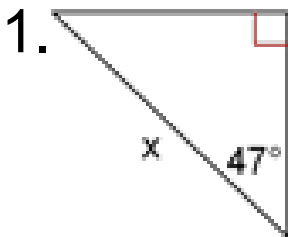
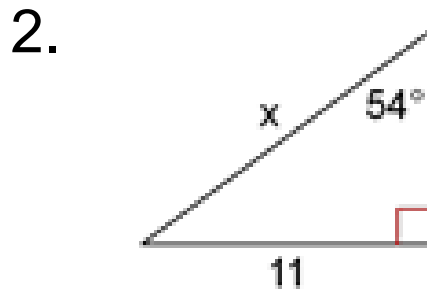


Warm Up: SOHCAHTOA

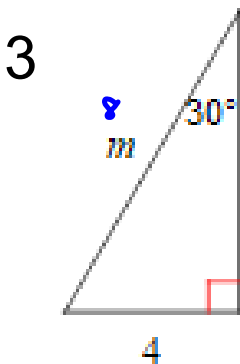
Use trig to find the missing side. Round to the nearest tenth.



$$\begin{aligned} \cos 47 &= \frac{15}{x} \\ x &= \frac{15}{\cos 47} \\ x &= 22 \end{aligned}$$



$$\begin{aligned} \sin 54 &= \frac{11}{x} \\ x &= \frac{11}{\sin 54} \\ x &= 13.6 \end{aligned}$$



$$\begin{array}{ccc} 30 & - & 60 & - & 90 \\ 5 & & 5\sqrt{3} & & 25 \\ 4 & & & & \\ & & 4\sqrt{3} & & \end{array}$$

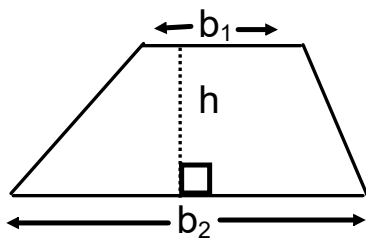
$$m = 8, n = 4\sqrt{3}$$

Learning Goal: Today I will learn how to find the area of a trapezoid, rhombus and kite.

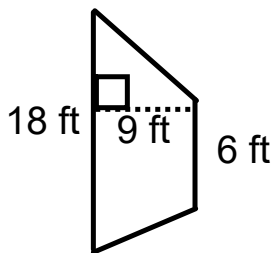
Success Criteria: I am able to identify each piece required to find the area.

10-2 Area of Trapezoids, Rhombuses and Kites

Flip Books



Example



5

Area of a Trapezoid

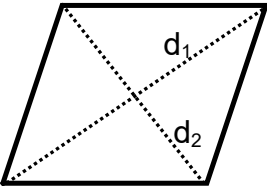
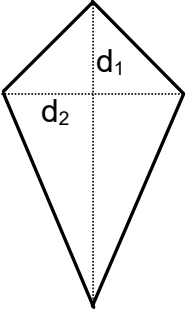
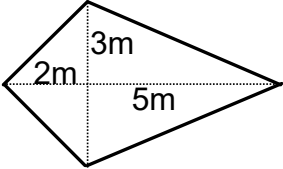
$$A = h \left(\frac{b_1 + b_2}{2} \right) \quad A = \frac{1}{2} (b_1 + b_2) h$$

b_1 & b_2 - parallel side lengths
 h - height (distance between parallel sides, 90°)

Example

$$\begin{aligned} A &= h \left(\frac{b_1 + b_2}{2} \right) \\ b_1 &= 18 \text{ ft} \\ b_2 &= 6 \text{ ft} \\ h &= 9 \text{ ft} \\ &= 9 \left(\frac{18+6}{2} \right) \\ &= 9(12) \\ &= 108 \text{ ft}^2 \end{aligned}$$

