Name Mrs. Jarvis .

Math 9

(MTH1W)

Unit 4:

Measurement

of 2-D (Plane) Shapes and 3-D (Solid) Shapes

MTH1W

Math 9 – Unit 4: Measurement

Name: Ms. Jacob

Lesson #4.1: Perimeter and Area of 2D Figures

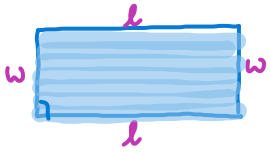
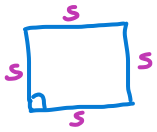
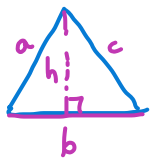
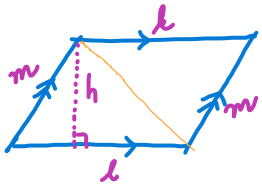
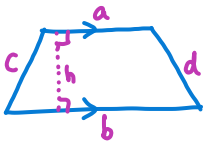
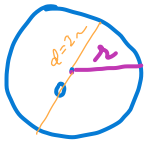
Date: March 18, 2025

PERIMETER of a CIRCLE

length of BOUNDARY

Region enclosed.

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

RECTANGLE  $P = 2l + 2w$ $A = lw$	SQUARE  $P = 4s$ $A = s \cdot s = s^2$	TRIANGLE   $P = a + b + c$ $A = \frac{b \cdot h}{2}$
PARALLELOGRAM  $P = 2l + 2m$ $A = lh.$	TRAPEZOID   $P = a + c + b + d$ $A = \frac{(a+b)h}{2}$	CIRCLE  $\pi = 3.14$ (approx). $P = C = 2\pi r$ $= (2r)\pi$ $= d\pi$ $A = \pi r^2$ $= \pi \cdot r \cdot r$

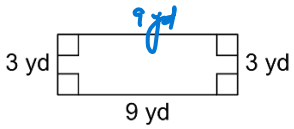
* UNITS very important

Perimeter → units eg cm, m, km, . .

Area → square units eg cm^2, m^2, km^2 . . .
(sq. cm) (sq. m.)

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

1.

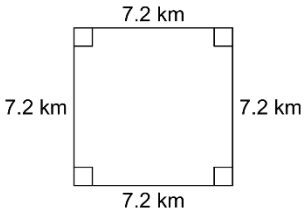


$P = 2(l+w) = 2(3+9) = 24$ yd

$A = lw = (9\text{ yd})(3\text{ yd})$

$= 27\text{ yd}^2$ or 27 sq. yd.

2.

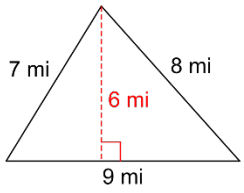


$P = 4\,side = 4(7.2) = 28.8$ km

$A = (side)(side) = (7.2\text{ km})(7.2\text{ km})$

$= 51.84\text{ km}^2$

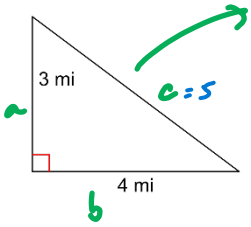
3.



$P = a+b+c = 7+8+9 = 24$ mi

$A = \frac{bh}{2} = \frac{(9)(6)}{2} = 27\text{ mi}^2$

4.



Right Δ.

∴ By Pythagorean Theorem,

$c = \sqrt{a^2+b^2}$

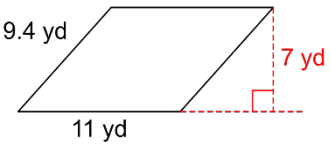
$c = \sqrt{3^2+4^2} = \sqrt{9+16}$

$= \sqrt{25} = 5$

$\therefore P = 3+4+5 = 12$ mi

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

5.

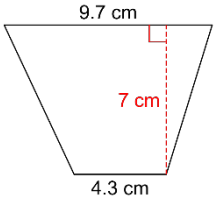


$P = 2(9.4+11) = 40.8$ yd.

$A = bh = (11\text{ yd})(7\text{ yd})$

$= 77\text{ yd}^2$

6.



P → Not sufficient info to find P.

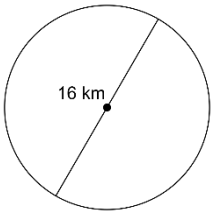
$A = \frac{(b_1+b_2)h}{2}$

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

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

Find the circumference and the area of each circle.

7.



$d = 16$ km

$\therefore r = \frac{16}{2} = 8$ km.

$C = 2\pi r$

$= 2(3.14)(8)$

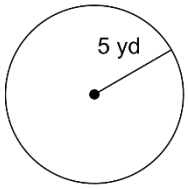
$= 50.24$ km.

$A = \pi r^2 = \pi r r$

$= 3.14(8)(8)$

$= 200.96$ km^2

8.



$C = 2\pi r$

$= 2(3.14)(5)$

$= 31.4$ yd

$A = 3.14(5)(5)$

$= 78.5$ yd^2

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?

Given: $h = 22$ cm; $A = 143$ cm^2

To find: $b = ?$

$A = \frac{bh}{2} \Rightarrow \frac{2A}{h} = b$

$\therefore b = \frac{2A}{h} = \frac{2(143)}{22} = 13$ cm

Ans Length of base of $\Delta = 13$ cm.

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

Given

$A = 201$ in^2

To find: $d = ?$ $d = 2r$ but $r = ?$

$A = \pi r^2 \Rightarrow \frac{A}{\pi} = r^2$

$\Rightarrow \sqrt{\frac{A}{\pi}} = r$

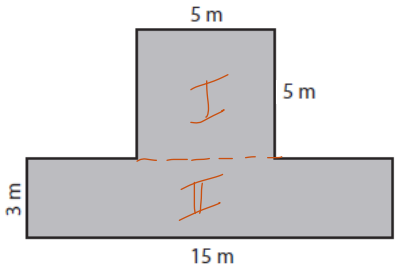
$\therefore r = \sqrt{\frac{201}{3.14}} = \sqrt{64} = 8$ (We only consider positive length)

Ans diameter of pizza $= 2(8)$

$= 16$ inches.

Find the area of the compound figures.

11.



Area of figure = Area (Square I) + Area (Rectangle II)

$= (5)(5) + (15)(3)$

$= 25 + 45$

$= 70$ m^2

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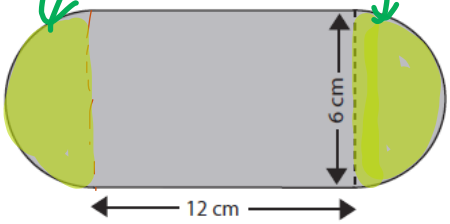
12.



Both ½ circles are identical

Area of figure

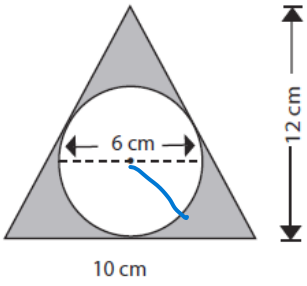
= Area (Rectangle) + Area (2 semi-circles)
i.e. 1 circle

= (12)(6) + (3.14)(3)(3)

= 72 + 28.26

= 100.26 cm²

13.



d = 6 cm

∴ r = 6/2 = 3cm.

Area of shaded region

= Area (Triangle) − Area (Circle)

$\frac{bh}{2}$ − $\pi \cdot r \cdot r$

$= \left[\frac{(10)(12)}{2}\right] - \left[(3.14)(3)(3)\right]$

= 60 − 28.26

= 31.74 cm²

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