Solutions

Assignment 10

Math 1030

### Due Monday, November 26th

1. **Perimeters and Area**

   Find the perimeter and area of each of the following shapes.

   (a) A rectangular postage stamp with a length of 2.2 centimeters and a width of 2.0 centimeters.

   $$Perimeter = 2 \times 2.2 cm + 2 \times 2.0 cm = \boxed{8.4 cm}$$

   $$Area = 2.2 cm \times 2.0 cm = \boxed{4.4 cm^2}$$
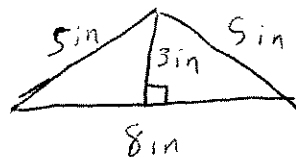
   (b) A parallelogram with sides of length 12 feet and 30 feet, and a distance between ~~telt~~ the 30-foot sides of 6 feet.

   6ft   12ft
   30 ft
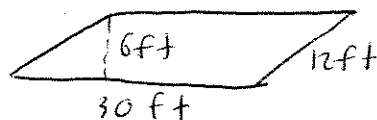
   $$Perimeter = 2 \times 30 ft + 2 \times 12 ft = \boxed{84 ft}$$

   $$Area = 30 ft \times 6 ft = \boxed{180 ft^2}$$

   (c) The triangle:

   5 in   3 in   5 in
   8 in

   $$Perimeter = 5 in + 5 in + 8 in = \boxed{18 in}$$

   $$Area = \frac{1}{2}(8 in)(3 in) = \boxed{12 in^2}$$

2. Three Dimensional Objects

(a) An arena has a ~~floow~~ *floor* that measures 30 meters by 40 meters, with a ceiling 8 meters high. How much air does it hold, in cubic meters? In liters?

$$Volume = 30m \times 40m \times 8m = \boxed{9,600 \; m^3}$$

$$In \; liters = (9,600 \; m^3)\left(\frac{1,000 \; L}{1 \; m^3}\right) = \boxed{9,600,000 \; L}$$

(b) A soccer ball has a circumference of 69 centimeters. What are its volume and surface area?

$$r = \frac{C}{2\pi} = \frac{69 \; cm}{2\pi}$$

$$Surface \; Area = 4\pi r^2 = 4\pi \left(\frac{69 \; cm}{2\pi}\right)^2 \approx \boxed{6,062 \; cm^2}$$

$$Volume = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi \left(\frac{69 \; cm}{2\pi}\right)^3 = \boxed{5,547 \; cm^3}$$

(c) Which holds more: an oil drum with a radius of 2 feet that is 3 feet high or an oil drum with a radius of 1.5 feet that is 4 feet high?

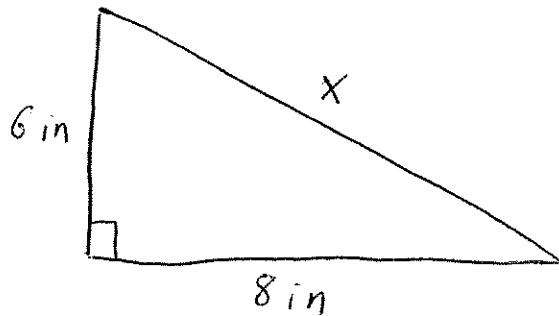$$Volume \; Oil \; drum \; \#1 = 3ft \times \pi (2ft)^2 = 12\pi \; ft^3$$

$$Volume \; Oil \; drum \#2 = 4ft \times \pi (1.5ft)^2 = 9\pi \; ft^3$$

$$So, \quad \boxed{Oil \; drum \; \#1}$$

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3. Geometric Problem Solving

(a) What is the distance x in the right triangle below:

$$X = \sqrt{(6\,in)^2 + (8\,in)^2} = \sqrt{100\,in^2}$$
$$= \boxed{10\,in}$$

(b) What is the angular size of a quarter viewed from a distance of 5 yards? Use 2.5 cm as the diameter of the quarter.

$$Angular\ size = \frac{2.5\,cm}{2\pi\,(5\,yards)} = \frac{2.5\,cm}{2\pi\,(5\,yd)(91.44\,cm/yd)}$$

$1\ yard = 91.44\,cm$

$$= \boxed{8.703 \times 10^{-4}\,rad}$$

Or

$$8.703 \times 10^{-4}\,rad \left(\frac{360°}{2\pi\,rad}\right)$$

$$= \boxed{.05°}$$

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