6

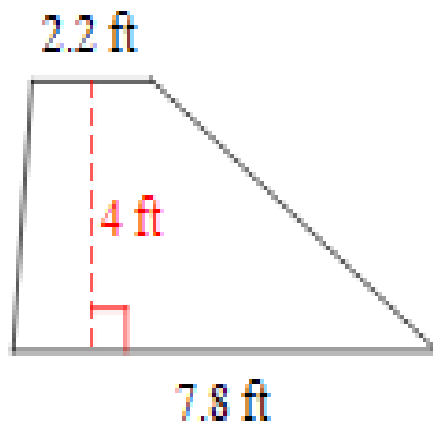
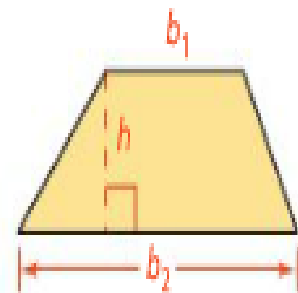
<div style="text-align: center;">  </div> <div style="text-align: center; margin-top: 20px;">  </div> <div style="text-align: center; margin-top: 10px;"> <p>Example:</p>  </div> <div style="text-align: center; font-size: 2em; font-weight: bold; margin-top: 20px;">7</div>	<div style="text-align: center;"> <p><u>Area of a Rhombus</u></p> $A = \frac{d_1 \bullet d_2}{2} \quad A = \frac{1}{2} d_1 d_2$ <p>d_1 - length of one diagonal d_2 - length of second diagonal</p> </div> <div style="text-align: center; margin-top: 20px;"> <p><u>Area of a Kite</u></p> $A = \frac{d_1 \bullet d_2}{2} \quad A = \frac{1}{2} d_1 d_2$ </div> <div style="text-align: center; margin-top: 10px;"> <p><u>Example:</u></p> <p>$d_1 = 2 + 5 = 7 \text{ m}$ $d_2 = 3 + 3 = 6 \text{ m}$</p> $A = \frac{7 \bullet 6}{2} = 21 \text{ m}^2$ </div> <div style="text-align: center; font-size: 2em; font-weight: bold; margin-top: 20px;">8</div>
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Take Note

Theorem 10-4 Area of a Trapezoid

The area of a trapezoid is half the product of the height and the sum of the bases.

$$A = \frac{1}{2}h(b_1 + b_2)$$



$$A = \frac{1}{2}(2.2 + 7.8) 4$$
$$A = 20 \text{ ft}^2$$

20 ft²

What is the area of trapezoid $PQRS$?

You can draw an altitude that divides the trapezoid into a rectangle and a 30° - 60° - 90° triangle. Since the opposite sides of a rectangle are congruent, the longer base of the trapezoid is divided into segments of lengths 2 m and 5 m.

$$h = 2\sqrt{3} \quad \text{longer leg} = \text{shorter leg} \cdot \sqrt{3}$$

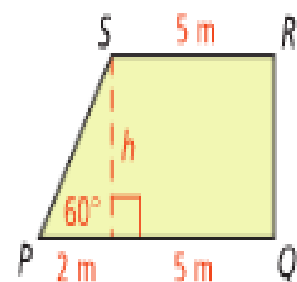
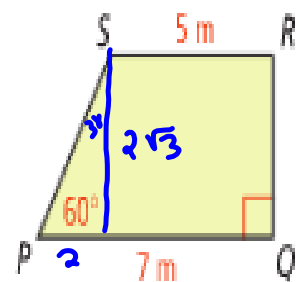
$$A = \frac{1}{2}h(b_1 + b_2) \quad \text{Use the trapezoid area formula.}$$

$$= \frac{1}{2}(2\sqrt{3})(7 + 5) \quad \text{Substitute } 2\sqrt{3} \text{ for } h, 7 \text{ for } b_1, \text{ and } 5 \text{ for } b_2.$$

$$= 12\sqrt{3} \quad \text{Simplify.}$$

The area of trapezoid $PQRS$ is $12\sqrt{3} \text{ m}^2$.

$$A = 20.8 \text{ m}^2$$



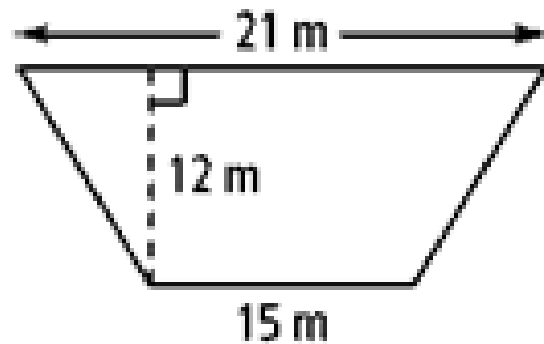
Example

Find the area of the trapezoid.

$$A = \frac{1}{2} (b_1 + b_2) h$$

$$A = \frac{1}{2} (15 + 21) 12$$

$$A = 216 \text{ m}^2$$

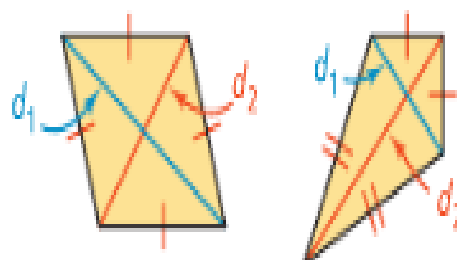


Take NOTE

Theorem 10-5 Area of a Rhombus or a Kite

The area of a rhombus or a kite is half the product of the lengths of its diagonals.

$$A = \frac{1}{2}d_1d_2$$



Rhombus

Kite

Problem 3 Finding the Area of a Kite

What is the area of kite $KLMN$?

