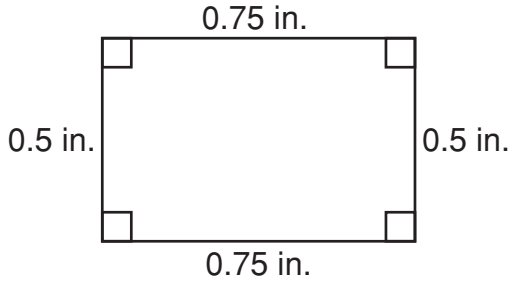
3. It is a rhombus. The missing side lengths are each 1.75 cm. The missing angle measure is 115°.

Think and Discuss

1. The figure is now a rectangle.

Try This

1.



This is a rectangle.

2. Both clue a and clue b can be deleted. It is an equilateral triangle.

Hands-On Lab 8-9
Activity

1. No; Yes because their angles are congruent.
2. The sides are proportional: $\frac{3}{6} = \frac{4}{8} = \frac{5}{10}$; the triangles are similar because their sides are proportional.

Think and Discuss

1. I agree. If two angles of one triangle are specified, there is only one angle measure possible for the third angle.

Try This

1. Yes because the angles are congruent. They are also similar because the sides are proportional.
2. Yes, because the two pairs of given sides are proportional and the included angles are congruent. They are also similar because the three sides are proportional.

Hands-On Lab 8-10
Activity

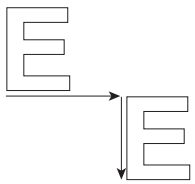
1. Each segment of the image is two times the length of the original.

Think and Discuss

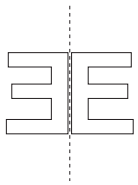
1. Examples will vary. Some examples are translations: repeating borders, wallpaper patterns, fabrics, reflections: all figures with line symmetry, mirror images; rotations: many corporate logos, the recycle symbol; dilations: photo enlargements, scale models.

Try This

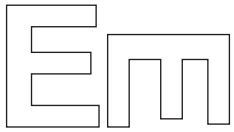
1. a.



b.



c.



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Answer Key

Hands-On Lab Recording Sheet 8-11
Think and Discuss

1. Transformation tessellations are translated images to create a pattern, and rotation tessellations use rotated images to create a pattern.

Try This

1. Check students' work.
2. Check students' work.

Hands-On Lab 8-11
Think and Discuss

1. Possible answer: Yes, because the fold is your line of symmetry. As long as you make one of the sides part of the fold, any regular shape you cut out will be symmetrical.

Try This

1. Possible answer: As long as the shape you start with is symmetrical, then two symmetrical shapes will be created when you cut them out of the folded paper, but if the folded paper does not make symmetrical figures, then the figure you cut out will not be symmetrical either.

Hands-On Lab 9-1
Think and Discuss

1. $t = 82q$
2. A graduated cylinder is more precise than a measuring cup because the unit of measurement is smaller.

Try This

1. 1 cup
2. 500 gallons
3. about 4.5 cups of water will fill a one-liter beaker; $l = 4.5c$
4. about 460 milliliters of water are needed to fill a 2 cup container; $c = 230m$

5–23. Check students' work.

Hands-On Lab 9-1A
Activity 1
Think and Discuss

1. 18.1 cm; the measurement to the nearest tenth best represents the actual length because it gives more exact information about the length of the pencil.
2. No; the measurement to the nearest tenth of a centimeter is more exact than a measurement in inches because the centimeter is a smaller unit than the inch.

Try This

1. 4 cm; 3.7 cm
2. 2 cm; 1.6 cm

Activity 2
Think and Discuss

1. 5.8 cm; 1.9 cm; 1 inch is about 2.5 cm

Try This

1. length: $\frac{3}{4}$ in.; width: $\frac{3}{4}$ in.; perimeter: 3 in.
2. length: $\frac{1}{4}$ in.; width: $2\frac{3}{4}$ in.; perimeter: 6 in.
3. length: 6.5 cm., width: 2.7 cm.; perimeter: 18.4 cm.
4. length: 5.7 cm.; width: 2.7 cm.; perimeter: 16 cm.

