Answers

1. value
2. compare
3. rounding
4. front-end estimation
5. fifteen thousand, seven hundred thirty-two
6. 60,000
7. a. 40,000   b. 400,000
8. a. $76,480 = 70,000 + \underline{6,000} + 400 + \underline{80}$
   b. $620,315 = \underline{600,000} + \underline{20,000} + 300 + 10 + 5$
9. a. $>$ b. $<$
10. 374,875   374,248   355,410
11. a. 37,900   b. 56,400
12. $4,000 + 7,000 = 11,000$
13. $10,000 - 3,000 = 7,000$
14. $500 + 800 = 1,300$
15. $900 - 400 = 500$
16. 2,742 rounds to 3,000.
    $3,000 \times 7 = 21,000$
    $2,742 \times 7$ is about 21,000.
17. $700 \times 9 = 6,300$
    $800 \times 9 = 7,200$
    6,502 is nearer to 6,300 than to 7,200.
    $6,300 \div 9 = 700$
    $6,502 \div 9$ is about 700.
18. a. Ms. Carlson has more money.
    b. $\$7,145 \longrightarrow \$7,100$
       $\$3,799 \longrightarrow \$3,800$
       They have about $\$7,100 + \$3,800 = \$10,900$.
19. $315 \text{ ft} \longrightarrow 300 \text{ ft}$
    $175 \text{ ft} \longrightarrow 100 \text{ ft}$
    $300 \text{ ft} \times 100 \text{ ft} = 30,000 \text{ sq. ft}$
    The area of the rectangular field is about 30,000 square feet.

1. C   2. B   3. D   4. C
5. C
6. a. six million, three hundred twenty-six thousand, five hundred eight
   b. $4,781,020 = \underline{4,000,000} + 700,000 + 80,000 + 1,000 + \underline{20}$
7. a. $<$ b. $>$

8. $2,691 \longrightarrow 2,000$
   $8,173 \longrightarrow 8,000$
   $4,724 \longrightarrow 4,000$
   $2,000 + 8,000 + 4,000 = 14,000$
   $691 + 173 + 724 \longrightarrow 600 + 100 + 700$
   $= 1,400$
   1,400 rounded to the nearest thousand is 1,000.
   $14,000 + 1,000 = 15,000$
   The estimated sum is 15,000.
9. $7,685 \longrightarrow 7,000$
   $3,768 \longrightarrow 3,000$
   $7,000 - 3,000 = 4,000$
   $768 - 685 \longrightarrow 700 - 600 = 100$
   100 rounded to the nearest thousand is 0.
   $4,000 - 0 = 4,000$
   The estimated difference is 4,000.
10. 3,937,245; 4,937,445
    Rule: Count on by 500,100.
11. $6,157 \longrightarrow 6,000$
    $6,000 \times 9 = 54,000$
    There are about 54,000 passengers in total.
12. $3,548 \longrightarrow 3,200$
    $3,200 \div 8 = 400$
    Each crate has about 400 mangoes.
    or $3,548 \longrightarrow 4,000$
    $4,000 \div 8 = 500$
    Each crate has about 500 mangoes.

1. expanded form   2. multiplication facts
3. product   4. bar model
5. nearest 1,000
6. a. eight million, two hundred thirty-eight thousand, six hundred fifteen
   b. $8,000,000 + 200,000 + 30,000 + 8,000 + 600 + 10 + 5$
7. $? = 315 + 89 = 404$
8. $? = 8,614 - 509 = 8,105$
9. $? = 8 \times 15 = 120$
10. $? = 294 \div 7 = 42$
11. $? = 156 \div 6 = 26$
12. 8,000   13. 82,000
14. $400 \times 9 = 3,600$
15. $800 \times 7 = 5,600$
16. $900 \times 5 = 4,500$
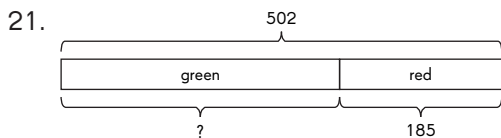17. $200 \times 8 = 1,600$

18. $4 \times 90 = 360$
    $4 \times 100 = 400$
    372 is nearer to 360 than to 400.
    $360 \div 4 = 90$
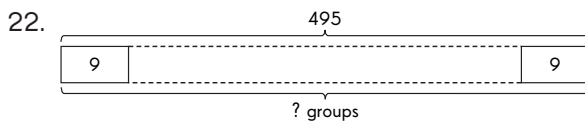 $372 \div 4$ is about 90.

19. $6 \times 30 = 180$
    $6 \times 40 = 240$
    197 is nearer to 180 than to 240.
    $180 \div 6 = 30$
    $197 \div 6$ is about 30.

20. $198 \div 5 \longrightarrow 200 \div 5 = 40$
    Each crate has about 40 oranges.

21.

    $? = 502 - 185$
    $ = 317$
    There are 317 green beads.

22.

    $? = 495 \div 9$
    $ = 55$
    Hector will need 55 envelopes.

Test Prep 2

1. B   2. C   3. C   4. D
5. A
6. $2,356 \times 700 = (2,356 \times 7) \times 100$
    $ = 16,492 \times 100$
    $ = 1,649,200$

7.
$$\begin{array}{r} \overset{4}{5}\overset{1}{0}\overset{1}{} \\ 8,0\,9\,3 \\ \times 5\,6 \\ \hline 4\,8,5\,5\,8 \\ 4\,0\,4,6\,5\,0 \\ \hline 4\,5\,3,2\,0\,8 \end{array}$$

8. $1,620 \times 68 = 1,600 \times 70$
    $ = 1,600 \times 7 \times 10$
    $ = 11,200 \times 10$
    $ = 112,000$
    The area of the wall is about 112,000 square centimeters.

9. $3,812 \div 48 = 4,000 \div 50$
    $ = (4,000 \div 10) \div 5$
    $ = 400 \div 5$
    $ = 80$
    About 80 rows of seats are occupied.

10. Cost of one camera $= (\$8,153 + \$847) \div 100$
    $ = \$9,000 \div 100$
    $ = \$90$
    $\$150 - \$90 = \$60$
    Tom earned $60 from selling each camera.

11. $\$5,645 - \$500 = \$5,145$
    $\$5,145 \div 7 = \$735$
    He paid $735 each month.

12. a. $1,400 \div 35 = 40$
        $40 \times \$1.60 = \$64$
        Jody paid $64 for the beads.
    b. $1,400 \div 16 = 87\frac{1}{2}$
        She needs 88 small boxes.

Pre-Test 3

1. like fractions   2. prime numbers
3. equivalent fractions 4. unlike fractions
5. $\frac{3}{10}, \frac{7}{10}$ 6. a. $\frac{3}{5}$ b. $\frac{1}{3}$
7. a. 32   b. 5   8. 23   9. 9
10. $\frac{2}{7}, \frac{1}{3}; \frac{2}{7}, \frac{3}{8}; \frac{2}{7}, \frac{5}{8}; \frac{3}{8}, \frac{1}{3}; \frac{1}{3}, \frac{5}{8}$

11. a.
$$\begin{array}{r} 5 \\ 3\overline{)\,17} \\ 15 \\ \hline 2 \end{array}$$
    $\frac{17}{3} = 5\frac{2}{3}$

    b.
$$\begin{array}{r} 1 \\ 20\overline{)\,23} \\ 20 \\ \hline 3 \end{array}$$
    $\frac{23}{20} = 1\frac{3}{20}$

12. $\frac{1}{3} + \frac{1}{12} = \frac{4}{12} + \frac{1}{12} = \frac{5}{12}$

13. $\frac{5}{8} + \frac{1}{4} + \frac{1}{2}$
    $= \frac{5}{8} + \frac{2}{8} + \frac{4}{8} = \frac{11}{8} = 1\frac{3}{8}$

14. $\frac{7}{9} - \frac{1}{3} = \frac{7}{9} - \frac{3}{9} = \frac{4}{9}$

15. $3 - \frac{1}{2} - \frac{1}{6} = \frac{18}{6} - \frac{3}{6} - \frac{1}{6}$
    $\phantom{3 - \frac{1}{2} - \frac{1}{6}} = \frac{14}{6}$
    $\phantom{3 - \frac{1}{2} - \frac{1}{6}} = \frac{7}{3}$
    $\phantom{3 - \frac{1}{2} - \frac{1}{6}} = 2\frac{1}{3}$

16. 0.6   17. 0.74

18. $1 - \dfrac{3}{5} - \dfrac{1}{10} = \dfrac{10}{10} - \dfrac{6}{10} - \dfrac{1}{10} = \dfrac{3}{10}$

Linus has $\dfrac{3}{10}$ of the cake.

19. $\dfrac{4}{5} + \dfrac{3}{10} = \dfrac{8}{10} + \dfrac{3}{10} = \dfrac{11}{10} = 1\dfrac{1}{10}$

He has $1\dfrac{1}{10}$ kilograms of raisins now.

