Measurement
Post-Test: Answers

1. 2.32 m × 4.51 m = 10.4632 m^2 (m is the abbreviation for meters).
    a. Round this result to the nearest hundredth of a meter.
    b. Round this result to the nearest tenth of a meter.

Answers:
    a. 10.46 m^2.
    b. 10.5 m^2.

2. The height of a building was reported to be 252 m.
    a. What is the absolute error in this measurement?
    b. What is the relative error in this measurement?

Answers:
    a. 0.5 m.
    b. Relative error: $\dfrac{0.5}{252} = 0.0020$ or   0.2%.

3. a. Convert 250 millimeters to meters.
    b. Convert 82 meters to kilometers.

Answers:
    a. 0.25 m.
    b. 0.082 km.

4. a. Convert 3.2 yards to inches.
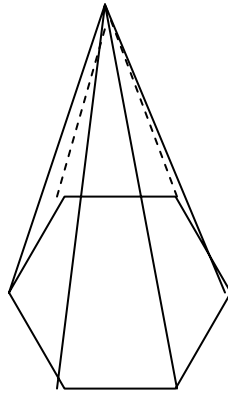   b. Convert 0.25 miles to yards.

Answers:
    a. 115.2 in.
    b. 440 yds.

5. Convert 2 yards to meters. [Recall 1 in = 2.54 cm.]

Answer: 1.83 m.

6. Draw a hexagonal pyramid. Then state the number of faces (including the base), edges, lateral faces, lateral edges, and vertices.

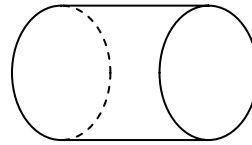**Answer: 7 faces, 12 edges, 6 lateral faces, 6 lateral edges, 7 vertices**

7. For each of the solids below, sketch two cross sections. One cross section should be parallel to a base, and the other perpendicular to a base. Then identify each of the cross sections with a name (regular pentagon, triangle, rectangle, circle, etc.)
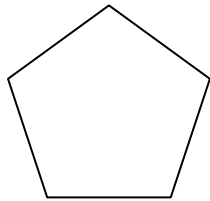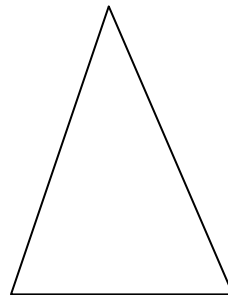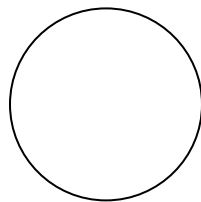
a.
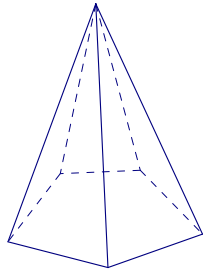
b.

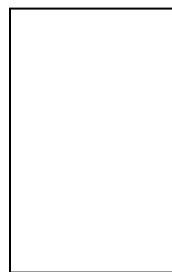**Answers:**

a.

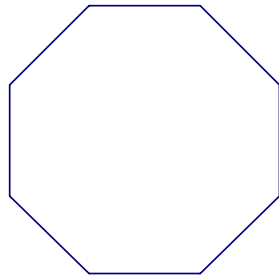**Regular pentagon**

Triangle
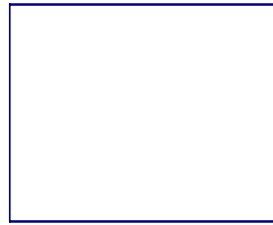
b.

Circle

Rectangle

8. Sketch a solid that could have the given cross sections.

Cross section parallel to a base: Cross section perpendicular to a base:

Answer:
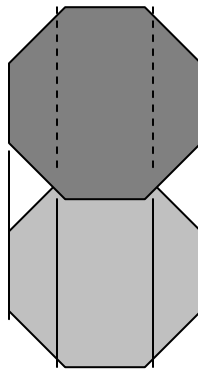
9. Find the area of an equilateral triangle with side length 6 in.

