LESSON 8.1

Areas of Triangles and Special Quadrilaterals

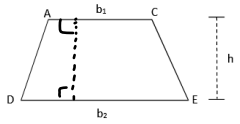
Day 3 - Trapezoids

Learning Targets

- I can apply the area formula(s) of TRAPEZOIDS to solve problems.

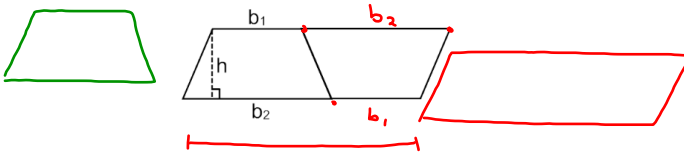
Trapezoids

Recall: A trapezoid is a special quadrilateral with two parallel sides, called **bases**, and two non-parallel sides, called **legs**. The distance between the parallel sides is called the **height**.



The bases are $\mathbf{b_1}$ and $\mathbf{b_2}$, and the height is **h**. We will use these measures to find the area of a trapezoid.

One approach to find the area of a trapezoid:



1.) Above are two congruent trapezoids connected by a congruent leg. What type of figure is made?

Parallelogram

2.) Express the length of the full base of the figure above in terms of b_1 and b_2.

$b_1 + b_2$

3.) What is the total area of the figure above?

$(b_1 + b_2) \cdot h$

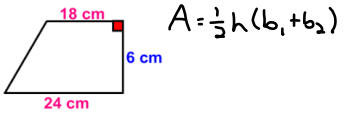
4.) Now, think of how you could use the area you found in 3.) to find the area of just one of the trapezoids. What would you do to find that area?

Multiply by $\frac{1}{2}$ (Divide by 2)

Area of a Trapezoid: $\frac{1}{2}h(b_1+b_2)$ or $\frac{h(b_1+b_2)}{2}$

Examples (8.1d)

1. Find the area of the trapezoid.

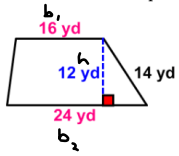


$A = \frac{1}{2}h(b_1+b_2)$

$A = \frac{1}{2} \cdot 6(18+24)$

$A = 126\text{ cm}^2$

2. Find the area of the trapezoid.

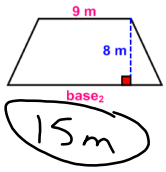


$A = \frac{1}{2} \cdot 12(16+24)$

$A = 240\text{ yd}^2$

For #3-5, use the area of a trapezoid to find the missing measure.

3. Area = 96 m^2



15 m

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

$96 = \frac{1}{2}\cdot 8(9+b_2)$

$96 = 4(9+b_2)$

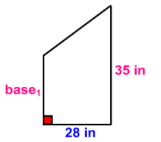
$96 = 36 + 4b_2$

$60 = 4b_2$

$\frac{60}{4} = \frac{4b_2}{4}$

$15 = b_2$

4. Area = 770 in^2



20 in

$770 = \frac{1}{2}\cdot 28(b+35)$

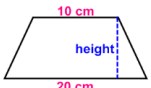
$\frac{770}{14} = \frac{14(b+35)}{14}$

$55 = b+35$

$-35 \quad -35$

$20 = b$

5. Area = 120 cm^2



8 cm

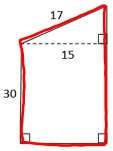
$A = \frac{1}{2}h(b_1+b_2)$ $10+20$

$120 = \frac{1}{2}h(30)$

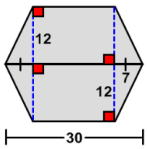
$120 = 15h$

$8 = h$

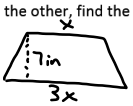
6. Find the area of the polygon below using two different methods.



7. Find the area of the complex polygon.



8. If a trapezoid has an area of 84 in^2, height of 7 inches, and one of the bases is three times the other, find the length of each of the bases.



$A = 84 in^2$

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

$84 = \frac{1}{2} \cdot 7(x + 3x)$

$84 = 3.5(4x)$

$84 = 14x$

$6 = x$

Bases are 6in + 18in

Assignment: 2, 3, 4, 5, 6, 8