Test Prep 3

1. D   2. C   3. A   4. C
5. B

6. a. $2\dfrac{3}{4} + 3\dfrac{2}{5}$

$= 2\dfrac{15}{20} + 3\dfrac{8}{20}$

$= 5\dfrac{23}{20}$

$= 6\dfrac{3}{20}$

b. $3\dfrac{1}{2} - 1\dfrac{7}{8}$

$= 3\dfrac{4}{8} - 1\dfrac{7}{8}$

$= 2\dfrac{12}{8} - 1\dfrac{7}{8}$

$= 1\dfrac{5}{8}$

7. a. $0 + \dfrac{1}{2} + \dfrac{1}{2} = 1$

b. $1 - \dfrac{1}{2} = \dfrac{1}{2}$

8. $\dfrac{2}{7} + (\dfrac{2}{7} + \dfrac{1}{3}) = \dfrac{19}{21}$

Gail sold $\dfrac{19}{21}$ of the cookies on the two days.

9. $(8 - 3) \div 8 = \dfrac{5}{8}$

Each shorter piece of ribbon is $\dfrac{5}{8}$ foot long.

10. $1 - (\dfrac{3}{7} + \dfrac{2}{5}) = 1 - \dfrac{29}{35} = \dfrac{6}{35}$

$\dfrac{6}{35}$ of the land is used to grow tomato plants.

11.
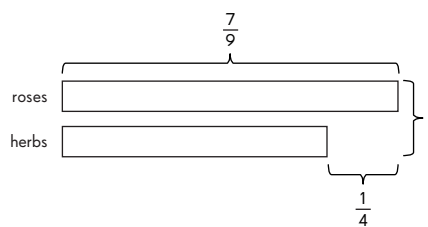
$\dfrac{7}{9} + (\dfrac{7}{9} - \dfrac{1}{4}) = \dfrac{7}{9} + \dfrac{19}{36} = \dfrac{47}{36} = 1\dfrac{11}{36}$

Jenny uses $1\dfrac{11}{36}$ gallons of water to water the roses and herbs.

12. Julian poured $3\dfrac{11}{12} - 1\dfrac{2}{5} = \dfrac{47}{12} - \dfrac{7}{5}$

$= \dfrac{151}{60} = 2\dfrac{31}{60}$ L

$3\dfrac{11}{12} + 2\dfrac{31}{60} = \dfrac{47}{12} + \dfrac{151}{60} = \dfrac{386}{60}$

$= 6\dfrac{13}{30}$ L

$10 \text{ L} - 6\dfrac{13}{30} \text{ L} = 3\dfrac{17}{30}$ L

$3\dfrac{17}{30}$ liters more water is still needed to fill the tank.

Pre-Test 4

1. simplify   2. improper fraction

3. decimal   4. $\dfrac{2}{9}; \dfrac{4}{18}; \dfrac{6}{27}$

5. $\dfrac{15}{18} = \dfrac{15 \div 3}{18 \div 3} = \dfrac{5}{6}$

6. $\dfrac{14}{35} = \dfrac{14 \div 7}{35 \div 7} = \dfrac{2}{5}$

7. $3 - \dfrac{3}{10} = \dfrac{30}{10} - \dfrac{3}{10} = \dfrac{27}{10} = 2\dfrac{7}{10}$

8. a. $\dfrac{15}{4} = \dfrac{12}{4} + \dfrac{3}{4}$

$= 3 + \dfrac{3}{4}$

$= 3\dfrac{3}{4}$

b. $\dfrac{21}{5} = \dfrac{20}{5} + \dfrac{1}{5}$

$= 4 + \dfrac{1}{5}$

$= 4\dfrac{1}{5}$

9. $5\frac{2}{5} = 5 + \frac{2}{5}$

$\qquad = \frac{25}{5} + \frac{2}{5}$

$\qquad = \frac{27}{5}$

10. $\frac{3}{5} = \frac{3 \times 20}{5 \times 20}$

$\qquad = \frac{60}{100}$

$\qquad = 0.6$

11. $\frac{2}{3} \times 36 = \frac{2 \times 36}{3}$

$\qquad\qquad = \frac{72}{3}$

$\qquad\qquad = 24$

12. $25 \times 4 \div (12 - 8) = 25 \times 4 \div 4$

$\qquad\qquad\qquad\qquad = 100 \div 4$

$\qquad\qquad\qquad\qquad = 25$

13.

gift   card   saved
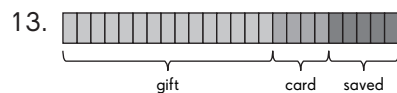
14. 9 cupcakes ⟶ $18

   1 cupcake ⟶ $18 ÷ 9 = $2

   6 cupcakes ⟶ 6 × $2 = $12

   6 cupcakes cost $12.

15. Teddy bears: $\frac{1}{3} \times 18 = 6$

   Balls: $\frac{1}{6} \times 18 = 3$

   Dolls: $18 - 6 - 3 = 9$

   Kim has 9 dolls.

16. $3 \times 12 = 36$

   $3 \times 20 = 60$

   Total number of colored pencils = 36 + 60 = 96

   96 ÷ 8 = 12

   There are 12 colored pencils in each packet.

Test Prep 4

1. A   2. C   3. C   4. D

5. B

6. a. $5\frac{5}{8} \times 18 = \frac{45}{8} \times 18$

$\qquad\qquad = \frac{810}{8}$

$\qquad\qquad = \frac{808}{8} + \frac{2}{8}$

$\qquad\qquad = 101 + \frac{2}{8}$

$\qquad\qquad = 101\frac{2}{8} = 101\frac{1}{4}$

b. **Method 1**

$\frac{3}{8} \div 12 = \frac{3}{8} \div \frac{12}{1}$

$\qquad\qquad = \frac{3}{8} \times \frac{1}{12}$

$\qquad\qquad = \frac{3}{96}$

$\qquad\qquad = \frac{1}{32}$

Method 2

$\frac{3}{8} \div 12 = \frac{1}{12}$ of $\frac{3}{8}$

$\qquad\qquad = \frac{1}{12} \times \frac{3}{8}$

$\qquad\qquad = \frac{3}{96}$

$\qquad\qquad = \frac{1}{32}$

7.
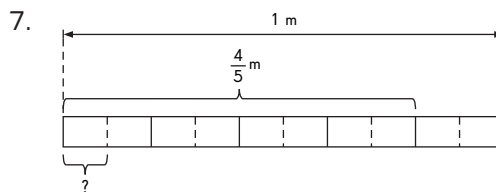
$\frac{4}{5} \div 8 = \frac{4}{5} \times \frac{1}{8} = \frac{4}{40} = \frac{1}{10}$ m

Each piece is $\frac{1}{10}$ meter long.

8. $1\frac{3}{4} \times \$8 = \frac{7}{4} \times \$8 = \$14$

   $\$14 \times 10 = \$140$

   He is paid $140 in 10 days.

9. $\frac{3}{4} \times \frac{1}{3} = \frac{1}{4}$

   $\frac{1}{4} \times 5 = \frac{5}{4} = 1\frac{1}{4}$

   His brother will take $1\frac{1}{4}$ hours to paint 5 similar walls.

10. $\$80 \times \frac{3}{5} = \$48$

   $\$80 - \$48 = \$32$

   $\$32 \div 5 = \$6.40$

   She spends $6.40 each day.

11.
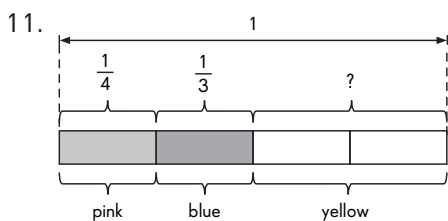
$1 - \dfrac{1}{4} = \dfrac{3}{4}$

$\dfrac{2}{3} \times \dfrac{3}{4} = \dfrac{1}{2}$

$\dfrac{1}{2}$ of the clips are yellow.

12.
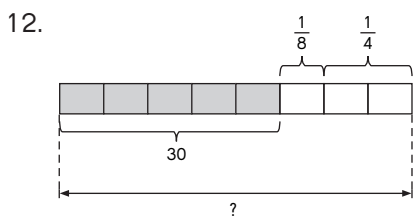
$1 - \dfrac{1}{8} - \dfrac{1}{4} = \dfrac{5}{8}$

5 units → 30

1 unit → 6

8 units → 6 × 8 = 48

There are 48 pages in the book.

Benchmark Assessment 1 for Chapters 1 to 4

1. B   2. D

3. B   4. C

5. A   6. D

7. A   8. A

9. C   10. B

11. 700,000

12. 124,678

13. 657 ÷ 3 = 219

219 × \$4 = \$876

Billy must pay \$876 for all the mugs.

14. 15 × 32 = 480

480 ÷ 16 = 30

There are 30 people in each group.

15. $3\dfrac{2}{5} + 9\dfrac{4}{15} = 3\dfrac{6}{15} + 9\dfrac{4}{15}$

$\qquad\qquad = 12\dfrac{10}{15}$

$\qquad\qquad = 12\dfrac{2}{3}$

$\dfrac{2}{5} \overset{\times 3}{=} \dfrac{6}{15}$ (×3)

16. $\dfrac{6}{25} \times \dfrac{3}{4} = \dfrac{6 \times 3}{25 \times 4}$

$\qquad\quad = \dfrac{18}{100}$

$\qquad\quad = 0.18$

17.
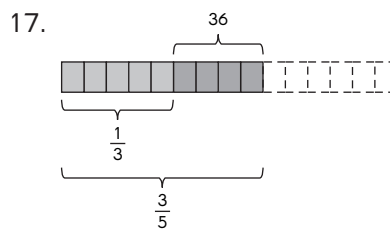
4 units → 36

1 unit → 9

5 units → 5 × 9 = 45

Belinda uses 45 beads to make the bracelet.

