

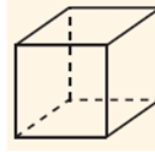
# Unit 9: Spatial Reasoning

| NAME          | FIGURE |
|---------------|--------|
| TRIANGLE      |        |
| PARALLELOGRAM |        |
| RHOMBUS       |        |
| RECTANGLE     |        |
| SQUARE        |        |
| TRAPEZOID     |        |
| CIRCLE        |        |

CYLINDER



PRISM



SPHERE



CONE



PYRAMID



## Day 1: Developing Formulas for Triangles and Quadrilaterals

$$A = s^2$$

Shape  
Square



$$A = bh$$

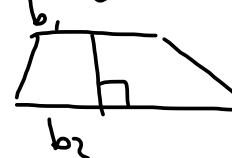
Parallelogram



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

Trapezoid

average of bases



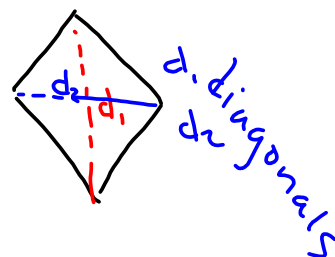
$$A = \frac{1}{2}bh$$

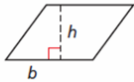
Triangle

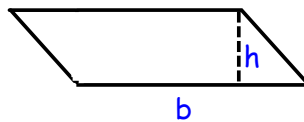
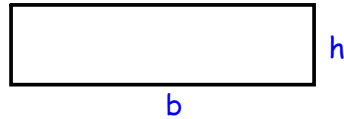


$$A = \frac{1}{2}d_1d_2$$

Rhombus



| Area Formula | Shape(s)      | Sketch   |
|--------------|---------------|--|
| $bh$         | Parallelogram |  |

**Area of a Parallelogram:**

\*\*Remember that rectangles and squares are also parallelograms.

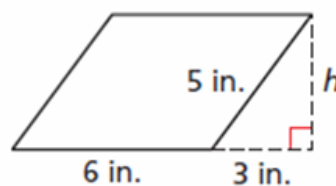
**Examples:** Find each measure.

- The area of the parallelogram

$$A = bh$$

$$A = 6(4)$$

$$A = 24 \text{ in}^2$$



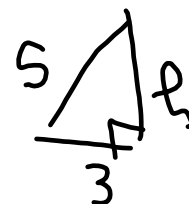
$$3^2 + h^2 = 5^2$$

$$9 + h^2 = 25$$

$$-9 \quad -9$$

$$h^2 = 16$$

$$h = 4$$

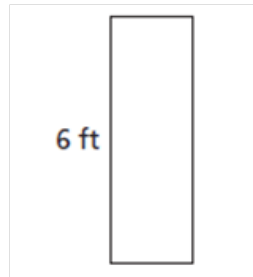


2. The base of the rectangle to the right in which  $A = 12 \text{ ft}^2$

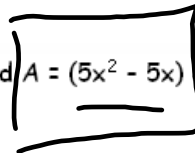
$$A = bh$$

$$\frac{12}{6} = \frac{b(6)}{6}$$

$$2 = b$$



- 3 The height of a rectangle in which  $b = 5 \text{ cm}$  and  $A = (5x^2 - 5x) \text{ cm}^2$

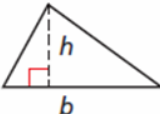


$$A = bh$$

$$\frac{5x^2 - 5x}{5} = \frac{5h}{5}$$

$$x^2 - x = h$$

$$h = (x^2 - x) \text{ cm}$$

|                     |          |  |
|---------------------|----------|--|
| $A = \frac{1}{2}bh$ | Triangle |  |
|---------------------|----------|--|



### Area of a Triangle:

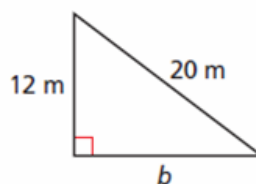
**Examples:** Find each measurement.

Find the area of the triangle.

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

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

$$A = 96\text{m}^2$$



$$b^2 + 12^2 = 20^2$$

$$b^2 + 144 = 400$$

$$\begin{array}{r} -144 \\ \hline \end{array} \quad \begin{array}{r} -144 \\ \hline \end{array}$$

$$b^2 = 256$$

$$b = 16$$

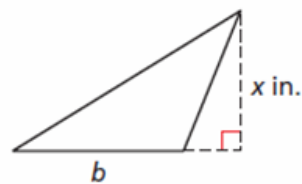
Find the base of a triangle, in which  $A = x^2 \text{ in}^2$ .

