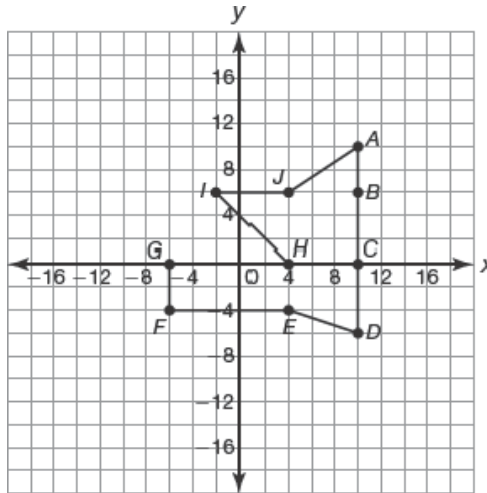1. Analyze the figure shown.


a.   Determine the perimeter of the composite figure. Round to the nearest tenth.

b.   Determine the area of the composite figure. Round to the nearest tenth.

2. A square on the coordinate plane has opposite vertices at (0, 0) and (6, 6). What would the area of the square be if each side length were decreased by a factor of $\frac{1}{2}$?

    a. 6 square units
    b. 9 square units
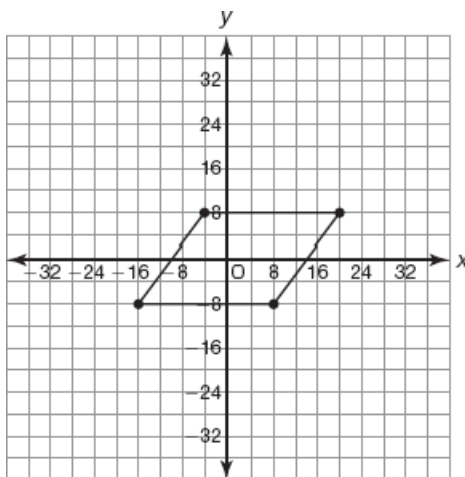   c. 12 square units
    d. 18 square units

3. Analyze triangle *XYZ*.
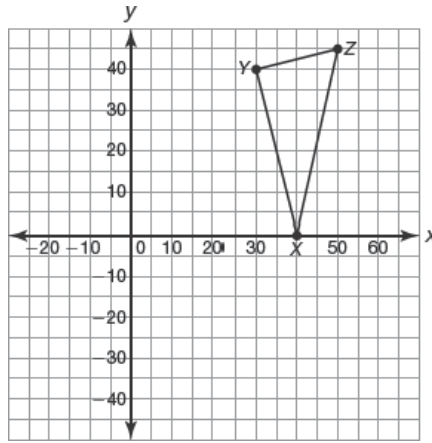
     a. Determine the perimeter of triangle *XYZ*.

     b. Explain why triangle *XYZ* is a right triangle.

     c. Determine the area of triangle *XYZ*.

4. What happens to the perimeter of a regular hexagon with side lengths of 5 units when each side length is increased by a factor of 4?

5. What happens to the area of a triangle with base 10 units and height 9 units when its dimensions are decrease by 3 units.

     6.   **A trapezoid has bases 12m and 8m and an area of 384m². Find its height.**

____   **7.** Which statement is *not* true about this polygon?

  a. The polygon has a perimeter of 88 units.
  b. The polygon has an area of 384 square units.
  c. The polygon has 2 pairs of congruent angles.
 **d.** The polygon has 4 congruent sides.

8. Joel knows that the formulas to determine the areas of rectangles and non-rectangular parallelograms are the same. He multiplies the lengths of $\overline{WX}$ and $\overline{WZ}$ to determine the area of parallelogram *WXYZ*.
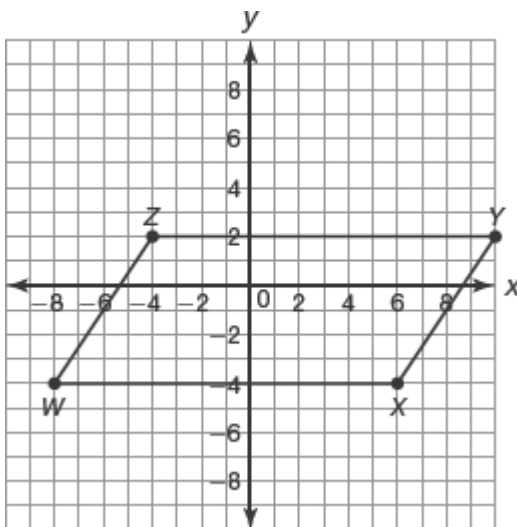
  a.   Has Joel correctly determined the area of the parallelogram? Explain your reasoning.

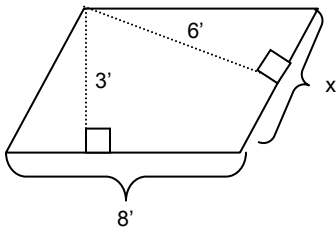 **b.**   Calculate the area of parallelogram *WXYZ*. Show your work.

Determine its perimeter.   Round your answer to the nearest hundredth, if necessary.