18. $1\dfrac{2}{3} + 2\dfrac{1}{2} = 1\dfrac{4}{6} + 2\dfrac{3}{6}$

$\qquad\qquad = 3\dfrac{7}{6}$

$\qquad\qquad = 3 + \dfrac{7}{6}$

$\qquad\qquad = 3 + 1\dfrac{1}{6}$

$\qquad\qquad = 4\dfrac{1}{6}$

She baked $4\dfrac{1}{6}$ pounds of biscuits in all.

19. Width: $\dfrac{1}{4} \times \dfrac{2}{5} = \dfrac{1}{10}$ m

Perimeter $= 2 \times (\dfrac{2}{5} + \dfrac{1}{10}) = 1$ m

The perimeter of the rectangle is 1 meter.

20.

$$8)\overline{132} \quad \begin{array}{r} 16 \\ \hline 132 \\ 80 \\ \hline 52 \\ 48 \\ \hline 4 \end{array}$$

132 ÷ 8 = 16 R 4

The travel company needs to book 17 boats.

21. $1\dfrac{1}{2} \times \dfrac{2}{3} + 3\dfrac{3}{5} \times \dfrac{5}{6}$

$= \dfrac{3}{2} \times \dfrac{2}{3} + \dfrac{18}{5} \times \dfrac{5}{6}$

$= 1 + 3$

$= 4$ L

Patrick has 4 liters of purple paint.

22.

300

almonds · pecans · walnuts
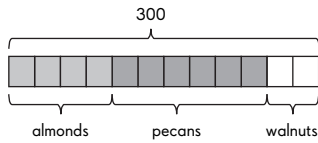
12 units → 300
1 unit → 25
2 units → 50
There are 50 walnuts in the bag.

23. $5,170 + $450 + $626 = $6,246
$6,246 ÷ 2 = $3,123
Mrs. Jefferson had $3,123 − $626 = $2,497.
Mr. Jefferson had $3,123 − $450 = $2,673.

1. Strategies: Make a systematic list. Guess and check.

10 Gift Cards		Total Number of Sides	Check
Number of Triangles	Number of Squares		
$2 \times 3 = 6$	$8 \times 4 = 32$	38	✗
$3 \times 3 = 9$	$7 \times 4 = 28$	37	✗
$4 \times 3 = 12$	$6 \times 4 = 24$	36	✗
$5 \times 3 = 15$	$5 \times 4 = 20$	35	✗
$6 \times 3 = 18$	$4 \times 4 = 16$	34	✔

Leslie has 4 square cards.

2. Strategy: Make a systematic list.

	Number of Eggs					
Groups of 4 eggs + 3	7	11	15	19	23	⦸27
Groups of 5 eggs + 2	7	12	17	22	⦸27	
Groups of 9 eggs	9	18	⦸27			

The least number of eggs the grocer had is 27 eggs.

1. inverse operations
2. equal; greater than; less than
3. order of operations
4. $<$ 5. $=$
6. $<$ 7. $>$
8. 9   9. 32, 32
10. 12   11. 76
12. 140   13. 24

14. $2 + (7 − 4) \times 3 = 2 + 3 \times 3$
$= 2 + 9$
$= 11$

15. $(95 − 15) ÷ 10 = 8$
He needs 8 plastic bags.

1. B   2. C   3. A   4. D
5. D
6. $3 + x − 100$
7. $60 − y$ or $(60 − y)$
8. a. $17y + 8$ b. $\dfrac{z − 24}{8} + 2$

9. a. $4x + 3$ $\dfrac{100x}{20} = \dfrac{100 \times 9}{20}$
   $= (4 \times 9) + 3$ $= \dfrac{900}{20}$
   $= 36 + 3$ $= 45$
   $= 39$

   $4x + 3 \;⦸<\; \dfrac{100x}{20}$

   b. $(100 − 2x) ÷ 2$ $4 \times (x + 1)$
   $= (100 − 2 \times 9) ÷ 2$ $= 4 \times (9 + 1)$
   $= (100 ÷ 18) ÷ 2$ $= 4 \times 10$
   $= 82 ÷ 2$ $= 40$
   $= 41$
   $(100 − 2x) ÷ 2 \;⦸>\; 4 \times (x + 1)$

10. a. $18m − 52 = 5m$
    $18m − 52 + 52 = 5m + 52$
    $18m = 5m + 52$
    $18m − 5m = 5m + 52 − 5m$
    $13m = 52$
    $13m ÷ 13 = 52 ÷ 13$
    $m = 4$
    b. $4p + 8 = 12p − 16$
    $4p + 8 + 16 = 12p − 16 + 16$
    $4p + 24 = 12p$
    $4p + 24 − 4p = 12p − 4p$
    $24 = 8p$
    $8p = 24$
    $8p ÷ 8 = 24 ÷ 8$
    $p = 3$

11. a. $3 \times p = 3p$
    $3p + 2$
    Cheryl has $3p + 2$ oranges.
    b. $3p + 2 = 3 \times 6 + 2$
    $= 20$
    Cheryl has 20 oranges.

12. a. If $y = 3$,

        Ernie $\rightarrow$ $3y + 4 = 3 \times 3 + 4 = 13$

        Gladice $\rightarrow$ $4y - 5 = 4 \times 3 - 5 = 7$

        Ernie read more books.

   b. $3y + 4 = 4y - 5$

    $3y + 4 + 5 = 4y - 5 + 5$

         $3y + 9 = 4y$

   $3y + 9 - 3y = 4y - 3y$

              $9 = y$

              $y = 9$

   When $y = 9$, both of them will read the same number of books.

Pre-Test 6

1. area
2. square units
3. triangles
4. formula
5.
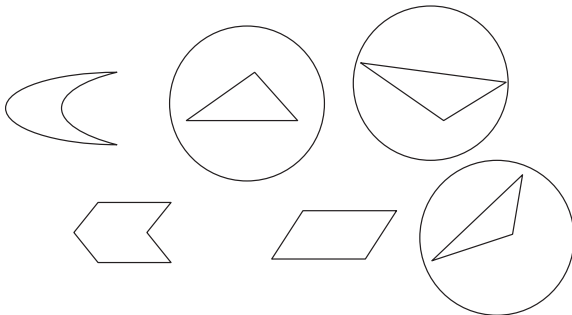
6. a. obtuse angle
   b. right angle
   c. acute angle
7. b
8.
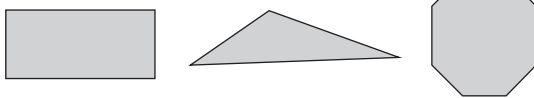
9. 48 cm²
10. 12 in.²
11. 175 ft²
12. 81 yd²
13. 680 m²
14. 3 m × 2 m = 6 m²

The garden's area is 6 square meters.

15. Area of land = $50 \times 50 = 2{,}500$ m²

Area of land and footpath = 56×56
                         $= 3{,}136$ m²

Area of footpath = $3{,}136 - 2{,}500 = 636$ m²
The area of the footpath is 636 square meters.

Test Prep 6

1. B   2. D   3. A   4. C
5. B

6.
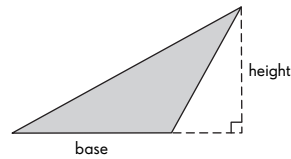
7. Base: $\overline{DC}$
Height: $\overline{BD}$

8. Area of triangle $CDE = \frac{1}{2} \times$ base $\times$ height

                   $= \frac{1}{2} \times 24$ m $\times 24$ m

                   $= 288$ m²

9. Area of the shaded triangle

   $= \frac{1}{2} \times$ base $\times$ height

   $= \frac{1}{2} \times 20$ cm $\times 5$ cm

   $= 50$ cm²

10. Area of the rectangle = 15 in. × 20 in.
                      $= 300$ in.²

Area of the 2 triangles

$= \frac{1}{2} \times 8$ in. $\times 15$ in. $+ \frac{1}{2} \times 6$ in. $\times 15$ in.

$= 60$ in.² $+ 45$ in.²

$= 105$ in.²

Area of the shaded part = 300 in.² $-$ 105 in.²
                        $= 195$ in.²

11. Area of the rectangle = 8 cm × 9 cm = 72 cm²

Area of the unshaded triangle

$= \frac{1}{2} \times 8$ cm $\times 9$ cm $= 36$ cm²

Area of the shaded part of the figure

$= 72$ cm² $- 36$ cm²

$= 36$ cm²

12. Length of the rectangle = $(60 - 24) \div 2$
                           $= 18$ m

Area of the rectangle = $18 \times 12 = 216$ m²

Area of the shaded part of the figure

$= 216 - (\frac{1}{2} \times 18 \times 8) - (\frac{1}{2} \times 12 \times 4)$

$= 120$ m²

Pre-Test 7

1. numerator; denominator
2. bar model
3.

