

Objective: Students will be able to find the area of shapes using formal and informal methods.

Shape	Triangle	Rectangle	Parallelogram	Trapezoid	Circle
Picture					
Formula	$A = \frac{1}{2}bh$	$A = bh$	$A = bh$	$A = \frac{1}{2}(b_1 + b_2)h$	$A = \pi r^2$

Understanding the equation for area of a circle:

1. What is the formula for circumference of a circle? $C = 2\pi r$	
2. Lets dissect the circle into 20 pieces. And lay them flat.	
3. Rearrange the pieces. What shape does it make? parallelogram	
4. What are the dimensions? $h = r$ $b = \frac{1}{2}(2\pi r)$	
5. What is the area of a circle? $A = \frac{1}{2}(2\pi r)r$	$AREA = \pi r^2$

Example 1: Use the formal method to find the areas of these shapes: *use equations*

<p>a)</p> <p>Triangle</p> <p>$A_{\Delta} = \frac{1}{2}bh$</p> <p>$A_{\Delta} = \frac{1}{2}(8)(10)$ $= 40 \text{ units}^2$</p>	<p>b)</p> <p>parallelogram</p> <p>$A_{\square} = bh$</p> <p>$A = (6)(3)$ $= 18 \text{ units}^2$</p>	<p>c)</p> <p>circle</p> <p>$A = \pi r^2$ $= \pi (3)^2$ $= 9\pi \text{ units}^2$ exact approx. 28.27 units²</p>
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Example 2: Use an "informal" method to find the areas of these shapes:

a)

$$A_{\square} = (5)(3) = 15 \text{ units}^2$$

$$A_{\Delta} = \frac{1}{2}(1)(2) = 1 \text{ units}^2$$

$$A_{\Delta} = \frac{1}{2}(5)(3) = 7.5 \text{ units}^2$$

$$A = 15 - 1 - 7.5 = \boxed{6.5 \text{ units}^2}$$

"Informal" method to finding area:

- 1) Create rectangle around object
- 2) Calculate area of rectangle
- 3) Calculate "extra" area
- 4) Subtract: Area of Rectangle - Area of "Extra"

b)

$$A_{\square} = (6)(4) = 24 \text{ units}^2$$

$$A_{\Delta} = \frac{1}{2}(6)(1) = 3 \text{ units}^2$$

$$A_{\Delta} = \frac{1}{2}(3)(3) = 4.5 \text{ units}^2$$

$$A = 24 - 3 - 4.5 = \boxed{16.5 \text{ units}^2}$$

c)

$$A_{\square} = (6)(5) = 30$$

$$A_{\Delta} = \frac{1}{2}(3)(2) = 3$$

$$A_{\Delta} = \frac{1}{2}(6)(2) = 6$$

$$A_{\Delta} = \frac{1}{2}(5)(1) = 2.5$$

$$A_{\Delta} = \frac{1}{2}(4)(1) = 2$$

$$A = 30 - 3 - 6 - 2.5 - 2 = \boxed{16.5 \text{ units}^2}$$

Example 3: Find the area of the following figures:

a)

$$A_1 = (4)(2) = 8 \text{ cm}^2$$

$$A_2 = (3)(3) = 9 \text{ cm}^2$$

$$A_3 = (9)(3) = 27 \text{ cm}^2$$

$$A_T = 8 + 9 + 27 = \boxed{44 \text{ cm}^2}$$

b)

$$A_{\Delta} = \frac{1}{2}(12)(6) = 36 \text{ m}^2$$

$$A_{\square} = 4(12) = 48 \text{ m}^2$$

$$A_T = 36 + 48 = \boxed{84 \text{ m}^2}$$

c) Find the area of the shaded region:

$$A_{\square} = (18)(12) = 216 \text{ cm}^2$$

$$A_{\square} = (4)(3) = 12 \text{ cm}^2$$

$$A_{\text{shade}} = 216 - 12 = \boxed{204 \text{ cm}^2}$$

d) Find the area of the shaded region:

unshaded \rightarrow circle
 shape \rightarrow square

$$A_{\circ} = \pi(14)^2 = 196\pi \text{ in}^2$$

$$A_{\square} = (28)(28) = 784 \text{ in}^2$$

$$A_{\text{shade}} = 784 - 196\pi = \boxed{168.2 \text{ in}^2}$$