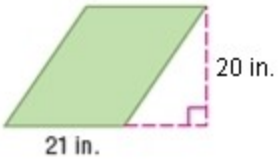
Mid-Chapter Quiz: Lessons 11-1 through 11-3

Find the perimeter and area of each parallelogram or triangle. Round to the nearest tenth if necessary.

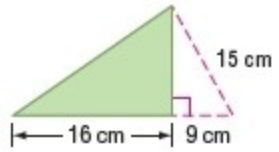
1. 

SOLUTION:

$$\begin{aligned} A &= bh \\ &= 21(20) \\ &= 420 \end{aligned}$$

$$\begin{aligned} P &= 2(25+21) \\ &= 2(46) \\ &= 92 \end{aligned}$$

Mid-Chapter Quiz: Lessons 11-1 through 11-3

2. 

SOLUTION:

Use the Pythagorean Theorem to find the height *h*, of the triangle.

$$a^2 + b^2 = c^2$$
$$9^2 + h^2 = 15^2$$
$$h^2 = 15^2 - 9^2$$
$$h^2 = 225 - 81$$
$$h = \sqrt{144}$$
$$h = 12$$

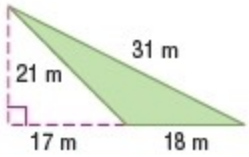
$$A = \frac{1}{2}bh$$
$$= \frac{1}{2}(16)(12)$$
$$= 96$$

Use the Pythagorean Theorem to find the length of the third side of the triangle.

$$a^2 + b^2 = c^2$$
$$16^2 + 12^2 = c^2$$
$$256 + 144 = c^2$$
$$\sqrt{400} = c$$
$$20 = c$$

The perimeter is 16 + 12 + 20 = 48 cm.

Mid-Chapter Quiz: Lessons 11-1 through 11-3

3. 

SOLUTION:

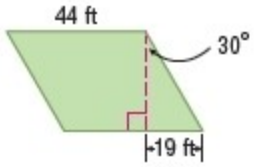
$$A = \frac{1}{2}bh$$
$$= \frac{1}{2}(18)(21)$$
$$= 189$$

Use the Pythagorean Theorem to find the length of the third side of the triangle.

$$a^2 + b^2 = c^2$$
$$21^2 + 17^2 = c^2$$
$$441 + 289 = c^2$$
$$\sqrt{730} = c$$
$$27 \approx c$$

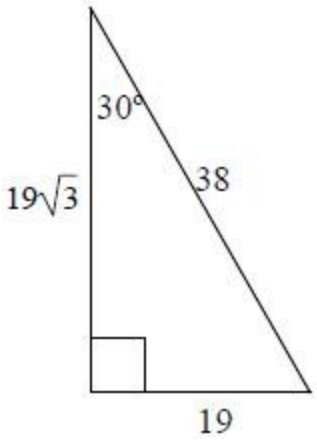
The perimeter is about 31 + 18 + 27 = 76 m.

Mid-Chapter Quiz: Lessons 11-1 through 11-3

4. 

SOLUTION:

Use the 30-60-90 triangle to find the other lengths.



$$A = bh$$
$$= 44\left[19\sqrt{3}\right]$$
$$\approx 1448.0$$

The perimeter is 2(44 + 38) = 164.

5. The height of a triangle is 8 inches more than its base. The area of the triangle is 104.5 square inches. Find the base and height.

SOLUTION:

Let x be the length of the base of the triangle in inches. The height is $x + 8$ in.

$$A = \frac{1}{2}bh$$
$$104.5 = \frac{1}{2}(x)(x+8)$$
$$209 = x^2 + 8x$$
$$0 = x^2 + 8x - 209$$
$$0 = (x+19)(x-11)$$
$$x = -19 \text{ or } x = 11$$

Since x is a length it cannot be negative.

Therefore, the base of the triangle is 11 in. long and the height of the triangle is 11 + 8 = 19 in.

6. **DESIGN** A plaque is made with a rhombus in the middle. If the diagonals of the rhombus measure 7 inches and 9 inches, how much space is available for engraving text onto the award?

SOLUTION:

$$A = \frac{1}{2}d_1d_2$$
$$= \frac{1}{2}(7)(9)$$
$$= 31.5$$

7. **MULTIPLE CHOICE** The area of a kite is 4 square feet. If the tail is to be 3 times longer than the kite's long diagonal, and the short diagonal measures 2 feet, how long should the kite tail be?

A 4 feet
B 6 feet
C 7 feet
D 12 feet

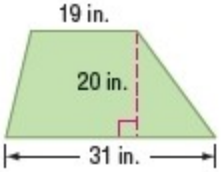
SOLUTION:

The area A of a kite is one half the product of the lengths of its diagonals, d_1 and d_2.

$$\text{area} = \frac{1}{2} \cdot d_1d_2$$
$$4 = \frac{1}{2} \cdot 2 \cdot x$$
$$4 = x$$

Therefore, the length of the kite tail should be 3 × 4 or 12 ft, which is choice D.

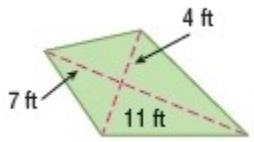
Find the area of each trapezoid, rhombus, or kite.

8. 