4.

5. 2 out of 7 parts
6. 8 out of 9 parts

7. $\dfrac{9}{12} = \dfrac{3}{4}$ 8. $\dfrac{24}{60} = \dfrac{2}{5}$

9. From the model,
   5 parts $\longrightarrow$ 30
   1 part $\longrightarrow$ 6
   8 parts $\longrightarrow$ 8 $\times$ 6 = 48
   3 parts $\longrightarrow$ 3 $\times$ 6 = 18
   A = <u>48</u>; B = <u>18</u>
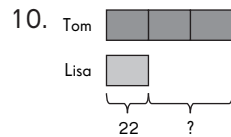
10.
    22 $\times$ 2 = 44
    Tom has 44 more stamps than Lisa.

Test Prep 7

1. A   2. C   3. B   4. D
5. C
6. Number of black beads = 7 + 12 + 9
   $\qquad\qquad\qquad\qquad\quad$ = 28
   Number of white beads = 9 + 3 + 4
   $\qquad\qquad\qquad\qquad\quad$ = 16

   $\dfrac{28}{16} = \dfrac{7}{4}$

   The number of black beads is $\dfrac{7}{4}$ times the number of white beads.

7. 5 : $\boxed{4}$: 9 = $\boxed{15}$: 12 : 27

8.

   The ratio of the time Ron spends reading to the time he spends on the computer to the total time he spends on both activities is 1 : 2 : 3.
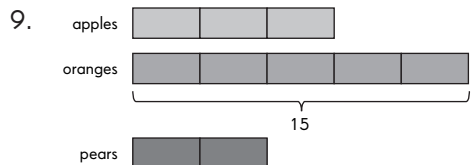
9.
   5 units $\longrightarrow$ 15
   1 unit $\longrightarrow$ 15 $\div$ 5 = 3
   Total number of units = 3 + 5 + 2 = 10
   10 $\times$ 3 = 30
   There are 30 fruits in all.
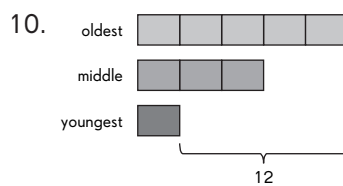
10.
    4 units $\longrightarrow$ 12 years
    3 units $\longrightarrow$ (12 $\div$ 4) $\times$ 3 = 9 years
    The middle child is 9 years old.
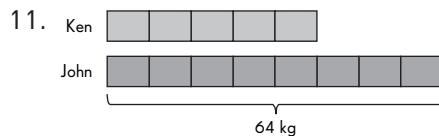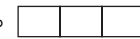
11.
    a. 5 : 8
    b. 8 units $\longrightarrow$ 64 kg
       3 units $\longrightarrow$ (64 $\div$ 8) $\times$ 3 = 24 kg
       John is 24 kilograms heavier than Ken.

12.
    a. 1 : 4
    b. 5 units $\longrightarrow$ 5 m^2
       4 units $\longrightarrow$ (5 $\div$ 5) $\times$ 4 = 4 m^2
       The area of the part of the door that is painted pink is 4 square meters.

Mid-Year Test

1. C   2. C   3. A   4. A
5. B   6. D   7. C   8. B
9. D   10. B
11. 4,192,560
12. 6,315 $\longrightarrow$ 6,000
    72 $\longrightarrow$ 70
    6,000 $\times$ 70 = (6,000 $\times$ 7) $\times$ 10
    $\qquad\qquad\qquad$ = 420,000
13. 32 + (25 $\div$ 5) $-$ 21 $\div$ 7 = 32 + 5 $-$ 21 $\div$ 7
    $\qquad\qquad\qquad\qquad\qquad$ = 32 + 5 $-$ 3
    $\qquad\qquad\qquad\qquad\qquad$ = 34
14. $\dfrac{4}{5} \div 20 = \dfrac{4}{5} \times \dfrac{1}{20} = \dfrac{4}{100} = 0.04$
15.
    1 unit $\longrightarrow$ $12
    3 units $\longrightarrow$ 3 $\times$ $12 = $36
    The radio costs $36.

16. $2\frac{3}{4} - \frac{1}{5} = 2\frac{15}{20} - \frac{4}{20} = 2\frac{11}{20}$

$2\frac{3}{4} + 2\frac{11}{20} = 2\frac{15}{20} + 2\frac{11}{20}$

$\qquad\qquad = 4\frac{26}{20}$

$\qquad\qquad = 5\frac{6}{20} = 5\frac{3}{10}$

It takes $5\frac{3}{10}$ hours to complete both projects.

17. Area of the rectangle = 10 cm × 24 cm
$\qquad\qquad\qquad\qquad = 240$ cm²

Area of the unshaded parts

$= 2 \times (\frac{1}{2} \times 5$ cm $\times 12$ cm$) = 60$ cm²

Area of the shaded part = 240 cm² − 60 cm²
$\qquad\qquad\qquad\qquad\quad = 180$ cm²

18. Pens ⟶ x
Rulers ⟶ $5 \times x = 5x$
Pencils ⟶ $x - 3$
$x + 5x + (x - 3) = 7x - 3$

They sold a total of $7x - 3$ items at the carnival.

19. Sandy's age : Tammy's age = 1 : 4
Jim's age : Tammy's age = 2 : 1 = 8 : 4
Jim's age : Tammy's age : Sandy's age = 8 : 4 : 1

The ratio of Jim's age to Tammy's age to Sandy's age is 8 : 4 : 1.

20. Area of triangle $PQR = \frac{1}{2} \times 15$ in. $\times 36$ in.
$\qquad\qquad\qquad\qquad = 270$ in.²

Area of triangle $QRS = \frac{1}{2} \times 15$ in. $\times 16$ in.
$\qquad\qquad\qquad\qquad = 120$ in.²

Area of the shaded part = 270 in.² − 120 in.²
$\qquad\qquad\qquad\qquad\qquad = 150$ in.²

21.

Quarter	Dime	Total Amount	Check ($22.40)
10	3	$2.50 + $0.30 = $2.80	✗
60	18	$15 + $1.80 = $16.80	✗
70	21	$17.50 + $2.10 = $19.60	✗
80	24	$20 + $2.40 = $22.40	✔

There are 80 quarters and 24 dimes.

22. 2 boxes of crayons ⟶ $18 − $10 = $8
$\qquad$ 1 box of crayons ⟶ $8 ÷ 2 = $4
$\qquad\qquad$ 3 erasers ⟶ $10 − $4 = $6
$\qquad\qquad\qquad$ 1 eraser ⟶ $6 ÷ 3 = $2
1 box of crayons and 1 eraser ⟶ $4 + $2 = $6
1 box of crayons and 1 eraser cost $6.

23. $\frac{2}{5}$ of the books are fiction books.

So, $1 - \frac{2}{5} = \frac{3}{5}$ of the books are non-fiction books.

Total number of fiction mystery books

$= \frac{2}{5} \times \frac{1}{5} = \frac{2}{25}$

Total number of non-fiction mystery books

$= \frac{3}{5} \times \frac{1}{3} = \frac{1}{5}$

$\frac{2}{25} + \frac{1}{5} = \frac{7}{25}$

$\frac{7}{25}$ of all the books in the shop are mystery books.

Bonus Questions

1. Strategy: Simplify the problem.
Area of the whole figure = 15 × 15
$\qquad\qquad\qquad\qquad\quad = 225$ cm²
Area of the shaded part = 5 × 5
$\qquad\qquad\qquad\qquad\quad = 25$ cm²
Area of the unshaded part = 225 − 25
$\qquad\qquad\qquad\qquad\qquad = 200$ cm²
The area of the unshaded part of the figure is 200 square centimeters.

2. Strategy: Draw a diagram.

Distance between each tree $= \frac{3}{5} \div 3 = \frac{1}{5}$ m

Distance between 1ˢᵗ and 10ᵗʰ tree $= \frac{1}{5} \times 9$

$\qquad\qquad\qquad\qquad\qquad = \frac{9}{5}$

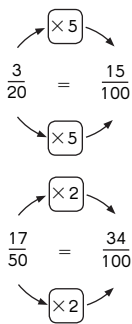$\qquad\qquad\qquad\qquad\qquad = 1\frac{4}{5}$ m

The distance between the 1ˢᵗ tree and the 10ᵗʰ tree is $1\frac{4}{5}$ meters.

Pre-Test 8

1. tenths
2. hundredths
3. nearest whole number
4. nearest tenth
5. decimals

6. a. 1.7   b. 10.18

7. a. 1.6   b. 3.28

8. 4.13   9. 9.2

10. $\frac{3}{20} = \frac{15}{100} = 0.15$

11. $3\frac{17}{50} = 3 + \frac{17}{50}$

$= 3 + \frac{34}{100}$

$= 3 + 0.34 = 3.34$

12. 3; 2.7   13. 5; 5.2

14. 10; 9.6   15. 1; 1.0

16. 8; 7.9   17. 3; 3.0

18. $1\frac{2}{5} - \frac{17}{20} = \frac{7}{5} - \frac{17}{20} = \frac{28}{20} - \frac{17}{20}$

$= \frac{11}{20}$

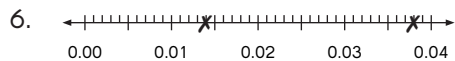$\frac{11}{20} = \frac{11 \times 5}{20 \times 5} = \frac{55}{100} = 0.55$ m

0.55 m is about 0.6 m.
The length of the remaining piece of ribbon is about 0.6 m.