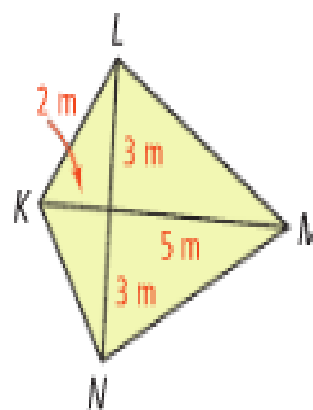
Find the lengths of the two diagonals:

$$KM = 2 + 5 = 7 \text{ m and } LN = 3 + 3 = 6 \text{ m.}$$

$$A = \frac{1}{2}d_1d_2 \quad \text{Use the formula for area of a kite.}$$

$$= \frac{1}{2}(7)(6) \quad \text{Substitute 7 for } d_1 \text{ and 6 for } d_2.$$

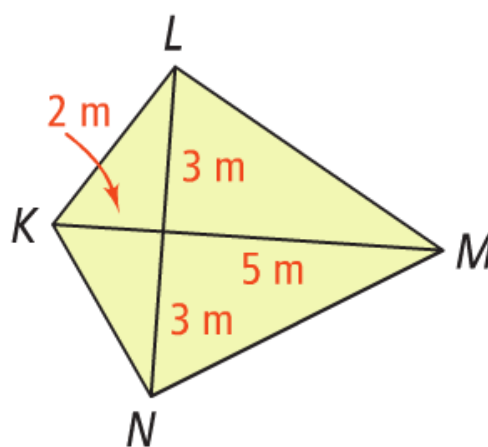
$$= 21 \quad \text{Simplify.}$$



The area of kite $KLMN$ is 21 m^2 .

Example

Find the area of kite KLMN.



Example

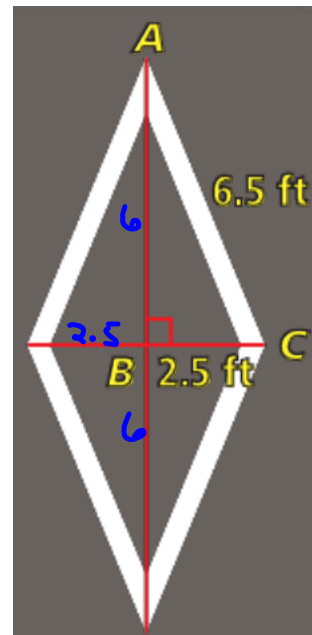
Find the area of the rhombus.

$$6.5^2 - 2.5^2 = b^2$$
$$\sqrt{36} = b$$
$$b = 6$$

$$A = \frac{1}{2}(12)(5)$$

$$A = \frac{1}{2}(60)$$

$$A = 30 \text{ ft}^2$$



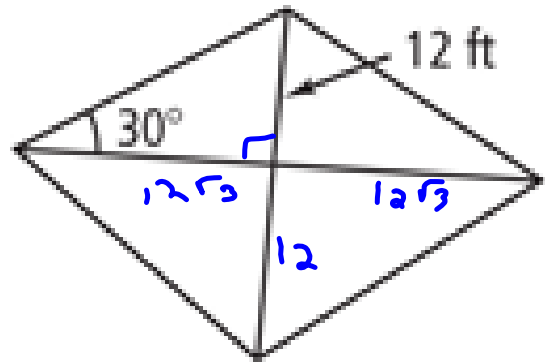
Example

Find the area of the rhombus.

$$\begin{array}{ccc} 5 & 5\sqrt{3} & 29 \\ 30 & 40 & 90 \end{array}$$

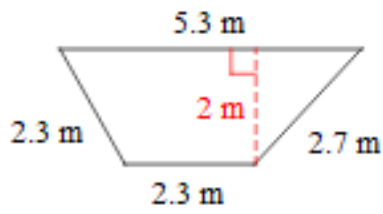
$$A = \frac{1}{2}(24)(41.6)$$

$$A = 499.2 \text{ ft}^2$$



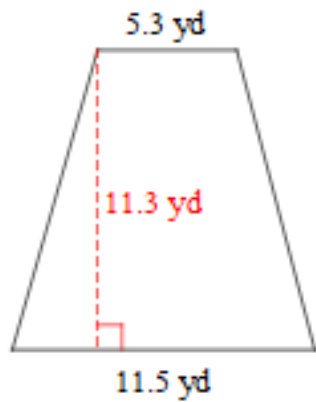
Closure: Today I learned how to find the area of a trapezoid, rhombus and kite.