Hands-On Lab Recording Sheet 9-2
Activity 1
Think and Discuss

1. The point lies on a straight line.
2. For each rectangle, the sum of the length and the width is $\frac{1}{2}$ the perimeter.
3. $P = 2(l + w)$ or $P = 2l + 2w$

Try This

1. 20 in
2. 24 ft
3. 20 cm

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Answer Key

Activity 2
Think and Discuss

1. The points are close to lying on a straight line.
2. Possible answer: $\pi = 3.14$

Try This

1. $C = \pi d$
2. Possible answer: $C = 12.56$ cm

Hands-On Lab Recording Sheet 9-3
Activity 1
Think and Discuss

1. The length and width of the rectangle are equal to the base and height of the parallelogram.
2. $A = bh$

Try This

1. The formula works for any parallelogram; $A = 5 \cdot 3 = 15$ in^2
2. They all have the same area.

Activity 2
Think and Discuss

1. The base and height of the triangle are equal to the base and height of the parallelogram.
2. $A = \frac{1}{2}bh$

Try This

1. 25 ft^2

Activity 3

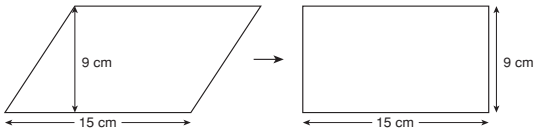
1. length of base: $b^1 + b^2$; area of parallelogram: $h(b^1 + b^2)$
2. $\frac{1}{2}h(b^1 + b^2)$
3. 40 in^2

Hands-On Lab 9-3
Think and Discuss

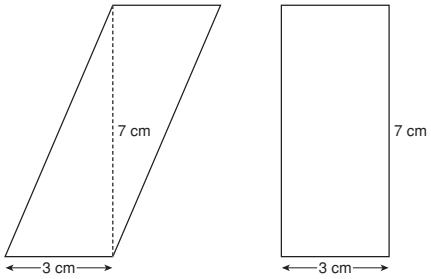
1. The formula for the area of a rectangle $A = h \cdot \ell$ also applies to the area of a parallelogram, but h is a vertical height and not the length of the left and right sides.

Try This

1. $A = b \cdot \ell = 9 \cdot 15 = 135$ cm^2



2. $A = b \cdot \ell = 7 \cdot 3 = 21$ cm^2



Hands-On Lab 9-4
Think and Discuss

1. Trapezoid 1 and Trapezoid 2 have the same area:
   $A_{T1} = \frac{5}{2}(9 + 4.5) = 33.75$ cm^2; $A_{T2} = \frac{5}{2}(12 + 1.5) = 33.75$ cm^2
   They have the same area, because they have the same height (5 cm) and the sum of their lengths (13.5 cm) is the same.

Try This

1. The area of the parallelogram
   $A_p = h \cdot b = 10 \cdot 4 = 40$ cm^2
   The area of each triangle is $A_T = \frac{h}{2} \cdot b = \frac{10}{2} \cdot 4 = 20$ cm^2
2. The area of the parallelogram
   $A_p = h(a + b) = 2(6 + 4) = 20$ cm^2
   The area of the trapezoid is
   $A_{TZ} = \frac{h}{2}(a + b) = \frac{2}{2}(6 + 4) = 10$ cm^2

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Answer Key

Hands-On Lab 9-4A
Think and Discuss

1. No, you would need at least one other measurement, because there might be more than one combination of base and height that would have been the same area.

Try This

1. 4 in.
2. 180 cm^2
3. 8.5 in.
4. 16 ft

Hands-On Lab Recording Sheet 9-7
Activity 1
Think and Discuss

1. The square root, multiplied by itself, equals the total number of small squares.
2. The square root is equal to the number of small squares on a side of the figure.

Try This

1. 11
2. 12
3. 14

Activity 2
Think and Discuss

1. If x is the non-perfect square, find the largest perfect square that is less than x and the smallest perfect square that is greater than x. Then $\sqrt{x}$ lies between the square roots of those two perfect squares.
2. A 4 × 4 square contains 16 small squares. A 5 × 5 square contains 25 small squares. Since $16 < 19 < 25$, $4 < \sqrt{19} < 5$.
3. Any number greater than 25 and less than 36.