Test Prep 8

1. B   2. C   3. D   4. A

5. B

6.

7. a. $5\frac{18}{1000}$

= 5 ones and 1 hundredth 8 thousandths

= 5.018

b. $2\frac{349}{1000}$

= 2 ones and 3 tenths 4 hundredths
9 thousandths

= 2.349

8. 3.178   3.6   6.63   10.1

9. 8.275 = 8 + 0.2 + 0.07 + 0.005

10. 1.650 rounded to the nearest tenth is 1.7.

1.649 rounded to the nearest tenth is 1.6.

So, the greatest possible decimal is 1.649.

11. 850 mL $= \frac{850}{1000}$ L $= 0.85$ L

1,200 mL = 1.2 L

1.2 L + 0.85 L = 2.05 L

She makes 2.05 liters of fruit punch.

12. 6.149 rounded to the nearest tenth is 6.1.

6.150 rounded to the nearest tenth is 6.2.

So, the shortest possible height of the vase is 6.150 feet.

Pre-Test 9

1. multiplied by 10   2. divided by 1,000

3. estimation   4. 370

5. 13,600   6. 85,000

7. $92 \times 30 = 92 \times (3 \times 10)$

$= (92 \times 3) \times 10$

$= 276 \times 10$

$= 2,760$

8. $381 \times 500 = 381 \times (5 \times 100)$

$= (381 \times 5) \times 100$

$= 1,905 \times 100$

$= 190,500$

9. $76 \times 8,000 = 76 \times (8 \times 1,000)$

$= (76 \times 8) \times 1,000$

$= 608,000$

10. 640

11. 39

12. 8

13. $540 \div 90 = (540 \div 9) \div 10$

$= 60 \div 10$

$= 6$

14. $6,300 \div 700 = (6,300 \div 7) \div 100$

$= 900 \div 100$

$= 9$

15. $72,000 \div 8,000 = (72,000 \div 8) \div 1,000$

$= 9,000 \div 1,000$

$= 9$

16. 623 rounds to 600.

59 rounds to 60.

$600 \times 60 = (600 \times 6) \times 10$

$= 3,600 \times 10$

$= 36,000$

623×59 is about 36,000.

17. 9,842 rounds to 9,800.

36 rounds to 40.

$9,800 \div 40 = (9,800 \div 4) \div 10$

$= 2,450 \div 10$

$= 245$

$9,842 \div 36$ is about 245.

18.

$7.65

buttons | | $16.25

fabric | | |
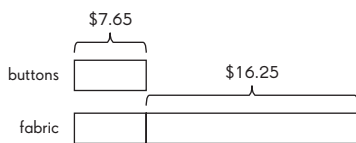
a. $7.65 + $16.25 = $23.90
   Suzanne paid $23.90 for the items.
b. $50 − $23.90 = $26.10
   She got $26.10 in change.

19. a. 208 × 50 = 208 × (5 × 10)
              = (208 × 5) × 10
              = 1,040 × 10
              = 10,400
   There are 10,400 roses in all.
   b. 10,400 ÷ 20 = (10,400 ÷ 2) ÷ 10
                  = 5,200 ÷ 10
                  = 520
   He needs 520 boxes.

1. B
2. C
3. A
4. D
5. C
6. a. 1,000   b. 100
7.

$$\begin{array}{r} \overset{5\;\,2}{6\,.\,8\,4} \\ \times 7 \\ \hline 4\,7\,.\,8\,8 \end{array}$$

8. a. 23.63 rounds to 24.
      15.3 rounds to 15.
      24 + 15 = 39
      23.63 + 15.3 is about 39.
   b. 17.85 rounds to 18.
      9.49 rounds to 9.
      18 − 9 = 9
      17.85 − 9.49 is about 9.
9. 5 m ÷ 8 = 0.625 m
   0.625 rounded to the nearest hundredth is 0.63.
   Each piece of rope is about 0.63 meter long.
10. 1.065 lb × 8 = 8.52 lb
    15 lb − 8.52 lb = 6.48 lb
    6.48 pounds of flour is left after 8 days.
11. Cost of 2 pounds of grapes = 2 × $2.49
                               = $4.98
    Cost of 3 muffins = 3 × $0.75 = $2.25
    $4.98 + $2.25 = $7.23
    He paid $7.23 for the grapes and muffins.

12.

$90

$20 | | $20
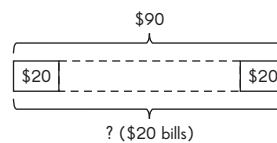
? ($20 bills)

$27.90 is about $30.
3 × $30 = $90
The total cost of 3 chairs is about $90.
$90 ÷ $20 = 4.5
He needs at least 5 $20 bills to buy the chairs.

1. out of
2. decimal
3. fraction
4. equivalent; denominator
5. 0.28
6. 0.73
7. $\dfrac{19}{100}$
8. $\dfrac{91}{100}$
9. 3; 40
10. 79; 100
11. 58; 100
12. 32; 100

13. $\dfrac{9}{12} = \dfrac{3}{\boxed{4}} = \dfrac{\boxed{75}}{100}$

14. $\dfrac{4}{\boxed{7}} = \dfrac{16}{\boxed{28}} = \dfrac{28}{49}$

15. $\dfrac{2}{5} = \dfrac{4}{\boxed{10}} = \dfrac{18}{\boxed{45}}$

16. $\dfrac{9}{25} = \dfrac{18}{\boxed{50}} = \dfrac{\boxed{36}}{100}$

17. $\dfrac{14}{25}$
18. $\dfrac{3}{4}$
19. $\dfrac{1}{2}$
20. $\dfrac{4}{5}$

21.

$\boxed{\frac{8}{100}}$ $\boxed{\frac{50}{100}}$

0   0.10   0.20   0.30   0.40   0.50   0.60   0.70   0.80   0.90   1.00

$\boxed{0.35}$ $\boxed{0.96}$
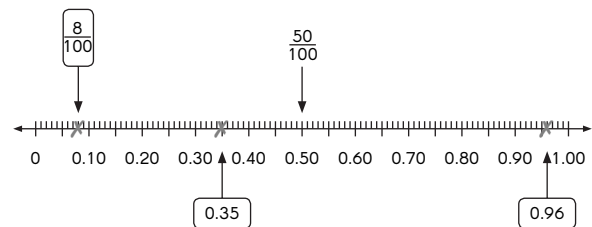
22. 300 g = $\dfrac{300}{1000}$ = 0.3 kg
    1.4 kg + 0.3 kg = 1.7 kg
    The mass of the mixture is 1.7 kilograms.
23. 2.4 − (1.75 + 0.2) = 0.45 L
    0.45 L = $\dfrac{45}{100}$ L = $\dfrac{9}{20}$ L
    $\dfrac{9}{20}$ liter of lemonade is left.

1. D   2. A   3. C   4. B

5. D

6. $45\% = \dfrac{45}{100} = \dfrac{45 \div 5}{100 \div 5} = \dfrac{9}{20}$

7. Total number of people = 200
   Number of women = 200 − 80 = 120
   $\dfrac{120}{200} = \dfrac{60}{100} = 60\%$
   60% of the people are women.

8. Total number of students = 680
   Number of girls = 55% × 680
   $= \dfrac{55}{100} \times 680$
   $= 374$
   Number of boys = 680 − 374 = 306
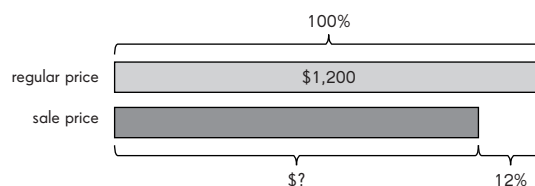   374 − 306 = 68
   There are 68 more girls than boys.

9. 100% − 75% − 12% = 13%
   13% are green beads.
   13% → 104 beads
   1% → 104 ÷ 13 = 8 beads
   12% → 12 × 8 = 96 beads
   Lucy has 96 blue beads.

10. 100% → $3,500
    1% → $3,500 ÷ 100 = $35
    72% → $35 × 72 = $2,520
    He spends $2,520.
    $3,500 − $2,520 = $980
    25% of $980 = $245
    He saves $245.
    $980 − $245 = $735
    Mr. Daniels' rent is $735.

11.
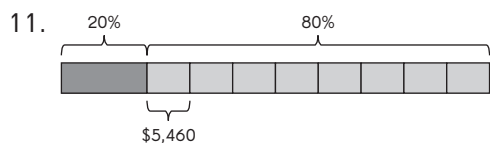
    $5,460 × 8 = $43,680
    80% → $43,680
    1% → $\dfrac{\$43,680}{80} = \$546$
    20% → $546 × 20 = $10,920
    Cost of the car = $43,680 + $10,920
                    = $54,600
    The car costs $54,600.