9.   triangle *JKL*
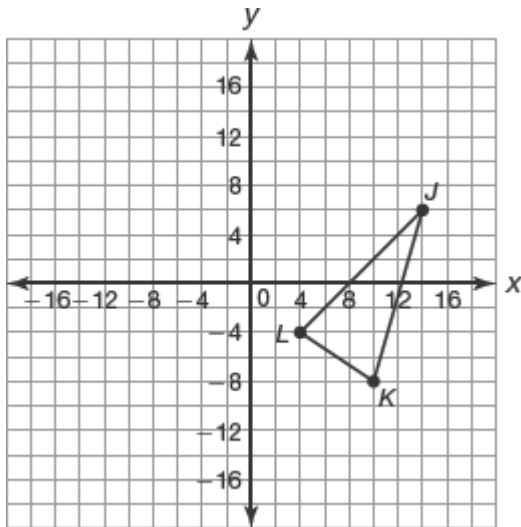
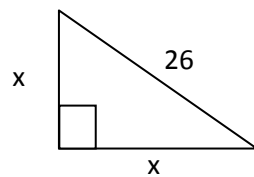**10.**   Given the parallelogram, find the value of x.   X=_____

11.   **Find X**   **X=**_____

For #12-16, find the area and Perimeter.   Round to the nearest hundredth if necessary.
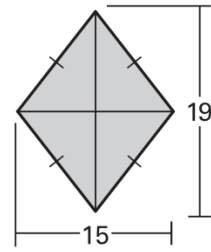
12.
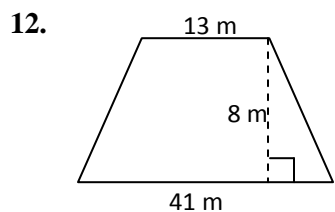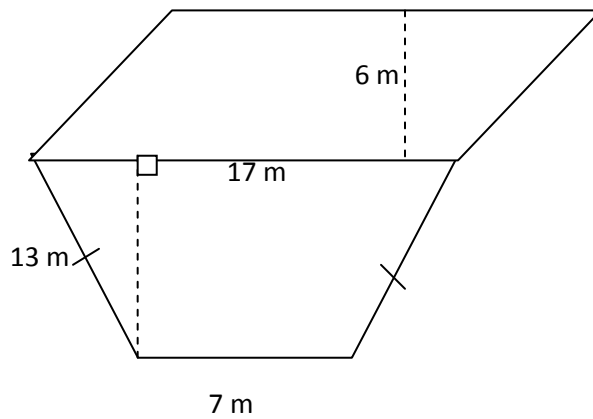
13.
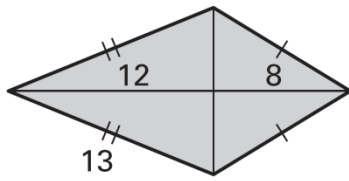
14.
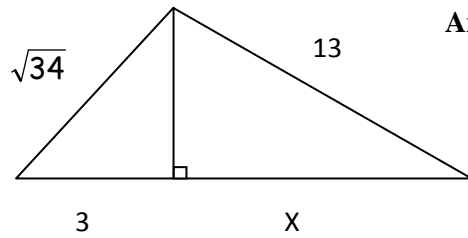
15.   **Area**_____ **Perimeter**_____

16.

Review Chap 3
Answer Section

1. ANS:
   a.   The perimeter of the composite figure is approximately 68.0 units.

   I counted the lengths of the horizontal and vertical sides, and I used the Pythagorean Theorem to calculate the lengths of the other sides.

   $AD = 16, EF = 10, FG = 4, GH = 10, IJ = 6$

   Length of $\overline{DE}$:   Length of $\overline{HI}$:   Length of $\overline{JA}$:
   $a^2 + b^2 = c^2$ $a^2 + b^2 = c^2$ $a^2 + b^2 = c^2$

   $2^2 + 6^2 = c^2$ $6^2 + 6^2 = c^2$ $6^2 + 4^2 = c^2$

   $40 = c^2$ $72 = c^2$ $52 = c^2$

   $\sqrt{40} = c$ $\sqrt{72} = c$ $\sqrt{52} = c$

   $$\text{perimeter} = AD + DE + EF + FG + GH + HI + IJ + JA$$
   $$= 16 + \sqrt{40} + 10 + 4 + 10 + \sqrt{72} + 6 + \sqrt{52}$$
   $$\approx 68.0$$

   b.   The area of the composite figure is 136 square units.

   I divided the figure into two triangles, one rectangle, and one trapezoid.