Answer: $9\sqrt{3}.\,\text{in}^2$

10. If a rectangle has width $(x+3)$ ft, length $(x+7)$ ft, and perimeter 104 ft,
    a. Find the width.
    b. Find the length.

Answers:
   a. Width 24 ft
   b. Length 28 ft

11. If a rectangle has width $(x-2)$ ft, length $(x+6)$ ft, and area 9 ft^2,
    a. Find the width.
    b. Find the length.

Answers:
   a. **Width 1 ft**
   b. **Length 9 ft**
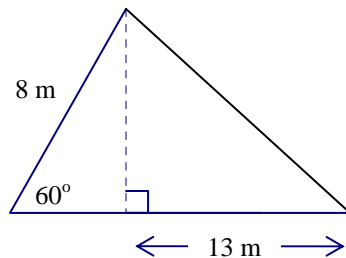

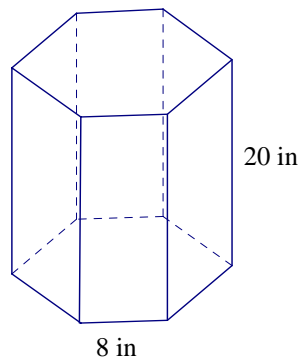12. If a trapezoid has area 28 in^2 and bases 8 in and 12 in, find the height.

Answer: $\dfrac{14}{5}$ **in**

13. Find the area of the following triangle:

8 m

60°

13 m

Answer: $34\sqrt{3}$ m^2

14. The following figure is a regular right prism. Find the volume, the lateral area and the total surface area.

20 in

8 in

Answers: Volume: area of base × height $= 1920\sqrt{3}$ **in**^{3},

   lateral area: $20 \times 8 \times 6 = 960$ **in**^{2},

   total area: $\left(960 + 192\sqrt{3}\right)$ **in**^{2}.

15. A rectangular prism with a square base has a height of 7 m and a volume of 175 m^3.
   a. Find the dimensions of the square base.
   b. Find the lateral surface area.
   c. Find the total surface area.

Answers:
   a. **The square base has side length 5 m.**
   b. **Lateral surface area: 140 m^2.**
   c. **Total surface area: 190 m^2.**

16. A cube has a total surface area of 96 m^2. Find the length of an edge.

Answer: Side length: 4 m.

17. A right circular cylinder has a height of 5 in and a volume of 245π in^3.
   a. Find the radius.
   b. Find the lateral area.
   c. Find the total surface area.

Answers:
   a. **Radius: 7 in.**
   b. **Lateral area: 70π in^2**
   c. **Total surface area: 168π in^2**
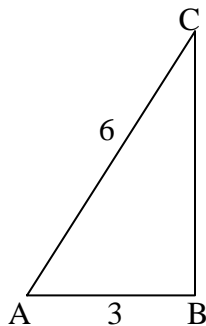

18. A right circular cone has a diameter of 18 in and a volume of 108π in^3.
   a. Find the height.
   b. Find the slant height.
   c. Find the total surface area.

Answers:
   a. **Height: 4 in.**
   b. **Slant height: $\sqrt{97}$ in.**
   c. **Total surface area: $\left(81+9\sqrt{97}\right)\pi$ in^2**

19. Find the indicated trigonometric ratios for the triangle below. Write all answers in simplest radical form.

a. $\sin (A)$ b. $\csc (C)$ c. $\tan(C)$

d. $\cot (A)$ e. $\cos(A)$ f. $\sec(C)$

Answers:

$$a.\ \sin (A) = \frac{\sqrt{3}}{2}, \qquad b.\ \csc(C) = 2, \qquad c.\ \tan (C) = \frac{\sqrt{3}}{3},$$

$$d.\ \cot (A) = \frac{\sqrt{3}}{3}, \qquad e.\ \cos (A) = \frac{1}{2}, \qquad f.\ \sec (C) = \frac{2\sqrt{3}}{3}.$$

20. A girl is flying a kite and lets out 250 feet of string. If she sights the kite at a 60° angle of elevation, what is the height of the kite? (disregard the height of the girl in your calculations; do not evaluate radicals)

Answer: Height: $125\sqrt{3}$ ft.