Try This

1. 4.4
2. 3.2
3. 5.3
4. 5.9

Hands-On Lab Recording Sheet 9-8
Activity 1
Think and Discuss

1. The area of the two red squares added together is equal to the area of the blue square.
2. a. Squaring the side length of a square will give you the area of a square.
   b. Squaring the lengths of each side of the triangle will give you the area of the square that shares one of its sides.
   c. $a^2 + b^2 = c^2$

Try This

1. Yes; the relationship is true for each isosceles triangle.

Activity 2

1. 9, 16, 25; If you add the areas of the two smaller squares, you get the area of the largest square.
2. 5
3. $3^2 + 4^2 = 5^2$; 9 + 16 = 25; the equation seems to be true for right triangles other than just isosceles right triangles.
4. No; for example, the relationship is not true for an equilateral triangle with side length 1. $1^2 + 1^2 \neq 1^2$

Try This

1. No; the total area of the red squares is 25, but the area of the blue square is 36.
2. Yes; to find the length of the longest side, square each of the smaller sides and add them together: $9^2 + 12^2 = 81 + 144 = 225$. The length of the longest sides is the square root of 225: $\sqrt{225} = 15$.
3. Square both numbers. Subtract the square of the shorter side from the square of the longest side. The length of the third side is the square root of the difference.

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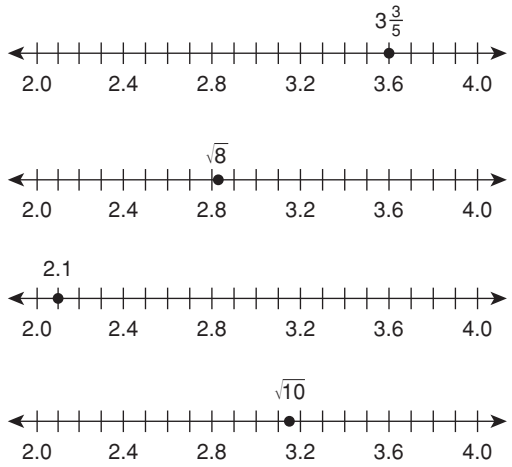
Answer Key

Hands-On Lab 9-ext
Think and Discuss

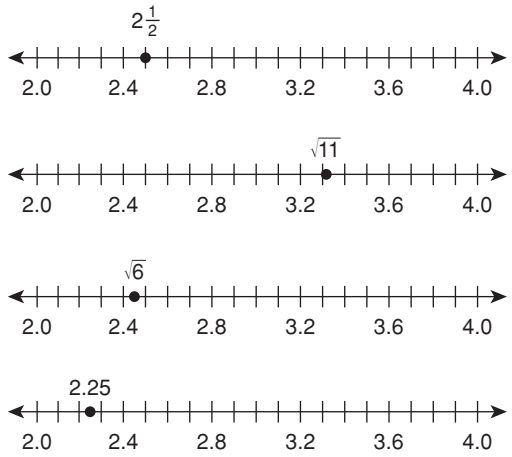
1. Possible answer: $\sqrt{5} = 2.23606\ldots$; This answer is similar to the one found in the activity since it is between 2.23 and 2.24, but it has more decimal places, making it more precise.
2. Possible answer: π is an irrational number because it cannot be expressed as a terminating or repeating decimal.

Try This

1.



2.

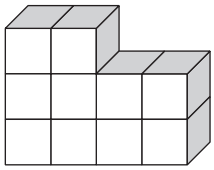


Hands-On Lab Recording Sheet 10-1
Activity 1
Think and Discuss

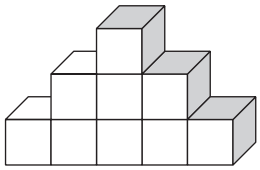
1. 15
2. Add a cube on top of any cube on top of the figure.
3. You could remove any cube.

Try This

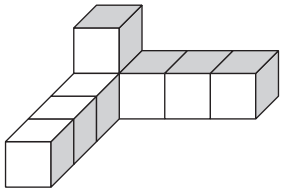
1.



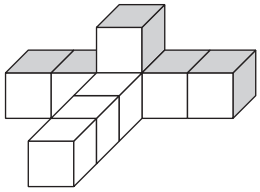
2.



3.



4.



Activity 2
Think and Discuss

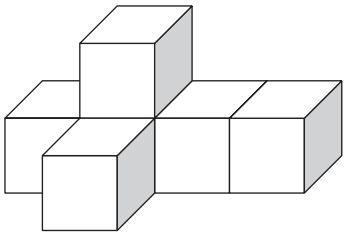
1. Yes, you can start with any view (front, top, or side), then add cubes so the figure matches one of the 2 remaining views, then take away cubes using whichever view you haven't used to build the figure.

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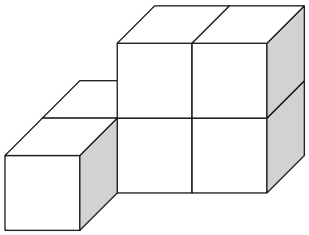
Answer Key

Try This

1.