   The total area of the two triangles is 30 square units.
   Area of Triangles:

   area of $\triangle IJH = \frac{1}{2}bh$ area of $\triangle JAB = \frac{1}{2}bh$

   $= \frac{1}{2}(6)(6)$ $= \frac{1}{2}(6)(4)$

   $= 18$ $= 12$

   The total area of the rectangle is 40 square units.
   Area of Rectangle *FGHE*:

   area $= bh$

   $= 10(4)$

   $= 40$

   The total area of the trapezoid is 78 square units.
   Area of Trapezoid *EJBD*:

$$\text{area} = \frac{1}{2}(base_1 + base_2)height$$

$$= \frac{1}{2}(10+16)6$$

$$= \frac{1}{2}(26)6$$

$$= 78$$

The total area of the figure is 136 square units.

$$\text{total area} = \text{area of triangles} + \text{area of rectangle} + \text{area of trapezoid}$$

$$= 30 + 40 + 78$$

$$= 148$$

PTS: 1   REF: 3.5   STA: 3.B | 11.B   TOP: Pre Test
KEY: composite figures

2. ANS:

a.   The perimeter of triangle *XYZ* is approximately 107.94 units.

$$XY = \sqrt{(30-40)^2 + (40-0)^2} \qquad\qquad YZ = \sqrt{(50-30)^2 + (45-40)^2}$$

$$= \sqrt{(-10)^2 + 40^2} \qquad\qquad\qquad = \sqrt{20^2 + (-5)^2}$$

$$XY = \sqrt{1700} \qquad\qquad\qquad\qquad YZ = \sqrt{425}$$

$$ZX = \sqrt{(40-50)^2 + (0-45)^2}$$

$$= \sqrt{(-10)^2 + (-45)^2}$$

$$ZX = \sqrt{2125}$$

$$\text{Perimeter} = XY + YZ + ZX$$

$$= \sqrt{1700} + \sqrt{425} + \sqrt{2125}$$

$$\approx 107.94$$

b.   Triangle *XYZ* is a right triangle because the slope of $\overline{YZ}$ is $\frac{1}{4}$ and the slope of $\overline{XY}$ is −4. These are negative reciprocals, which means $\overline{YZ}$ is perpendicular to $\overline{XY}$. Angle *Y* is a right angle.

Slope of $\overline{XY}$: −4   Slope of $\overline{YZ}$: $\frac{1}{4}$ Slope of $\overline{ZX}$: $\frac{9}{2}$

c.   The area of triangle *XYZ* is 425 square units.

$$\text{area} = \frac{1}{2}bh$$

$$= \frac{1}{2}(\sqrt{1700})(\sqrt{425})$$

$$= 425$$

d.   If the dimensions of triangle *XYZ* increase by 3 units, then the area of the resulting triangle also increases, but not by a factor of 3.

Original area (square units): 425

Resulting area (square units): $(\sqrt{1700} + 3) + (\sqrt{425} + 3) \approx 522.27$

Ratio of resulting area to original area: $\frac{522.27}{425} \approx 1.23$

PTS: 1   REF: 3.2   STA: 3.B | 10.B   TOP: End Ch Test
3. ANS: B   PTS: 1   REF: 3.1   STA: 3.B
TOP: Standardized Test
4. ANS: D   PTS: 1   REF: 3.3   STA: 3.B
TOP: Standardized Test
5. ANS:
a.   No. Joel is not correct. The height of a parallelogram must be a perpendicular line from the base to a vertex on the opposite side of the figure. Multiplying the lengths of $\overline{WX}$ and $\overline{WZ}$ will not result in the correct area.

b.   The area of parallelogram *WXYZ* is 84 square units.

$$WX = 14\,\text{units}$$

$$\text{Height} = 6\,\text{units}$$

$$\text{Area} = bh$$

$$= (14)(6)$$

$$= 84$$

PTS: 1   REF: 3.3   STA: 3.B   TOP: Assignment
6. ANS:
If the side lengths of the regular hexagon are increased by a factor of 4, then the perimeter of the resulting hexagon increases by a factor of 4.
Perimeter of original hexagon (units): $5 + 5 + 5 + 5 + 5 + 5 = 30$
Perimeter of resulting hexagon (units): $20 + 20 + 20 + 20 + 20 + 20 = 120$

Ratio of resulting perimeter to original perimeter: $\frac{120}{30} = 4$

PTS: 1   REF: 3.1   STA: 3.B   TOP: Skills Practice
7. ANS:
If the dimensions of the triangle decrease by 3 units, then the area of the resulting triangle also decreases, but not by a factor of 3.

Area of original triangle (square units): $\frac{1}{2}(10)(9) = 45$

Area of resulting triangle (square units): $\frac{1}{2}(7)(6) = 21$

Ration of resulting area to original area: $\frac{21}{45} = \frac{7}{15}$

PTS: 1   REF: 3.1   STA: 3.B   TOP: Skills Practice

8. ANS:
The perimeter is approximately 35.9 units.

$$JK = \sqrt{(10-14)^2 + (-8-6)^2}$$
$$= \sqrt{16+196}$$
$$= \sqrt{212}$$

$$KL = \sqrt{(4-10)^2 + (-4-(-8))^2}$$
$$= \sqrt{36+16}$$
$$= \sqrt{52}$$

$$JL = \sqrt{(4-14)^2 + (-4-6)^2}$$
$$= \sqrt{100+100}$$
$$= \sqrt{200}$$

$$\text{Perimeter} = JK + KL + JL$$
$$= \sqrt{212} + \sqrt{52} + \sqrt{200}$$
$$\approx 35.9$$

PTS: 1   REF: 3.2   STA: 3.B | 10.B   TOP: Skills Practice