1)

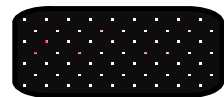
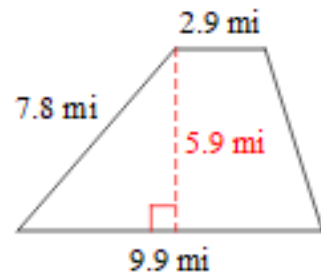


7.6 m²

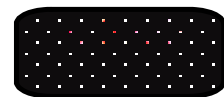
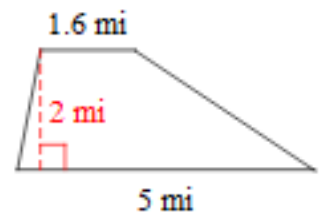
3)



2)



4)

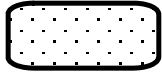


Find the missing measurement. Round your answer to the nearest tenth.

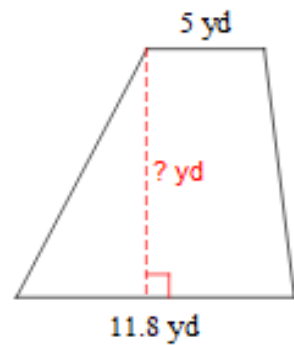
5)



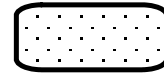
$$\text{Area} = 68.4 \text{ m}^2$$



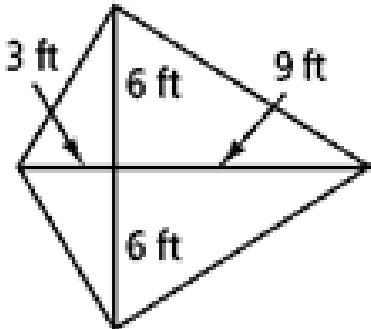
6)



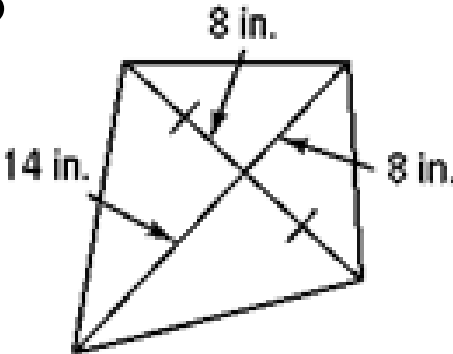
$$\text{Area} = 87.4 \text{ yd}^2$$



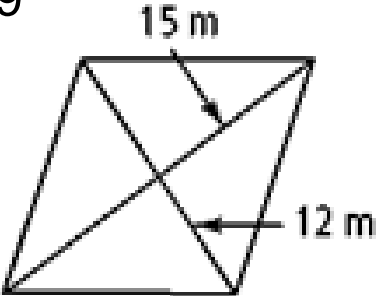
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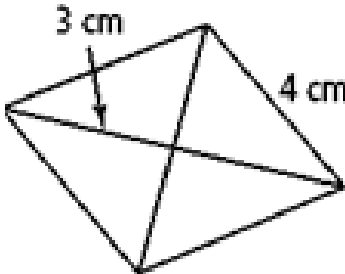
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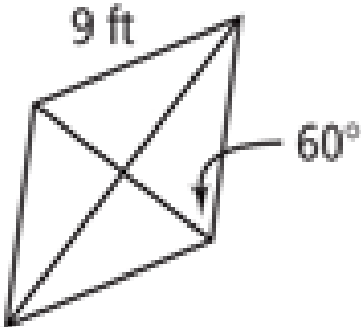
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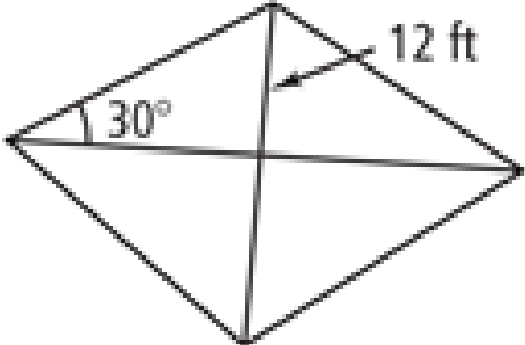
10



11



12



Exit Ticket

- complete and turn in to teacher before you leave