SOLUTION:

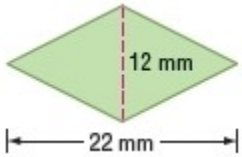
$$A = \frac{1}{2}(b_1 + b_2)h$$
$$= \frac{1}{2}(19 + 31)(20)$$
$$= 500$$

Mid-Chapter Quiz: Lessons 11-1 through 11-3

9. 

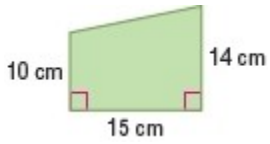
SOLUTION:

$$A = \frac{1}{2}d_1d_2$$
$$= \frac{1}{2}(8)(18)$$
$$= 72$$

10. 

SOLUTION:

$$A = \frac{1}{2}d_1d_2$$
$$= \frac{1}{2}(22)(12)$$
$$= 132$$

11. 

SOLUTION:

$$A = \frac{1}{2}(b_1 + b_2)h$$
$$= \frac{1}{2}(10 + 14)(15)$$
$$= 180$$

12. **ARCHAEOLOGY** The most predominant shape in Incan architecture is the trapezoid. The doorway pictured on page 789 is 3 feet wide at the top and 4 feet wide at the bottom. A person who is 5 feet 8 inches tall can barely pass through the doorway. How much fabric would be necessary to make a curtain for the doorway?

SOLUTION:

The doorway is in the shape of a trapezoid.

5 feet 8 inches ≈ 5.67 feet

$$\begin{aligned} A &= \tfrac{1}{2}(b_1 + b_2)h \\ &= \tfrac{1}{2}(3+4)(5.67) \\ &\approx 19.8 \end{aligned}$$

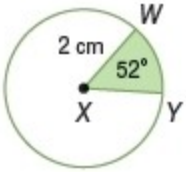
13. **ALGEBRA** A sector of a circle has a central angle measure of 30° and radius *r*. Write an expression for the perimeter of the sector in terms of *r*.

SOLUTION:

$$\begin{aligned} arclength &= \tfrac{x}{360} \cdot 2\pi r \\ &= \tfrac{30}{360}(2\pi r) \\ &= \tfrac{1}{12}(2\pi r) \\ &\approx \tfrac{1}{6}\pi r \end{aligned}$$

The perimeter of the sector is the sum of the length of the arc and twice the radius, so the perimeter of the sector is $\frac{1}{6}\pi r + 2r$ units.

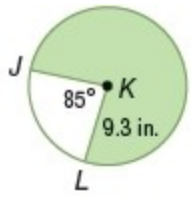
Find the area of each shaded sector. Round to the nearest tenth.

14. 

SOLUTION:

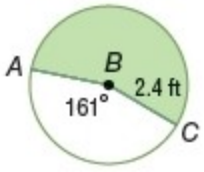
$$\begin{aligned} A &= \tfrac{x}{360} \cdot \pi r^2 \\ &= \tfrac{52}{360}\pi(2)^2 \\ &= \tfrac{13}{90}\pi(4) \\ &\approx 1.8 \end{aligned}$$

Mid-Chapter Quiz: Lessons 11-1 through 11-3

15. 

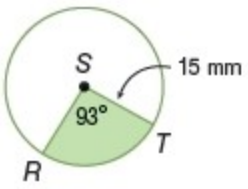
SOLUTION:

$$A = \frac{x}{360} \cdot \pi r^2$$
$$= \frac{275}{360}\pi(9.3)^2$$
$$= \frac{55}{72}\pi(86.49)$$
$$\approx 207.6$$

16. 

SOLUTION:

$$A = \frac{x}{360} \cdot \pi r^2$$
$$= \frac{199}{360}\pi(2.4)^2$$
$$\approx 10.0$$

17. 

SOLUTION:

$$A = \frac{x}{360} \cdot \pi r^2$$
$$= \frac{93}{360}\pi(15)^2$$
$$= \frac{93}{360}\pi(225)$$
$$\approx 182.6$$

Mid-Chapter Quiz: Lessons 11-1 through 11-3

Find the indicated measure. Round to the nearest tenth.

18. The area of a circle is 52 square inches. Find the diameter.

SOLUTION:

$$\begin{aligned} A &= \pi r^2 \\ 52 &= \pi r^2 \\ \frac{52}{\pi} &= r^2 \\ \sqrt{\frac{52}{\pi}} &= r \\ 2\sqrt{\frac{52}{\pi}} &= d \\ 8.1 &\approx d \end{aligned}$$

19. Find the radius of a circle with an area of 104 square meters.

SOLUTION:

$$\begin{aligned} A &= \pi r^2 \\ 104 &= \pi r^2 \\ \frac{104}{\pi} &= r^2 \\ \sqrt{\frac{104}{\pi}} &= r \\ 5.8 &\approx r \end{aligned}$$

20. **FRUIT** The diameter of the orange slice shown is 9 centimeters. If each of the orange's 10 sections are congruent, find the approximate area covered by 8 sections.

SOLUTION:

Since the orange is equally divided into 10 sections, each one will have an arc measure of 360 ÷ 10 or 36.

8 sections is 36(8) = 288.

$$\begin{aligned} A &= \frac{x}{360} \cdot \pi r^2 \\ &= \frac{288}{360}\pi(4.5)^2 \\ &= \frac{8}{10}\pi(20.25) \\ &\approx 50.9 \end{aligned}$$