10 Area Measurement

SKILLS CHECK

Complete and score the following skills test. Each section should be scored separately in the box provided to the right. For Section 10.1, a score of 8 or above indicates you are sufficiently strong in that concept. A score of 7 or below indicates a review of that section is advisable. For Sections 10.2 and 10.3, a score of 4 or above indicates you are sufficiently strong in that concept. A score of 3 or below indicates a review of that section is advisable.

### 10.1 Areas—Basic Shapes

- **Calculate the sq ft areas for the figures shown below.**

  1. ![Rectangle](image1.png)  
     
     \[ \text{Area} = 7 \times 12 = 84 \text{ sq ft} \]  
     
     \[ \text{ANS} \]  

  4. ![Circle](image2.png)  
     
     \[ \text{Area} = \pi \times \left( \frac{8}{2} \right)^2 = 16\pi \approx 50.27 \text{ sq ft} \]  
     
     \[ \text{Diam} = 8 \text{ ft} \]  
     
     \[ \text{ANS} \]

  2. ![Triangle](image3.png)  
     
     \[ \text{Area} = \frac{1}{2} \times 4 \times 2 = 4 \text{ sq ft} \]  
     
     \[ \text{ANS} \]

  5. ![Square](image4.png)  
     
     \[ \text{Area} = 15 \times 15 = 225 \text{ sq ft} \]  
     
     \[ \text{ANS} \]

  3. ![Parallelogram](image5.png)  
     
     \[ \text{Area} = 11 \times 5 = 55 \text{ sq ft} \]  
     
     \[ \text{ANS} \]

  6. ![Three equal areas](image6.png)  
     
     \[ \text{Area} = \frac{1}{3} \times 20 \times 10 = 66.67 \text{ sq ft} \]  
     
     \[ \text{ANS} \]

- **Solve the following problems, as indicated.**

  7. A clarifier is 75 ft long and has a surface area of 1875 sq ft. What is the width of the clarifier?

     \[ \text{ANS} \]

  8. What is the sq in. cross section of an 8-inch pipe?

     \[ \text{ANS} \]

*The Division of Water Quality makes no claim as to the accuracy of any answers provided herein.*
9. The cross section of a trapezoidal channel is shown below. Given the dimensions as shown, what is the distance across the top of the water? (Area = 21 sq ft)

\[
\begin{array}{c}
\text{ft} \\
3 \\
4 \\
\text{ft} \\
\end{array}
\]

\(x\) ft

\(3\) ft

\(4\) ft

ANS: ________

10. What is the cross-sectional area (sq in) of the trough shown below?

\(6\) in

ANS: ________

10.2 Areas—Combined Shapes

☐ Calculate the sq ft areas for the figures shown below.

1. \[
\begin{array}{c}
20 \text{ ft} \\
10 \text{ ft} \\
\text{ft} \\
5 \text{ ft} \\
\text{ft} \\
\end{array}
\]

ANS: ________

2. \[
\begin{array}{c}
10 \text{ ft} \\
5 \text{ ft} \\
\text{ft} \\
3 \text{ ft} \\
\text{ft} \\
\end{array}
\]

ANS: ________

3. \[
\begin{array}{c}
8 \text{ ft} \\
4 \text{ ft} \\
\text{ft} \\
4 \text{ ft} \\
\text{ft} \\
\end{array}
\]

ANS: ________

☐ Solve the following problems, as indicated.

4. What is the total depth of water in the channel, given the information shown below. (Total Area = 8 sq ft)

\[
\begin{array}{c}
4 \text{ ft} \\
\text{ft} \\
\text{ft} \\
2 \text{ ft} \\
\text{ft} \\
\end{array}
\]

ANS: ________

5. What is the length of \(x\) in the diagram shown below?

Total Area = 38 sq ft

\[
\begin{array}{c}
x \text{ ft} \\
4 \text{ ft} \\
\text{ft} \\
1.5 \text{ ft} \\
\text{ft} \\
\end{array}
\]

ANS: ________
10.3 Lateral Areas

- Calculate the lateral area for each figure shown below.

1. \[ \text{3 ft} \]

\[ \text{4 ft} \]

ANS

2. \[ \text{10 ft} \]

\[ \text{35 ft} \]

ANS

3. \[ \text{5 ft} \]

ANS

- Complete the following problems, as indicated.

4. The lateral area of a cylinder is 628 sq ft. If the height of the tank is 8 ft, what is the length of its diameter?

ANS

5. The diameter of a cone is 6 ft. If the lateral area of the cone is 47 sq ft, what is the slant height of the cone?

ANS
11 Volume Measurement

SKILLS CHECK

Complete and score the following skills test. Each section should be scored separately in the box provided to the right. For Section 11.1, a score of 8 or above indicates you are sufficiently strong in that concept. A score of 7 or below indicates a review of that section is advisable. For Section 11.2, a score of 4 or above indicates you are sufficiently strong in that concept. A score of 3 or below indicates a review of that section is advisable.

11.1 Volumes—Basic Shapes

☐ Calculate the cubic feet volume of the figures shown below.

1. [Image of a rectangular prism with dimensions 10 ft x 8 ft x 10 ft] ANS ________

2. [Image of a cylinder with diameter 25 ft and height 80 ft] ANS ________

3. [Image of a sphere with diameter 9 ft] ANS ________

☐ Solve the following problems, as indicated.

7. A circular clarifier has a diameter of 40 ft. If the cu ft capacity of the clarifier is 18,840 cu ft, what is the maximum water depth in the tank?

ANS ________

8. A rectangular basin containing 26,400 cu ft of water has a length of 80 ft and is 30 ft wide. What is the depth of water in the tank?

ANS ________

(Continued)
9. A triangular trough 3 ft wide and 10 ft long contains 30 cu ft of water. What is the depth of the water in the trough?

ANS ______

10. What is the cu ft capacity of a 5-foot section of a 2-ft diameter pipe?

ANS ______

11.2 Volumes—Combined Shapes

Calculate the cubic feet capacity for each figure shown below.

1. \[ \text{ANS} ______ \]

2. \[ \text{ANS} ______ \]

3. \[ \text{ANS} ______ \]

4. \[ \text{ANS} ______ \]

5. \[ \text{ANS} ______ \]