12.

a. **Method 1**
   100% → $1,200
   1% → $1,200 ÷ 100 = $12
   12% → 12 × $12 = $144
   The dollar amount of the discount was $144.

   Method 2
   Discount = 12% of regular price
   $= \dfrac{12}{100} \times \$1,200$
   $= \$144$

b. $1,200 − $144 = $1,056
   The airline ticket cost $1,056.
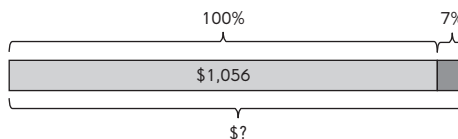
   100% → $1,056
   1% → $1,056 ÷ 100 = $10.56
   7% → 7 × $10.56 = $73.92
   $1,056 + $73.92 = $1,129.92
   Mr. Sims paid $1,129.92.

Benchmark Assessment 2 for Chapters 8 to 10

1. B   2. C   3. B   4. C

5. A   6. A   7. D   8. C

9. D   10. B

11. 3 tens and 25 thousandths = 30.025

12. $\dfrac{9675}{1000} = 9.675$

    9.675 is nearer to 10 than to 9.
    So, 9.675 rounds to 10.

13. $7.065 = 7\dfrac{65}{1000} = 7\dfrac{13}{200}$

14. 900 × 3.168
    = (100 × 9) × 3.168
    = 100 × (9 × 3.168)
    = 100 × 28.512
    = 2,851.2

    $\begin{array}{r} \overset{1}{}\overset{6}{}\overset{7}{} \\ 3\,.\,1\,6\,8 \\ \times \qquad 9 \\ \hline 2\,8\,.\,5\,1\,2 \end{array}$

15. 6.24 ÷ 10 = 0.624
    624 ÷ 1,000 = 0.624
    So, 6.24 ÷ 10 = 624 ÷ 1,000

16. 8.75 pounds rounds to 9 pounds.
36 rounds to 40.
Weight of 1 chicken drumstick
$= 9 \text{ lb} \div 40$

$= \dfrac{9}{40}$

$= \dfrac{9 \times 25}{40 \times 25}$

$= \dfrac{225}{1000}$

$= 0.225 \text{ lb}$

Each chicken drumstick weighs about
0.225 pound.

17. Number of non-school holidays in April
$= 30 - 6 = 24$

$\dfrac{24}{30} \times 100\% = 80\%$

80% of the days in April are not school holidays.

18. 15% of $360 $= \dfrac{15}{100} \times \$360 = \$54$

18% of $720 $= \dfrac{18}{100} \times \$720 = \$129.60$

Difference $= \$129.60 - \$54 = \$75.60$

19.

$42\% \longrightarrow 2.1 \text{ L}$
$1\% \longrightarrow 2.1 \div 42 = 0.05 \text{ L}$
$58\% \longrightarrow 58 \times 0.05 = 2.9 \text{ L}$
Leon used 2.9 liters of brown paint.

20.
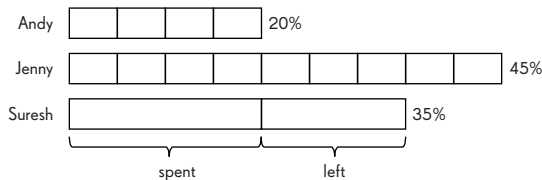
$\dfrac{3}{5} \times 35\% = \dfrac{3}{5} \times \dfrac{35}{100} = \dfrac{105}{500} = \dfrac{21}{100} = 21\%$

Suresh spends 21% of the total amount of money.
$35\% - 21\% = 14\%$
Suresh has 14% of the total amount of money left.

21.
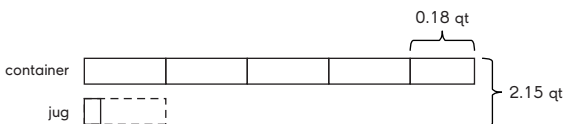
$5 \text{ parts} \longrightarrow 2.15 \text{ qt}$
$1 \text{ part} \longrightarrow 2.15 \div 5 = 0.43 \text{ qt}$
$4 \text{ parts} \longrightarrow 4 \times 0.43 = 1.72 \text{ qt}$
$1.72 \text{ qt} + 0.18 \text{ qt} = 1.9 \text{ qt}$
There were 1.9 quarts of oil in the container at first.

22.
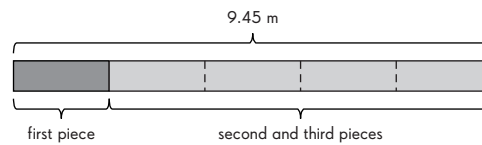
$5 \text{ units} \longrightarrow 9.45 \text{ m}$
$1 \text{ unit} \longrightarrow 1.89 \text{ m}$
$4 \text{ units} \longrightarrow 7.56 \text{ m}$
The second and third pieces of rope were
7.56 meters long.
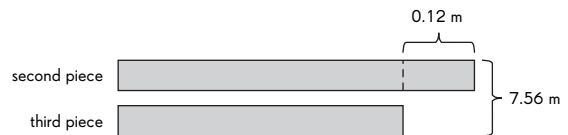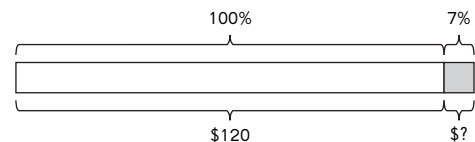

$7.56 \text{ m} - 0.12 \text{ m} = 7.44 \text{ m}$
$2 \text{ units} \longrightarrow 7.44 \text{ m}$
$1 \text{ unit} \longrightarrow 3.72 \text{ m}$
$3.72 \text{ m} + 0.12 \text{ m} = 3.84 \text{ m}$
The second piece of rope was 3.84 meters long.

23. a.

$100\% \longrightarrow \$120$
$1\% \longrightarrow \$120 \div 100 = \$1.20$
$7\% \longrightarrow 7 \times \$1.20 = \$8.40$
The tax was $8.40.
b. $15\% \longrightarrow 15 \times \$1.20 = \$18$
The tip was $18.
c. Total cost of the meal
$= \$120 + \$8.40 + \$18$
$= \$146.40$
$\$146.40 \div 5 = \$29.28$
Each of them had to pay $29.28.

Bonus Questions

1. Strategy: Make logical deduction.
Volume of 9 bottles = Volume of 12 pails
Divide both sides by 3:
Volume of 3 bottles = Volume of 4 pails
Volume of 3 bottles and 5 pails
= Volume of 4 pails + Volume of 5 pails
21.6 L = Volume of 9 pails
Volume of 9 pails = 21.6 L
Volume of 1 pail = 21.6 ÷ 9
$= 2.4 \text{ L}$
The volume of 1 pail is 2.4 liters.

2. Strategy: Draw a model.
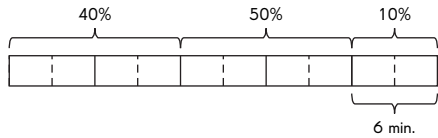
$100\% - (50\% + 40\%) = 10\%$
$10\% \longrightarrow 6$ min.
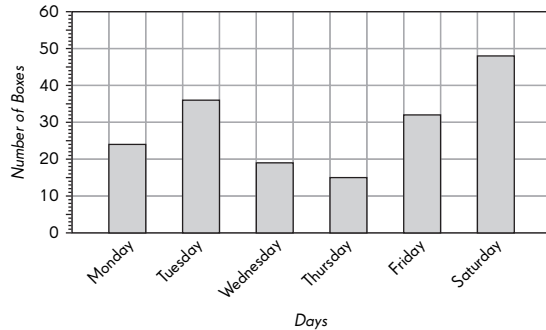$100\% \longrightarrow 6 \times 10 = 60$ min.
60 min. $\div 5 = 12$ min.
Pauline should have spent 12 minutes on each question.

Pre-Test 11

1. mean
2. table; tally chart
3. graph
4. probability
5. more likely
6. impossible
7. a.

Cookies Sold in a Week

b. Saturday

8. 1.2 kg $= 1,200$ g
   Total mass of the 4 objects
   $= 45$ g $+ 76$ g $+ 103$ g $+ 1,200$ g
   $= 1,424$ g
   Average mass $= 1,424$ g $\div 4 = 356$ g

9. a. less likely
   b. impossible
   c. certain
   d. less likely

10. a. $\dfrac{1}{6}$

    b. $\dfrac{2}{6} = \dfrac{1}{3}$

    c. $\dfrac{3}{6} = \dfrac{1}{2}$

11. a. 19 quarters
    b. $24 - 15 = 9$
       He saved 9 more quarters in Week 2 than in Week 1.
    c. $15 + 24 + 19 + 30 = 88$
       He saved 88 quarters in 4 weeks.
    d. $88 \times 25¢ = 88 \times \$0.25 = \$22$
       Bob saved $22.
    e. $\$22 \div 4 = \$5.50$
       He saved an average of $5.50 per week.

12. Total amount of water in the 5 containers
    $=$ mean amount of water $\times$ number of containers
    $= 620$ mL $\times 5$
    $= 3,100$ mL
    Amount of water in the fifth container
    $= 3,100$ mL $- 2,750$ mL
    $= 350$ mL
    The amount of water in the fifth container is 350 mL.