2.



3. figure D

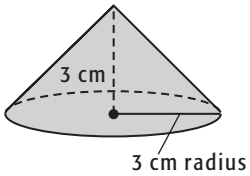
Hands-On Lab 10-1

Think and Discuss

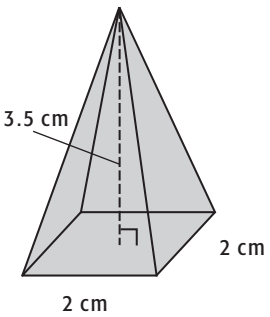
1. You have to draw line segments from the base to a common point above the base.
2. You draw an oval for the base of the cone and for the base of a hemisphere.
3. When drawn from a side view, the circular base of a cone looks like an oval and the rectangle base of a rectangular pyramid looks like a parallelogram.

Try This

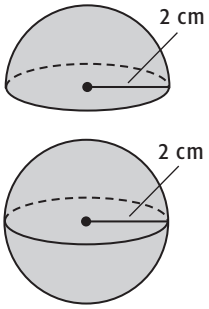
1.



2.



3.



Hands-On Lab Recording Sheet 10-2

Activity 1

Think and Discuss

1. multiply the length by the width by the weight.
2. multiply the area of the base by the height.
3. $V = Bh$

Try This

1. 72 cm^3
2. 42 cm^3
3. 24 cm^3

Activity 2

Think and Discuss

1. multiply the area of the base by the height.
2. $V = Bh$
3. The area of the base equals the area of the circle: $V = \pi r^2 h$

Try This

1. 12.6 cm^3
2. 56.5 cm^3
4. 31.4 cm^3

Hands-On Lab 10-2

Think and Discuss

1. Yes, the volume of a prism is 5 x 3 x 8 = 120 cubic inches. If the length were doubled to 10 inches, the volume would be 10 × 3 x 8 = 240 cubic inches, which is twice the volume of the original prism.

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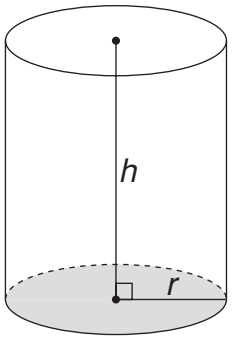
Answer Key

Try This

1. 10.5 in^3

Hands-On Lab 10-2A
Activity 1

1.



Think and Discuss

1. Possible Answer: It is about the same.

Activity 2

1. Since the base of the prism is a rectangle, $B = lw$.

Step 1 : $V = (lw) \times h$

Step 2 : $V = (12)(4)(3)$

Step 3 : $V = 144$ in^3

Try This

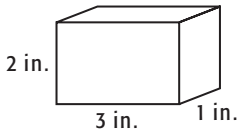
1. Volume equals pi times radius squared times height.
2. Volume equals length times width times height.
3. 0.125 in^3
4. 21.195 ml

Hands-On Lab Recording Sheet 10-4
Think and Discuss

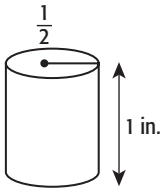
1. Answers will vary, depending upon the number of squares per inch.
2. Answers will vary, depend upon the number of squares per inch.

Try This

1.



2.



Hands-On Lab 10-4
Think and Discuss

1. $S_{cyl} = 2\pi r^2 + C \times h = 2\pi r^2 + 2\pi rh = 2\pi r(r + h)$

Try This

1. $l = C = 2\pi r = 6.28$ cm; $S_{cyl} = 2\pi + 6.28 = 6.28 + 6.28 + 6.28 = 69.08$ cm^2

Hands-On Lab Recording Sheet 10-5
Activity 1
Think and Discuss

1. Because each of these faces has a matching face: back, bottom, and “either side” face.
2. Length is 5 cm, width is 3 cm, and height is 4 cm. The surface area is 94 cm^2.

Try This

1. 32 cm^2
2. 52 cm^2
3. 80 cm^2

Activity 2

1. The surface area of B is four times the the surface area of A. This number, 4, is the scale factor squared.
2. The surface area of C is none times the surface area of A. This number, 9, is the scale factor squared.

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3. The surface are of Y is K^2 times the surface area of X.

Try This

1. 54 cm^2
2. 16 × 54 cm^2 = 864 cm^2

Hands-On Lab 10-5
Think and Discuss

1. Possible Answer: The two prisms are identical: one is rotated. It is an optical illusion that makes prism 2 seem larger.

