Math 9 – Unit 5: Measurement

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Lesson #1: Perimeter and Area of 2D Figures

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

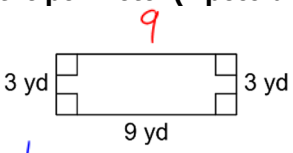
Area of a trapezoid: $A = \frac{(a+b)h}{2}$

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

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

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

1.



Rectangle

$P = 3 + 9 + 3 + 9$

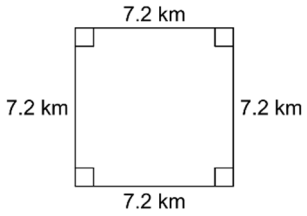
$P = 24\text{ yd}$

$A = lw$

$A = (3)(9)$

$A = 27\text{ yd}^2$

2.



Square.

$P = 4(7.2)$

$P = 28.8\text{ km}$

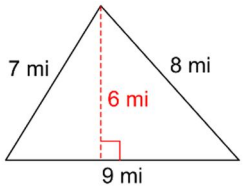
$A = lw$

$A = (7.2)(7.2)$

$A = 51.84\text{ km}^2$

$A = (7.2)^2$

3.



$P = 7 + 8 + 9$

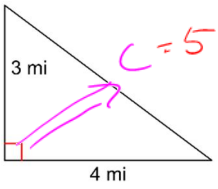
$P = 24\text{ mi}$

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

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

$A = 27\text{ mi}^2$

4.



Right Triangle

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

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

$9 + 16 = c^2$

$\sqrt{25} = \sqrt{c^2}$

$5 = c$

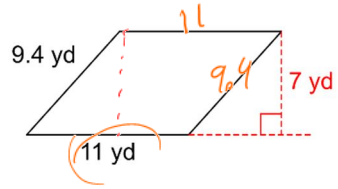
$P = 3 + 4 + 5$

$P = 12\text{ mi}$

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

$A = \frac{(3)(4)}{2} = 6\text{ mi}^2$

5.



Parallelogram

$P = 9.4 + 11 + 9.4 + 11$

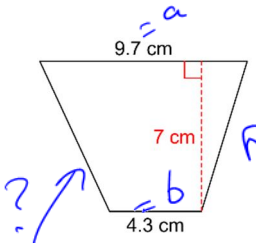
$P = 40.8\text{ yd}$

$A = bh$

$A = (11)(7)$

$A = 77\text{ yd}^2$

6.



Trapezoid

? ? cannot calculate Perimeter.

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

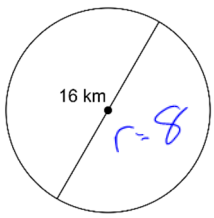
$A = \frac{(9.7+4.3)(7)}{2}$

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

perimeter

Find the circumference and the area of each circle.

7.



radius = $\frac{\text{diameter}}{2}$

$C = 2\pi r$

$C = 2(3.14)(8)$

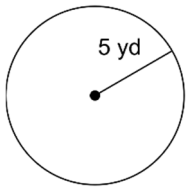
$C = 50.24\text{ km}$

$A = \pi r^2$

$A = (3.14)(8^2)$ (64)

$A = 200.96\text{ km}^2$

8.



Use the appropriate formula to find the missing piece.

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

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

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

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

$13\,cm = b.$

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

$A = \pi r^2$

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

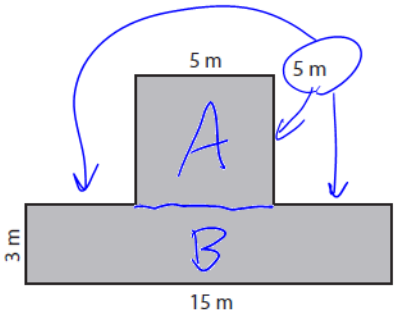
$\sqrt{64} = \sqrt{r^2}$

$8 = r$

∴ the diameter is 16 inches.

Find the area of the compound figures.

11.



$A = lw$

$A = 5^2$

$A = 25m^2$

$B = lw$

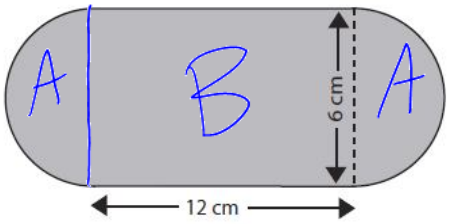
$B = (15)(3)$

$B = 45m^2$

add

The total area is $70m^2$

12.



$A = \pi r^2$ $\quad d = 6$, $r = 3$

$A = (3.14)(3^2)$

$A = 28.26 cm^2$

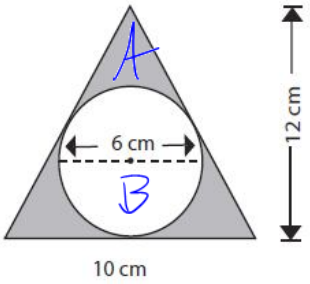
$B = lw$

$B = (12)(6)$

$B = 72 cm^2$

∴ the total area is $100.26 cm^2$

13. What is the area of the shaded regions?



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

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

$A = 60 cm^2$ △

$B = \pi r^2$

$B = (3.14)(3^2)$

$B = 28.26 cm^2$ ○

The area of the shaded regions is

△ − ○

$= 60 - 28.26 = 31.74 cm^2$

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