Test Prep 11

1. C
2. C
3. A
4. D
5. B
6. a. George: $\$32 + \$25 + \$40 = \$97$
      Henry: $\$36 + \$34 + \$29 = \$99$
      Henry made more money.
   b. $\$99 - \$97 = \$2$
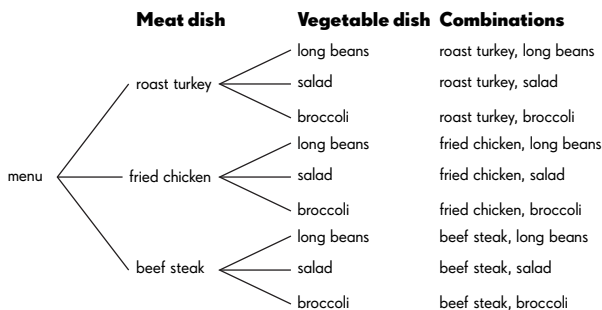   He made $2 more.

7.

8. 7 meters

9.
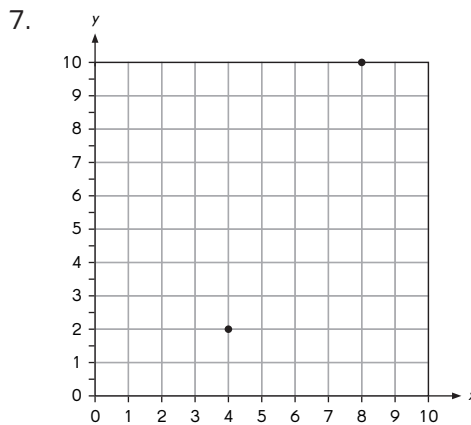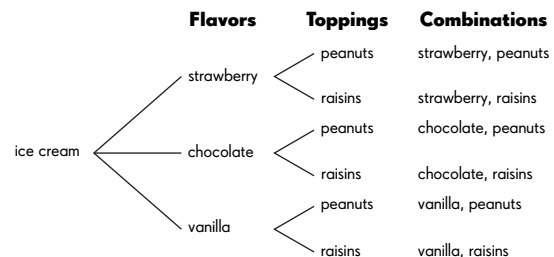
The shop can offer $3 \times 2 = 6$ combinations.

10. a. Number of times a black ball is drawn
$$= 50 - 15 - 26 = 9$$
Experimental probability $= \dfrac{9}{50}$

   b. Theoretical probability $= \dfrac{3}{5 + 3 + 4} = \dfrac{3}{12}$
   $$= \dfrac{1}{4}$$
   Experimental probability $= \dfrac{26}{50}$
   $$\dfrac{26}{50} - \dfrac{1}{4} = \dfrac{52}{100} - \dfrac{25}{100} = \dfrac{27}{100}$$
   The difference between the theoretical probability and the experimental probability of getting a green ball is $\dfrac{27}{100}$.

11. From the graph,
    45 ft → 15 yd
    72 ft → 24 yd
    Area of land = 15 yd × 24 yd = 360 yd²
    The area of the rectangular plot of land is 360 square yards.

12. a.

| Meat dish	Vegetable dish	Combinations
roast turkey	long beans	roast turkey, long beans
	salad	roast turkey, salad
	broccoli	roast turkey, broccoli
fried chicken	long beans	fried chicken, long beans
	salad	fried chicken, salad
	broccoli	fried chicken, broccoli
beef steak	long beans	beef steak, long beans
	salad	beef steak, salad
	broccoli	beef steak, broccoli

   She can choose from 3 × 3 = 9 combinations.
   b. Ms. Spencer can choose from 4 × 3 = 12 combinations.

Pre-Test 12

1. line; points
2. line segment
3. rays; angle
4. perpendicular lines
5. right angle
6. points; line
7. line segment; ray
8. $\overline{EF}$ and $\overline{CD}$
9. a. 4 b. 360°

10.

11. ∠TUV or ∠VUT
12. ∠BOC or ∠COB
13. 65°
14. 125°
15. Measure of ∠x = 90° − 12° = 78°
16. Measure of ∠y = 45° − 18° = 27°

Test Prep 12

1. A   2. B   3. C   4. D
5. C
6. $86° + x + x = 180°$
   $$x + x = 180° - 86°$$
   $$2x = 94°$$
   $$x = 94° ÷ 2 = 47°$$
7. $m\angle p + 63° + 90° + 78° = 360°$
   $$m\angle p + 231° = 360°$$
   $$m\angle p = 360° - 231°$$
   $$= 129°$$
8. $m\angle a + 90° = 137°$
   $$m\angle a = 137° - 90° = 47°$$
9. $m\angle ABC = 90°$
   $m\angle EBF = m\angle ABD = 90° - 45° = 45°$
   The measure of ∠EBF is 45°.
10. $m\angle p + 90° + 90° + 125° = 360°$
    $$m\angle p + 305° = 360°$$
    $$m\angle p = 360° - 305°$$
    $$= 55°$$
11. $m\angle p + 71° + 90° + m\angle q + 90° + m\angle r$
    $$= 360°$$
    $m\angle p + m\angle q + m\angle r = 360° - 251°$
    $$= 109°$$
12. $m\angle DBH = 180° - 90° = 90°$
    $m\angle CBD = 90° - 45° = 45°$
    $m\angle CBH = 90° - 45° = 45°$
    $m\angle CBG = m\angle CBH ÷ 2 = 45° ÷ 2$
    $$= 22.5°$$
    $m\angle DBG = 45° + 22.5° = 67.5°$
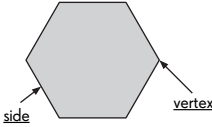 $m\angle FBE = m\angle DBG = 67.5°$

Pre-Test 13

1. polygon
2. vertices
3. triangles
4. quadrilaterals
5. trapezoid
6. inequality
7. a. rectangle   b. parallelogram   c. rhombus
   d. square   e. triangle   f. trapezoid
8. three
9. equal
10. parallel
11. opposite
12. one
13. greater than; less than
14. a. $m\angle\underline{\,q\,} + m\angle\underline{\,p\,} = 180°$ or
    $m\angle\underline{\,q\,} + m\angle\underline{\,x\,}$; $m\angle\underline{\,x\,} + m\angle\underline{\,DOB\,}$;
    $m\angle\underline{\,p\,} + m\angle\underline{\,DOB\,}$
    b. $m\angle x + m\angle\underline{\,y\,} + m\angle\underline{\,z\,} = 180°$
    c. $m\angle p + m\angle\underline{\,y\,} + m\angle\underline{\,z\,} = 180°$

15. <

16. =

17. >

18. rhombus

19. trapezoid
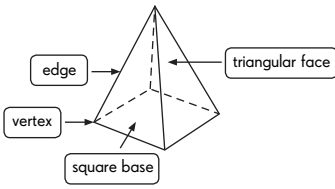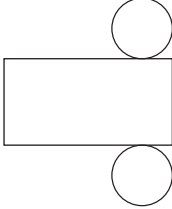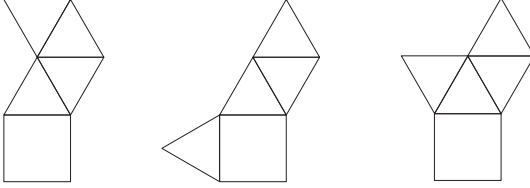
1. A   2. B   3. D   4. C

5. A

6. $m\angle ABC + m\angle BAC + m\angle ACB = 180°$
   $52° + 65° + m\angle ACB = 180°$
   $m\angle ACB = 180° - 52° - 65°$
   $= 63°$
   $m\angle BCD = 180° - 63° = 117°$
   $m\angle a + 30° + m\angle BCD = 180°$
   $m\angle a + 30° + 117° = 180°$
   $m\angle a + 147° = 180°$
   $m\angle a = 180° - 147°$
   $= 33°$

7. a. $m\angle ACB = 180° - 69° - 90° = 21°$
   $m\angle BAC \;\textgreater\; m\angle ACB$
   b. $69° - 21° = 48°$
   $m\angle BAC$ is greater than $m\angle ACB$ by 48°.

8. $m\angle CED = 90° - 60° = 30°$
   $m\angle a = m\angle CED = 30°$

9. $m\angle BCE = (180° - 56°) \div 2 = 62°$
   $m\angle ABC = m\angle ADC = 84°$
   $m\angle ABE = 62° + 84° = 146°$

10. $m\angle ABC = m\angle ADC = 76°$
    $m\angle CAB = (180° - 76°) \div 2 = 52°$
    $m\angle BAE = 180° - 52° = 128°$
    $m\angle ABE = (180° - 128°) \div 2 = 26°$
    $m\angle a = 360° - 26° - 76° = 258°$
    $m\angle CAD = 52°$
    $m\angle b = 180° - 52° = 128°$

11. $\angle 35° + \angle 73° + m\angle a + m\angle b + m\angle c +$
    $m\angle d = 180° + 180°$
    $\angle 108° + m\angle a + m\angle b + m\angle c + m\angle d$
    $= 360°$
    $m\angle a + m\angle b + m\angle c + m\angle d$
    $= 360° - 108° = 252°$
    The sum of the measures of $\angle a$, $\angle b$, $\angle c$, and $\angle d$ is 252°.