Try This

1. The surface area is 62.80 cm^2
2. Possible Answer: It is more than double the surface area of cylinder 1 because the surface area of the circular bases varies as the square of the radius.

Hands-On Lab Recording Sheet 11-4
Activity 1
Think and Discuss

1. Possible Answer: The experimental probability based on combined results is closer to the theoretical probability than the experimental probability based on the results of an individual's experiment.
2. Possible Answer: 125

Try This

1. $\frac{1}{5}$, 0.2, 20%
2. Possible Answer: 100

Activity 2
Think and Discuss

1. The probability is $\frac{1}{12}$, because there are 4 × 3 possible outcomes
2. Possible answer: 50
3. The experimental probability is a summary of the results of repeated trials. The theoretical probability is a calculation based on the number of favorable outcomes and the total number of possible outcomes.

Try This

1. a. HH, HT, TH, TT
   b. Possible answer: 25
   c. Possible answer: 250
2. a. red-1, red-2, red-3, red-4, red-5, red-6, blue-1, blue-2, blue-3, blue-4, blue-5, blue-6, green-1, green-2, green-3, green-4, green-5, green-6
   b. Possible answer: Spin the spinner and roll the number cube 100 times. Keep track of the number of times the spinner lands on green and you roll a 6. Divide this number by the number of trials(100).

Hands-On Lab 11-4
Activity

Answers will vary based on experimental results. Possible answer: 1, 3, 2, 5, 1, 6, 4, 2, 3, 1, 4, 5, 6, 6, 1, 2, 5, 4, 5, 1, 3, 3, 4, 1, 6, 5, 6, 2, 3, 2

Possible answer: 6, $\frac{6}{30}$, $\frac{1}{5}$

Possible answer: The results are different, but the experiment is close to the theoretical as expected.

Think and Discuss

1. Possible answer: You would expect 5 ones. Then the experimental probability would be $\frac{5}{30}$, or $\frac{1}{6}$, which is the same as the theoretical probability.
2. Possible answer: The theoretical probability tells what is expected on one trial. But since every outcome has some chance on every trial, it is unlikely that the results will exactly match what is expected over a number of trials.

Try This

1. Answers will vary based on experimental results. Answers below relating to experimental probability will use these numbers: 1, 3, 4, 2, 4, 5, 6, 6, 3, 2, 5, 1, 5, 3, 5, 4, 1, 6 ,5, 6, 2, 4, 1, 4, 3, 6, 5, 6, 1, 3

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2. Theoretical Probability $\frac{1}{6}\ \frac{1}{2}\ \frac{1}{3}$

   Experimental Probability $\frac{1}{5}\ \frac{7}{15}\ \frac{4}{15}$

3. Possible Answer: The experimental probability of getting a 6 was higher than the theoretical. The experimental probability of getting an even number was slightly lower than the theoretical. The experimental probability of getting a number less than 3 is slightly less than the theoretical.

Hands-On Lab 11-5
Activity

1, $\frac{5}{9}$

2. There will be 5 light balls since the number does not change.

   There will be 9 balls since the number of balls has remained the same.

   The probability of selecting a light ball again is $\frac{5}{9}$.

3. There will be 4 light balls, since one has been removed. Since one is gone, there will be 8 balls left. The probability of selecting a light ball will be $\frac{4}{8}$ or $\frac{1}{2}$.

Think and Discuss

1. "With replacement" means you take something then return it so that the objects in the bag remain the same. "Without replacement" means you take something out of the bag and keep it out, so that the number of objects in the bag is reduced.
2. Since the object is not replaced, the composition of the group is changed which affects all following probabilities.

Try This

1. $\frac{2}{15}$
2. $\frac{1}{3}$
3. $\frac{4}{15}$

Hands-On Lab 11-6
Think and Discuss

1. Possible answer: The order is not important because the purpose of the combination is simply to determine who is on the team.
2. Answer Row 7: 1, 7, 21, 35, 35, 21, 7, 1
   Answer Row 8: 1, 8, 28, 56, 70, 56, 28, 8, 1
3. Possible answer: Every row starts and ends with 1. Every number in a row is the sum of the two numbers diagonally above it.
4. Possible Answer: The answer is always 1. If the number of items in each combination is equal to the total number of items, there is only one possible combination.
5. look at row 10 column 5: 252

