**Math 9 – Unit 5: Measurement** Name: Mr. V

**Lesson #1: Perimeter and Area of 2D Figures** Date: Apr. 11

**Learning Goal:** We are learning to calculate the perimeter, circumference, and area for common 2D simple and compound shapes.

Welcome back to Mathematics! We will kick off our second half with a unit which you should be familiar with. There will be some new ideas, but overall, this is always a great unit to get back into Math. Let's dive in.

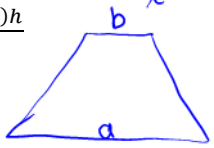
**Important Formulas**

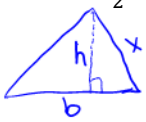
Perimeter – simply add up all the outside edges, regardless of the shape (not circles!)


Area of a square/rectangle: $A = lw$


Area of a triangle: $A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$

Area of a trapezoid: $A = \frac{(a+b)h}{2}$



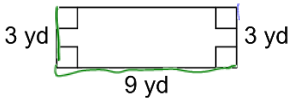

perimeter of a circle

Area of a circle: $A = \pi r^2$ (pi = 3.14)

Circumference of a circle: $C = 2\pi r$ $= \pi d$

**Find the perimeter (if possible) and area of each shape.**

1.




9 yd

$P = 3 + 3 + 9 + 9$

$= 24$ yd

$P = 2(3+9)$

$= 2(12)$

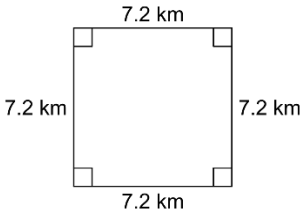
$= 24$ yd

$A = lw$

$= (9)(3)$

$= 27\ yd^2$

2.




$P = 4(7.2)$

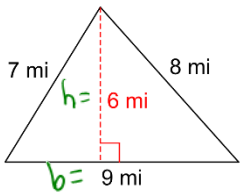
$= 28.8$ km

$A = lw$

$= (7.2)(7.2)$

$= 51.84\ km^2$

3.




P = sum of the sides

= 7 + 9 + 8

= 24 mi

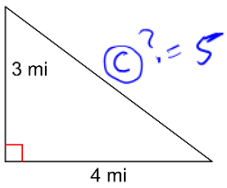
$A = \frac{bh}{2}$

$= \frac{(9)(6)}{2}$

$= \frac{54}{2}$

$= 27 mi^2$

4.




Use pythag theorem for last side.

$c^2 = a^2 + b^2$

$c^2 = (3)^2 + (4)^2$

$c^2 = 9 + 16$

$c^2 = 25$

$c = 5$ mi

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

$= \frac{(4)(3)}{2}$

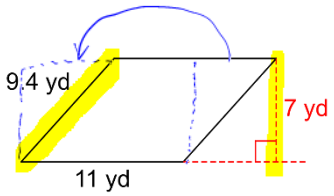
$= \frac{12}{2}$

$= 6 mi^2$

P = 3 + 4 + 5

= 12 mi

5.




parallelogram/ Rhombus

A = lw

= (11)(7)

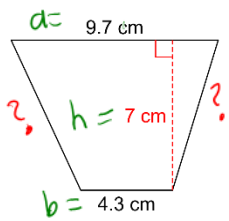
$= 77 yd^2$

P = 2(11) + 2(9.4)

= 22 + 18.8

= 40.8 yd

6.




Trapezoid

Perimeter? Not enough information

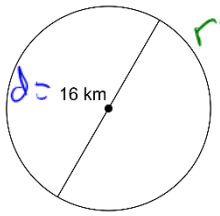
$A = \frac{(a+b)h}{2}$

$= \frac{(9.7+4.3)(7)}{2}$

$= \frac{(14)(7)}{2}$ $= 49 cm^2$

**Find the circumference and the area of each circle.**

7.




r = 8

C = πd or 2πr

C = (3.14)(16)

C = 50.24 km

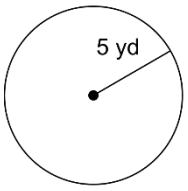
$A = \pi r^2$

$= (3.14)(8)^2$

$= (3.14)(64)$

$= 200.96 km^2$

8.



**Use the appropriate formula to find the missing piece.**

9. A triangle has a height of 22*cm* and an area of 143$cm^2$. What is the length of the base?

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

$143 = \frac{b(22)}{2}$ (11)

$\frac{143}{11} = \frac{11b}{11}$

$13 = b$

base is 13cm

10. A large pizza has an area of 201$in^2$. What is the diameter, in inches, of the pizza.

$A = \pi r^2$

$\frac{201}{3.14} = \frac{(3.14)r^2}{3.14}$

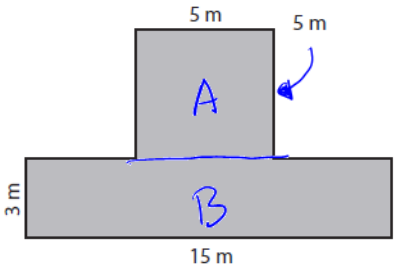
$\sqrt{64.01} = \sqrt{r^2}$

$8 = r$

∴ diameter is 16 in.

**Find the area of the compound figures.**

11.



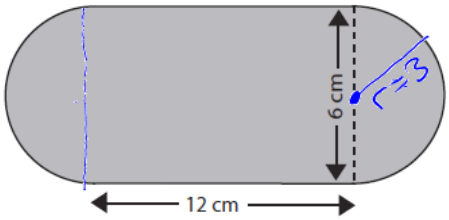

Strategy: Break it down into simple shapes.

Area A $= lw$
$= 5 \cdot 5$
$= 25\ m^2$

Area B $= lw$
$= (15)(3)$
$= 45\ m^2$

Total Area
$= A + B$
$= 25 + 45$
$= 70\ m^2$

12.




Rectangle

$A = lw$

$= (12)(6)$

$= 72\ cm^2$

Circle

$A = \pi r^2$

$= (3.14)(3)^2$

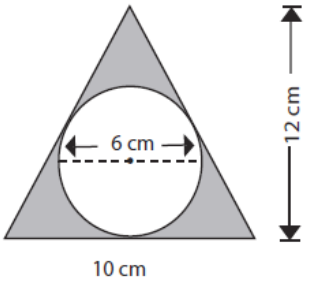
$= (3.14)(9)$

$= 28.26\ cm^2$

Total: $72 + 28.26$

$= 100.26\ cm^2$

13.




Area △ − Area ○

$\text{Area}\triangle = \frac{bh}{2}$

$= \frac{(10)(12)}{2}$

$= \frac{120}{2}$

$= 60\ cm^2$

$\text{Area}\bigcirc = \pi r^2$

$= (3.14)(3)^2$

$= 28.26\ cm^2$

∴ Total Area $= 60 - 28.26$

$= 31.74\ cm^2$

**Success Criteria:**

- I can find the perimeter and area of a square, rectangle, triangle, parallelogram, or trapezoid
- I can find the circumference and area of a circle
- I can find the area of compound shapes by breaking them down into simpler shapes
- I can, if given the area, find another missing dimension