12. $m\angle EDB = m\angle EAB = 110°$
    $m\angle DBE = (180° - 110°) \div 2 = 70° \div 2$
    $= 35°$
    $m\angle BDC = 180° - 110° = 70°$
    $m\angle CBD = 180° - 70° - 55° = 55°$
    $m\angle EBC = 360° - 35° - 55° = 270°$
    The measure of $\angle EBC$ is 270°.

1. plane figure   2. vertices

3. pentagon   4. pyramid

5. congruent

6. The plane figures are B, C, D, and F.
   The solid figures are A and E.

7.

8. sphere   9. cone

10. cube, rectangular prism, or pyramid

11. $\overline{AB}$ // $\overline{CD}$ or $\overline{AD}$ // $\overline{BC}$

12. B and E, D and H, C and G

1. B   2. C   3. D   4. D

5. A

6. rectangular prism

7.

8. It does not have any flat, triangular faces.

9. a. 10 edges and 6 vertices
   b. The base is a pentagon. The faces are triangles.

10.

11. A and C

12. square pyramid

1. square
2. prism
3. triangular prism
4. volume
5. capacity
6. area, formulas
7. triangular prism
8. cube or square prism
9. rectangular prism
10. a. The volume of the juice in the jug is 3.5 quarts.
   b. The capacity of the jug is more than 5 quarts.
11. $\frac{2}{3} \times 30 \text{ L} = 20 \text{ L}$

    The volume of the water in the tank is 20 liters.
12. Area of the bathroom floor $= 2 \text{ m} \times 2 \text{ m} = 4 \text{ m}^2$
    Area of the bedroom and study floor
    $= 8 \text{ m} \times 2 \text{ m}$
    $= 16 \text{ m}^2$
    Area of the living room floor
    $= 6 \text{ m} \times 3 \text{ m}$
    $= 18 \text{ m}^2$
    Total area $= 4 \text{ m}^2 + 16 \text{ m}^2 + 18 \text{ m}^2 = 38 \text{ m}^2$
    The total area of the floor of the apartment is
    38 square meters.

1. C
2. C
3. B
4. D
5. B
6. 9 cubes are used to build the solid.
7.
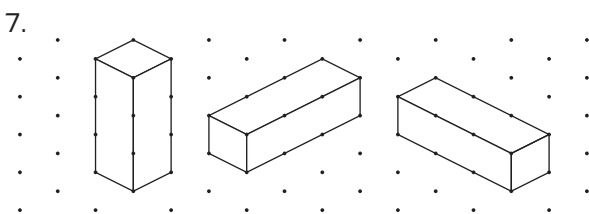
8. Total surface area of the triangular prism
   $= 2 \times 15 \times 16 + 2 \times \frac{1}{2} \times 17 \times 12 +$
   17×16
   $= 956 \text{ cm}^2$
9. Length $= 12 \times 2 = 24$ in.
   Volume of wood $= 12 \times 24 \times 8.5$
   $= 2{,}448 \text{ in.}^3$
   The volume of the block of wood is 2,448
   cubic inches.
10. Volume of water in the container
    $= 9 \times 12 \times 23 = 2{,}484 \text{ cm}^3 = 2{,}484 \text{ mL}$
    $2{,}484 \text{ mL} \times \frac{2}{3} = 1{,}656 \text{ mL}$
    $2{,}484 \text{ mL} - 1{,}656 \text{ mL} = 828 \text{ mL}$
    She must pour out 828 milliliters of water from
    the container.

11. Capacity of the tank $= 320 \times 160 \times 200$
    $= 10{,}240{,}000 \text{ cm}^3$
    Volume of water in the tank
    $= \frac{3}{4} \times 10{,}240{,}000$
    $= 7{,}680{,}000 \text{ cm}^3$
    Capacity of a small container $= 16 \times 16 \times 5$
    $= 1{,}280 \text{ cm}^3$
    Number of containers filled with water from the
    tank
    $= 7{,}680{,}000 \text{ cm}^3 \div 1{,}280 \text{ cm}^3$
    $= 6{,}000$
    The water from the tank can fill 6,000 small
    containers.
12. Capacity of the tank $= 30 \times 30 \times 50$
    $= 45{,}000 \text{ cm}^3 = 45 \text{ L}$
    $\frac{4}{5} \times 45 \text{ L} = 36 \text{ L}$
    The tank is filled with 36 liters of water.
    $6 \text{ L} \longrightarrow 1 \text{ min}$
    $36 \text{ L} \longrightarrow 36 \div 6 = 6 \text{ min}$
    It will take 6 minutes to fill $\frac{4}{5}$ of the tank
    with water.

1. B
2. D
3. C
4. B
5. A
6. C
7. A
8. D
9. B
10. C
11.
```
        7 6
        6 5
      6 8 7
  ×      9 8
  ───────────
    5, 4 9 6
   6 1, 8 3 0
  ───────────
   6 7, 3 2 6
```
12.
```
     1. 2 8 4
  5)6. 4 2
     5
     ─
     1 4
     1 0
     ───
       4 2
       4 0
       ───
         2 0
         2 0
         ───
           0
```
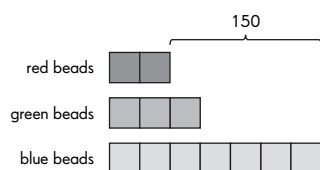1.284 rounded to the nearest hundredth is 1.28.

13. $6\frac{1}{4} + 2\frac{7}{9} + 1\frac{3}{4} = 8 + 2\frac{7}{9} = 10\frac{7}{9}$

14. $5\frac{1}{2} \times 4 = \frac{11}{2} \times 4$

$= \frac{11 \times 4}{2} = \frac{44}{2} = 22$ lb

The total weight of the charcoal is 22 pounds.

15. $14f + 2$

16.

5 parts → 150
1 part → 150 ÷ 5 = 30
12 parts → 12 × 30 = 360
There are 360 beads.

17. Number of combinations = 3 × 5 = 15
The teacher can choose from 15 combinations.

18. $m\angle ADC = 180° - 122° = 58°$
$m\angle ADE = 58° + 31° = 89°$
$m\angle DEA = (180° - 89°) ÷ 2 = 45.5°$

19. rectangular pyramid

20. Area covered by a face of solid B
$= 3 \times 4 = 12$ cm²
Surface area of solid A − 12 cm²
$= 2 \times 10 \times 9 + 2 \times 10 \times (7 + 4) +$
$\quad 2 \times 9 \times (7 + 4) - 12$ cm²
$= 586$ cm²
The total surface area of solid A that is painted red is 586 square centimeters.

21. Amount of juice left $= 7\frac{2}{3} - \frac{5}{6}$

$= 6\frac{5}{6}$ pt

Amount of juice poured into 3 bottles

$= 6\frac{5}{6} \times \frac{3}{4} = 5\frac{1}{8}$ pt

Amount of juice in each bottle

$= 5\frac{1}{8} ÷ 3 = 1\frac{17}{24}$ pt

Each bottle contains $1\frac{17}{24}$ pints of pineapple juice.

22. Volume of water in the rectangular tank

$= 24 \times 12 \times 10 \times \frac{4}{5}$

$= 2,304$ cm³ $= 2,304$ mL
Volume of water used to fill the cubical tank

$= 16 \times 16 \times 16 \times \frac{1}{2}$

$= 2,048$ cm³ $= 2,048$ mL
Volume of water left in the rectangular tank
$= 2,304 - 2,048 = 256$ mL $= 0.256$ L
0.256 liter of water is left in the rectangular tank.

23. Number of buns baked $= 270 ÷ 3 = 90$
72% of baked products → 90 + 270 = 360
1% of baked products → 360 ÷ 72 = 5
28% of baked products → 5 × 28
$\qquad\qquad\qquad = 140$ cookies
Number of buns left = 90 − 40 = 50
Number of cookies that should be left
$= 2 \times 50 = 100$
Number of cookies that need to be sold
$= 140 - 100 = 40$
The baker should sell 40 cookies so that the ratio of the number of buns left to the number of cakes left to the number of cookies left is 1 : 3 : 2.

1. Strategy: Make logical deduction.
   Cost of 5 erasers and 30 pencils
   = Cost of 10 erasers and 24 pencils
   Subtract 5 erasers from each side:
   Cost of 30 pencils = Cost of 5 erasers and
   $\qquad\qquad\qquad\qquad$ 24 pencils
   Subtract 24 pencils from each side:
   Cost of 6 pencils = Cost of 5 erasers
   Cost of 5 erasers = 5 × $0.30 = $1.50
   Cost of 1 pencil = $\frac{\$1.50}{6}$ = $0.25

   Each pencil costs $0.25.

2. Strategy: Simplify the problem.
   Area of each small triangle in figure 2
   $= 128$ cm² $÷ 4 = 32$ cm²
   Area of each smaller triangle in figure 3
   $= 32$ cm² $÷ 4 = 8$ cm²
   Area of each smallest triangle in figure 4
   $= 8$ cm² $÷ 4 = 2$ cm²
   The area of the smallest equilateral triangle in figure 4 is 2 square centimeters.