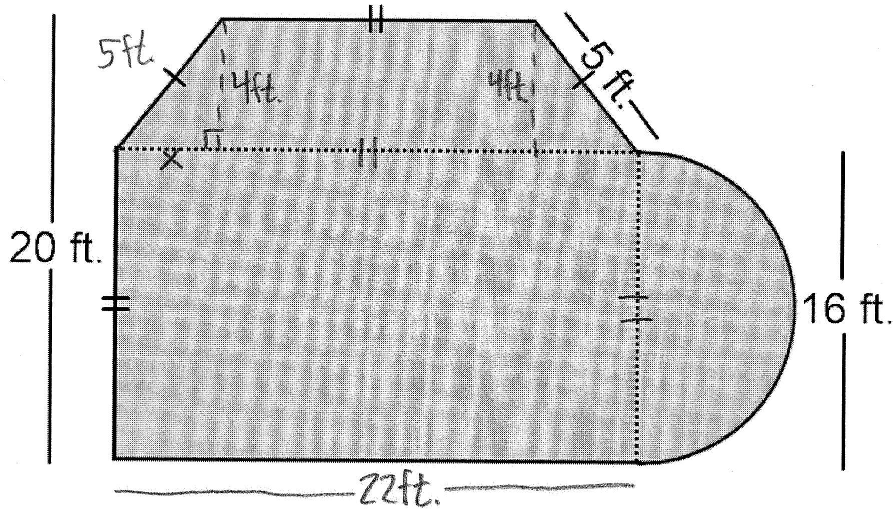
Measurement and Geometry – Review

A pool is to be built to the specifications shown in the diagram below.



1. Determine the perimeter of the pool.

2. If you wanted to design a rectangular pool with the same perimeter, what is the maximum area the pool could be?

3. Determine the area that the pool shown in the diagram will take up.

4. If you wanted to design a rectangular pool with the same area, what are the dimensions of the pool with the smallest possible perimeter?

5. How many laps of the pool shown in the diagram would you need to do to swim 100 metres?

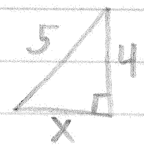
6. Determine the volume of the pool in the diagram, if the entire pool is 5 feet deep.

7. Determine the volume of the pool in litres. (1 litre = 1000 cm^3).

8. What is the least amount of material required to build a box with the same volume as the pool?

9. What is the least amount of material required to build a cylinder with the same volume as the pool?

1.



$$x^2 = 5^2 - 4^2$$
$$x^2 = 9$$
$$x = 3ft.$$

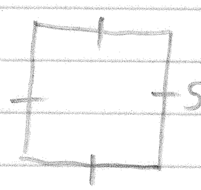
$$\text{Perimeter} = 22 + \frac{2\pi r}{2} + 5 + 16 + 5 + 16$$

$$= 22 + \frac{2\pi(8)}{2} + 5 + 16 + 5 + 16$$

$$= 22 + 25.1 + 42$$

$$\boxed{= 89.1 ft.}$$

2. $P = 4s$



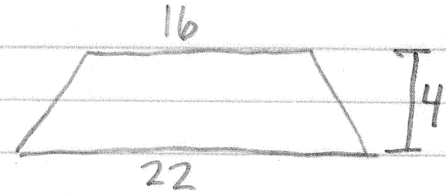
$$\frac{89.1}{4} = \frac{4s}{4}$$

$$s = 22.275$$

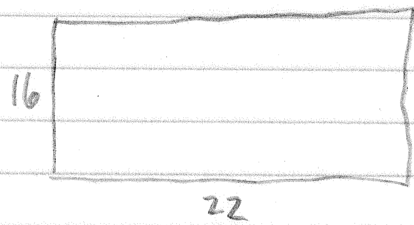
$$A = s^2$$

$$\boxed{A = 496.2 ft^2}$$

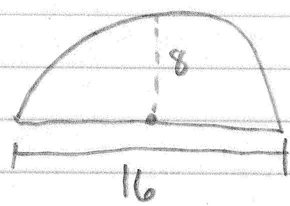
3.



$$A = \frac{(16+22)4}{2}$$
$$= \underline{76\,ft^2}$$



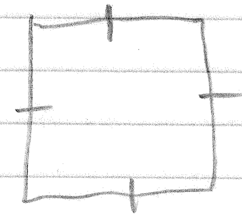
$$A = 16 \times 22$$
$$A = \underline{352\,ft^2}$$



$$A = \frac{\pi r^2}{2}$$
$$= \frac{\pi(8)^2}{2}$$
$$= \underline{100.5\,ft^2}$$

$$\boxed{Area = 528.5\ ft^2}$$

4. $A = s^2$



$528.5 = s^2$

$s = 22.99$

$s = 23\,ft$

The pool would be a square approximately 23ft. x 23ft.

5. One lap is 30 ft.

i) Convert 30 ft. into metres

$1 \text{ foot} = 30.48 \text{ cm}$

$$\frac{1}{30.48} = \frac{30}{x}$$

$x = 914.4 \text{ cm}$

$100 \text{cm} = 1 \text{m}$

$$\frac{100}{1} = \frac{914.4}{x}$$

$$\frac{100x}{100} = \frac{914.4}{100}$$

$x = 9.14 \text{m}$

One lap is 9.14 m

ii) How many laps in 100 m

$$\frac{100}{9.14}$$

$= 10.9$

∴ it would take 10.9, or nearly 11 laps to swim 100 m.

6. Use the area from 3

$A = 528.5 \text{ ft}^2$

$V =$ area of base $\times$ height

$V = 528.5 \times 5$

$V = 2,642.5 \text{ ft}^3$

7. i) Convert ft^3 to cm^3

1 foot = 30.48 cm

$1 \text{ ft.}^3 = 28,316.8 \text{ cm}^3$

$$\frac{1}{28,316.8} = \frac{2642.5}{x}$$

$x = 74,827,144 \text{ cm}^3$

ii) Convert cm^3 to litres

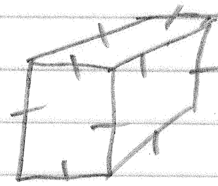
$1 L = 1000 \text{ cm}^3$

$$\frac{1}{1000} = \frac{x}{74,827,144}$$

$$\frac{1000x}{1000} = \frac{74,827,144}{1000}$$

$$\boxed{x = 74,827.1 \text{ L}}$$

8. Volume is 2,642.5 ft^3



$V = s^3$

$2642.5 = s^3$

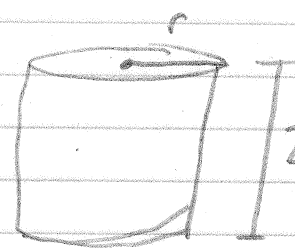
$s = 13.8$ ft

$SA = 6s^2$

$= 6(13.8)^2$

$\boxed{= 1{,}142.6 \text{ ft}^2}$

9. Volume is 2,642.5 ft^3



$V = 2\pi r^3$

$$\frac{2{,}642.5}{2\pi} = \frac{2\pi r^3}{2\pi}$$

$\sqrt[3]{r^3} = \sqrt[3]{420.6}$

$r = 7.5$ ft.

$SA = 6\pi r^2$

$= 6\pi(7.5)^2$

$\boxed{= 1{,}060.3 \text{ ft}^2}$