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

$$\frac{2}{1} \cdot x^2 = \frac{1}{2}bx \cdot \frac{2}{1}$$

$$\frac{2x^2}{x} = \frac{bx}{x}$$

$$2x_{in} = b$$



Area of a Trapezoid:

|                              |           |  |
|------------------------------|-----------|--|
| $A = \frac{(b_1 + b_2)h}{2}$ | Trapezoid |  |
|------------------------------|-----------|--|



**Examples:** Find each measurement.

1. Find the area of a trapezoid in which
- $b_1 = 9$
- cm,
- $b_2 = 12$
- cm, and
- $h = 3$
- cm.

$$A = \left( \frac{b_1 + b_2}{2} \right) h \rightarrow A = 31.5 \text{ cm}^2$$

$$A = \left( \frac{9+12}{2} \right) 3$$

2. Find
- $b_2$
- of the trapezoid, in which
- $A = 8 \text{ ft}^2$
- .

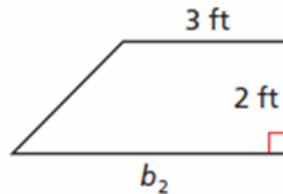
$$A = \left( \frac{b_1 + b_2}{2} \right) h$$

$$8 = \left( \frac{3 + b_2}{2} \right) 2$$

$$8 = 3 + b_2$$

$$-3 \quad -3$$

$$5 = b_2$$



|                           |         |  |
|---------------------------|---------|--|
| $A = \frac{1}{2} d_1 d_2$ | Rhombus |  |
|---------------------------|---------|--|

**Area of a Rhombus:****Examples:** Find each measurement.

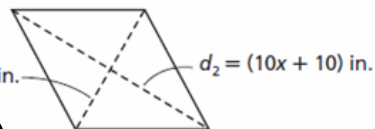
1. Find the area of the rhombus.

$$A = \frac{1}{2} (6x+4)(10x+10)$$

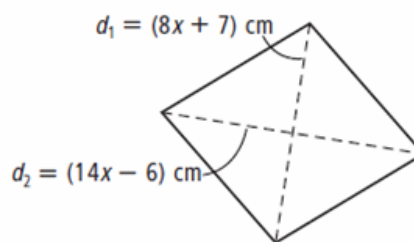
$$A = \frac{1}{2} (60x^2 + 60x + 40x + 40)$$

$$A = \frac{1}{2} (60x^2 + 100x + 40)$$

$$A = (30x^2 + 50x + 20) \text{ in.}^2$$



2. Find the area of the rhombus.

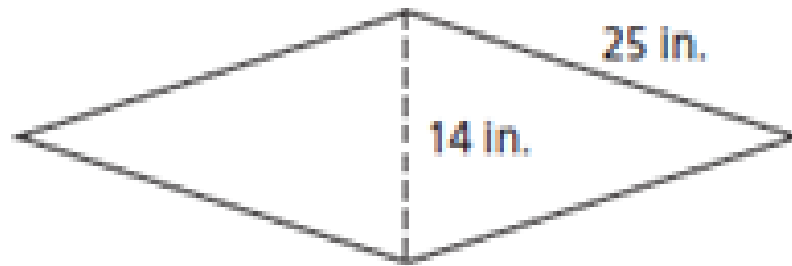


$$A = (56x^2 + 25x - 21) \text{ cm}^2$$

HW  
Worksheet 9-1

Hint for #7 . . . Next page. . .

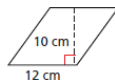
## 7. the area of the rhombus



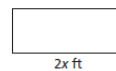
## HW 9-1

Find each measurement.

1. the area of the parallelogram

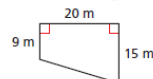


2. the height of the rectangle, in which
- $A = 10x^2 \text{ ft}^2$

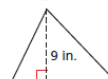


3. the perimeter of a square in which
- $A = 169 \text{ cm}^2$

4. the area of the trapezoid

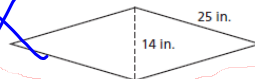


5. the base of the triangle, in which
- $A = 58.5 \text{ in}^2$



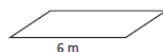
- 6.
- $b_1$
- of a trapezoid in which
- $A = (48x + 68) \text{ in}^2$
- ,
- $h = 8 \text{ in.}$
- , and
- $b_2 = (9x + 12) \text{ in.}$

7. the area of the rhombus

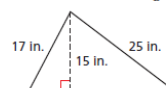


Find each measurement.

11. the height of the parallelogram, in which
- $A = 7.5 \text{ m}^2$



14. the area of the triangle



15. the height of the trapezoid, in which
- $A = 280 \text{ cm}^2$



34. The perimeter of a rectangle is 72 in. The base is 3 times the height. Find the area of the rectangle.

52. Which expression best represents the area of the rectangle?

☐ A  $2x + 2(x - c)$ 
☐ C  $x^2 + (x - c)^2$

☒ B  $x(x - c)$ 
☐ D  $2x(x - c)$