Hands-On Lab 11-7
Think and Discuss

1. Yes
2. Yes
3. all the big marbles; all the marbles

Try This

1. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
2. 5, 6, 7

Hands-On Lab 11-7A
Activity

2. Check students' work.

Think and Discuss

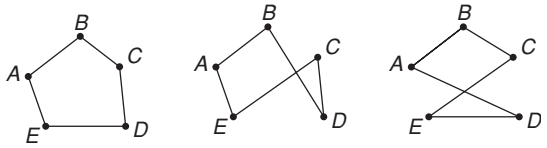
1. Sample answer: No. The path *A* to *C* to *B* to *A* is the reverse of the path *A* to *B* to *C* to *A*.
2. Sample answer: No. For example, the path from *A* to *B* to *C* to *D* to *A* would become the path from *B* to *C* to *D* to *A* to *B*.
3. Sample answer: No: The only choices are *A* to *B* to *C* to *D* to *A*; *A* to *B* to *D* to *C* to *A*; *A* to *C* to *B* to *D* to *A*. The choice *A* to *C* to *D* to *B* to *A* is the reverse of the path *A* to *B* to *D* to *C* to *A*.

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Answer Key

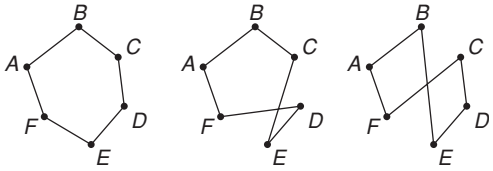
Try This

1.



2. 6 paths

3.



Hands-On Lab Recording Sheet 12-1
Think and Discuss

1. The Addition property of Equality states that you must add the same number to both sides of the equation for the statement to remain here.
2. Together, six yellow and six red unit tiles are equivalent to 0.
3. To model $3x - 5 = 10$, use 3 yellow variable tiles and 5 red tiles on the left side. Use the 10 yellow unit tiles on the right side. In order to remove 5 red tiles from the left side, you have to add 0 (5 yellow unit tiles and 5 red unit tiles) to the right side. After removing 5 red tiles from each side, you are left with the equation $3x = 15$. Separate the 15 yellow unit tiles on the right into 3 equal groups to solve for the variable. You find that $x = 5$.
4. Use the model for $3n + 6 = -15$, but substitute 7 red tiles for each yellow variable tile. Then check to see that both sides of the equation are equal.

Try This

1. $x = 8$
2. $r = -5$
3. $m = 7$
4. $n = -11$
5. $j = 7$
6. $r = 2$
7. $h = 2$
8. $g = -3$
9. $k = 4$

Hands-On Lab 12-3
Think and Discuss

1. Subtract 5 from each side of the equation, then divide both sides by 4.
2. Adding negative tiles.
3. Subtract the variable from both sides of the equation.
4. Subtract the variable x from each side of the equation.
5. division

Try This

1. $x = 9$
2. $x = -13$
3. $x = -1$
4. $x = -3$
5. $x = 4$
6. $x = -6$
7. $x = -5$
8. $x = 1$

Hands-On Lab 12-6
Activity

1. a. $x < 5$
   b. $x < 6$
   c. $x > 6$
   d. $x > -2$
2. a. $x < 8$
   b. $x < 12$
   c. $x > 2$
   e. $x > 2$
3. a. $x < 1$
   b. $x < 3$
   c. $x > -3$
   d. $x > 2$

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Answer Key

Think and Discuss

1. Inequalities have a range of possible solutions.
2. $a < c$
3. no
4. Add 9 to both sides.
5. Subtract 5 from both sides; divide both sides by 4.

Try This

1. $x > 10$
2. $x < 4$
3. $x > 3$
4. $x > 5$
5. $x > 9$
6. $x < 8$
7. $x > 6$
8. $x < 2$

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7. $x = -5$
8. $x = 1$

Hands-On Lab 12-6
Activity

1. a. $x < 5$
   b. $x < 6$
   c. $x > 6$
   d. $x > -2$
2. a. $x < 8$
   b. $x < 12$
   c. $x > 2$
   e. $x > 2$
3. a. $x < 1$
   b. $x < 3$
   c. $x > -3$
   d. $x > 2$

Think and Discuss

1. Inequalities have a range of possible solutions.
2. $a < c$
3. no
4. Add 9 to both sides.
5. Subtract 5 from both sides; divide both sides by 4.

Try This

1. $x > 10$
2. $x < 4$
3. $x > 3$
4. $x > 5$
5. $x > 9$
6. $x < 8$
7. $x > 6$
8. $x < 2$

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