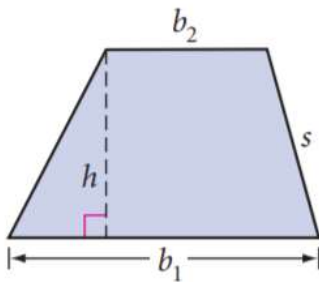


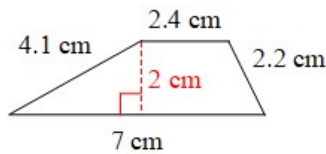
Area of a Trapezoid

***Remember to pay attention to units. Units of area should be squared (power of 2). Units of length like base, height, and perimeter should have a power of 1.

Trapezoid Area Conjecture - The area of a trapezoid is given by the formula $A = \frac{1}{2}(b_1 + b_2)h$, where A is the area, b_1 and b_2 are the lengths of the bases, and h is the height of the trapezoid. The height must be perpendicular to both bases of the trapezoid.



Example 1: Finding area of a trapezoid



$$A = \underline{\quad ? \quad}$$

The bases of a trapezoid are always the parallel sides. So, the bases will be the 2.4 cm and 7 cm sides. The other two sides are just extra, an unnecessary, information.

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

$$b_1 = 7, b_2 = 2.4, h = 2 \quad \text{**It doesn't matter which base you call } b_1 \text{ and which base you call } b_2$$

$$A = \frac{1}{2}(7 + 2.4)(2)$$

$$A = \frac{1}{2}(9.4)(2) \quad \text{**To calculate this, you can turn the } \frac{1}{2} \text{ into a 0.5 and multiply (i.e. } 0.5 \cdot$$

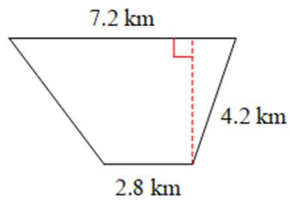
$$9.4 \cdot 2) \text{ or you can multiply 9.4 and 2 and then divide by 2 (i.e. } \left(\frac{9.4 \cdot 2}{2}\right).$$

Both methods will give you the same answer.

$$A = 9.4$$

The area is **9.4 cm²**.

Example 2: Finding height of a trapezoid



$$\text{Area} = 20 \text{ km}^2$$

$$h = \underline{\quad? \quad}$$

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

$$A = 20, b_1 = 2.8, b_2 = 7.2$$

$$20 = \frac{1}{2}(2.8 + 7.2)h$$

$$20 = \frac{1}{2}(10)h$$

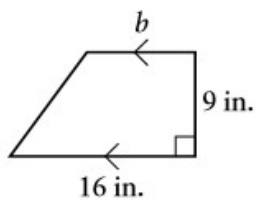
$$20 = 5h$$

$$\frac{20}{5} = \frac{5h}{5}$$

$$4 = h$$

The height of the trapezoid is **4 km**.

Example 3: Finding a missing base of a trapezoid



$$A = 126 \text{ in}^2 \quad b = \underline{\quad? \quad}$$

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

$$A = 126, b_1 = 16, h = 9$$

$$126 = \frac{1}{2}(16 + b)(9)$$

$$126 = \frac{1}{2}(9)(16 + b)$$

**We can switch the order of the multiplication

$$126 = 4.5(16 + b)$$

**Calculate $\frac{1}{2} \cdot 9$.

$$\frac{126}{4.5} = \frac{4.5(16 + b)}{4.5}$$

$$28 = 16 + b$$

$$12 = b$$

The base is **12 in.**