Chapter 6 Area

Practice 1 Finding the Area of a Rectangle with Fractional Side Lengths

Find the area of each rectangle.

Example

\[ A = \text{length} \times \text{width} \]

\[ = \frac{3}{4} \times \frac{3}{5} \]

\[ = \frac{9}{20} \text{ in}^2 \]

The area of the rectangle is \( \frac{9}{20} \) square inches.

1.

\[ A = ________ \times \text{width} \]

\[ = ________ \times \frac{1}{2} \]

\[ = ________ \text{ m}^2 \]

The area of the rectangle is ________ square meters.

2.
Find the area of each shaded rectangle.

3. \[
\begin{align*}
\text{Area} &= \text{length} \times \text{width} \\
&= \frac{4}{5} \text{ cm} \times \frac{5}{6} \text{ cm} \\
&= \frac{20}{30} \text{ cm}^2 \\
&= \frac{2}{3} \text{ cm}^2
\end{align*}
\]

4. \[
\begin{align*}
\text{Area} &= \text{length} \times \text{width} \\
&= \frac{3}{7} \text{ m} \times \frac{2}{4} \text{ m} \\
&= \frac{6}{28} \text{ m}^2 \\
&= \frac{3}{14} \text{ m}^2
\end{align*}
\]
5. A 1-meter square plot of land is covered by a rectangular patch of grass that measures \( \frac{4}{7} \) meter by \( \frac{2}{3} \) meter. What is the area of the patch of grass?
6. Find the area of the top of a rectangle bedside table with a length of \(\frac{3}{4}\) yard and width that is \(\frac{1}{6}\) yard less than the length.

Find the area of each composite figure.

7. \[
\begin{array}{c}
\frac{1}{5}\text{ cm} \\
\frac{3}{5}\text{ cm} \\
\frac{4}{5}\text{ cm} \\
\frac{1}{5}\text{ cm}
\end{array}
\]
8.

\[
\begin{array}{c}
\frac{2}{7} \text{ m} \\
\frac{4}{9} \text{ m} \\
\frac{1}{9} \text{ m}
\end{array}
\]

9.

\[
\begin{array}{c}
\frac{1}{10} \text{ m} \\
\frac{1}{5} \text{ m} \\
\frac{3}{5} \text{ m} \\
\frac{4}{5} \text{ m}
\end{array}
\]
Find the area of the shaded part.

11.

12.
Practice 2  Base and Height of a Triangle

Complete to give both the base and the height in each triangle.

Example

Base: \( \overline{AC} \)
Height: \( \overline{BA} \)

1.
Height: 
Base: 

2.
Base: 
Height: 

3.
Base: 
Height: 

4.
Base: 
Height: 

For each triangle, the base is given. Use a drawing triangle to draw the height. Label the height.

Example

5. 

6. 

7. 

8. 

9. 

10. 

Practice 3 Finding the Area of a Triangle

Find the area of each shaded triangle. Show each step and give your answer using the correct units.

Example

Area of triangle $= \frac{1}{2} \times 23 \times 15 = 172\frac{1}{2} \text{ cm}^2$

1. $\begin{align*}
\text{Area of triangle} &= \quad \quad \\
&= \quad \quad \\
&= \quad \quad 
\end{align*}$

2. $\begin{align*}
\text{Area of triangle} &= \quad \quad \\
&= \quad \quad \\
&= \quad \quad 
\end{align*}$

3. $\begin{align*}
\text{Area of triangle} &= \quad \quad \\
&= \quad \quad \\
&= \quad \quad 
\end{align*}$
Find the area of each shaded triangle.

**Example**

\[ \text{Area} = \frac{1}{2} \times 8 \times 6 \]
\[ = 24 \text{ cm}^2 \]

4.

\[ \text{Area} = \frac{1}{2} \times 9 \times 12 \]
\[ = \frac{54}{2} \]
\[ = 27 \text{ in}^2 \]

5.

\[ \text{Area} = \frac{1}{2} \times 18 \times 28 \]
\[ = \frac{504}{2} \]
\[ = 252 \text{ in}^2 \]

6.

\[ \text{Area} = \frac{1}{2} \times 5 \times 6 \]
\[ = \frac{30}{2} \]
\[ = 15 \text{ cm}^2 \]

7.

\[ \text{Area} = \frac{1}{2} \times 4 \times 7 \]
\[ = \frac{28}{2} \]
\[ = 14 \text{ in}^2 \]

8.

\[ \text{Area} = \frac{1}{2} \times 15 \times 25 \]
\[ = \frac{375}{2} \]
\[ = 187.5 \text{ in}^2 \]
Four students found the area of the shaded triangle.

These are their findings.

Zach: \(4 \times 4 = 16 \text{ cm}^2\)

Preeti: \(\frac{1}{2} \times 5 \times 4 = 10 \text{ cm}^2\)

Brian: \(\frac{1}{2} \times 7 \times 4 = 14 \text{ cm}^2\)

James: \(\frac{1}{2} \times 3 \times 4 = 6 \text{ cm}^2\)

Explain the mistakes they have made. Then write the correct answer.

Zach: ___________________________________________________________________

Preeti: ___________________________________________________________________

Brian: ___________________________________________________________________

James: ___________________________________________________________________

The area of the shaded triangle is: ___________________________________________________________________
3. \(ABCD\) is a rectangle and \(BE = EC\).

What can you say about the areas of triangles \(BED\) and \(ECD\)?

Explain your answer.

The area of the shaded triangle is 15 square centimeters.

Explain why the area of the rectangle is 30 square centimeters.
Put On Your Thinking Cap!

Challenging Practice

Solve. Show your work.

1. \(ABCD\) is a square of side 10 centimeters and \(BE = EC\).
Find the area of the shaded triangle.

2. \(ABCD\) is a rectangle 18 centimeters by 8 centimeters. \(AE = ED\) and \(AF = FB\).
Find the area of the shaded triangle.
3. \(ABCD\) is a rectangle of area 48 square inches. The length of \(CD\) is 3 times the length of \(DF\). \(BC = 4\) inches.

a. Find the length of \(DF\).

b. Find the area of the shaded triangle.

4. \(ABCD\) is a rectangle 12 centimeters by 5 centimeters. \(BE = 4\) centimeters. Find the area of the shaded region, \(ABED\).
5. The side of square $ABCD$ is 8 centimeters. $AE = AF = 4$ centimeters. Find the area of the shaded triangle, $CEF$.

![Diagram of a square with a shaded triangle]

6. The perimeter of rectangle $ABCD$ is 256 inches. Its length is 3 times as long as its width. Find the area of triangle $ABC$.

![Diagram of a rectangle with a shaded triangle]
7. **ABCD** is a rectangle of area 72 square centimeters. The length of **AD** is 3 times the length of **AE**. 

**BF** = 8 centimeters.

a. Find the width of the rectangle.

b. Find the area of the shaded region, **EBFD**.
1. Look at the pattern of these triangles.

What is the area of Triangle 5 in the pattern? _________

Which triangle in the pattern will have an area of 32,768 square centimeters? _________
2. \(ABCD\) is a square with sides of 20 centimeters. \(AX = XB, BY = YC, CZ = ZD, AW = WD\). \(WY\) and \(XZ\) are straight lines. Find the total area of the shaded parts.