MATH 310 ♦ TEST♣ Measure ♠ Spring, 2009 ♥ NAME

Don't forget UNITS! *Please* leave answers with π; do not replace with approximation.

(8) 1. Convert each of the following units, showing your work.

a. $2.05\ m^3$ = _____ cm^3

$2.05\ m^3 = 2.05\ m^3 \cdot \frac{100\ cm}{1\ m} \cdot \frac{100cm}{1\ m} \cdot \frac{100cm}{1\ m} = 2.05 \cdot 100 \cdot 100 \cdot 100\ cm^3 = 2050000\ cm^3$

b. 7500 mL water (at 4°C) = _____ kg.

$7500\ mL = 7500\ mL \cdot \frac{1\ g^*}{1\ mL} \cdot \frac{1\ kg}{1000\ g} = \frac{7500}{1000} kg = 7.5\ kg$

* (this equivalence good only for substances which have the same density as water at 4°C)

or say $7500\ mL = 7500\ cm^3 \overset{*}{=} 7500\ g = 7.5\ kg$

(8) 2. Place the following measures in increasing order: 2.5 ft 14 in 1.5 m 2 dm

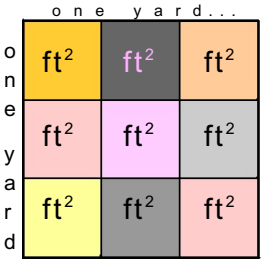
2 dm (Smallest) < 14 in < 2.5 ft < 1.5 m (Largest)

2.5 ft < 3 ft = 1 yd < 1 m < 1.5 m

14 in is close to 12 in = 1 ft < 2.5 ft

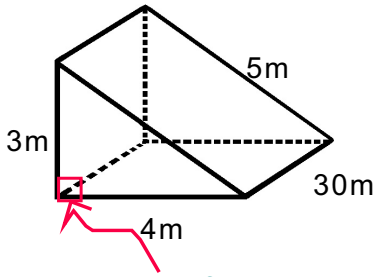
2 dm = .2 m < .3 m ...which is close to 1 ft, and 1 ft < 14 in

(3) 3a. Draw a sketch which illustrates the relationship between square yards and square feet.



Since 1 yd = 3ft, a square yd, being a square that's 1yd by 1yd, is a square that is 3ft by 3ft, and thus contains NINE ft^2, as SHOWN.

(9) 5. Find the SURFACE AREA of this right triangular prism, showing your work.



We know this from the 3-4-5 dimensions of the △

SA = Area of triangular ends + Area of rectangular lateral walls

= $2 \cdot \frac{1}{2} \cdot 4m \cdot 3m$ + $(3m + 4m + 5m) \cdot 30m$

= $12\ m^2$ + $12\ m \cdot 30\ m$

= $12\ m^2$ + $360\ m^2$

= $372\ m^2$

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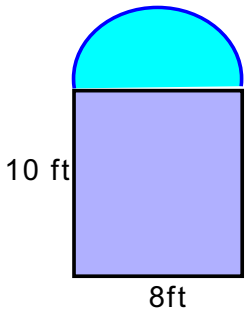
(8) 6. Find the AREA of the demilune* window pictured at right, showing your work.
*(the window is rectangular with a semicircular part at the top)



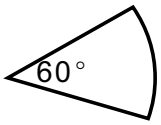
AREA = Area of the rectangular region + Area of the semicircular top

= 8 ft · 10 ft + (½) π (4 ft)^2

= 80 ft^2 + 8 π ft^2

= (80 + 8 π) ft^2

(4) 7. If the area in a circle is 600 square meters, then what area does a 60° sector of that circle contain?



A 60° sector contains **1/6** of the circle (since 60°/360° = 1/6) .

1/6 of 600 m^2 = 100 m^2

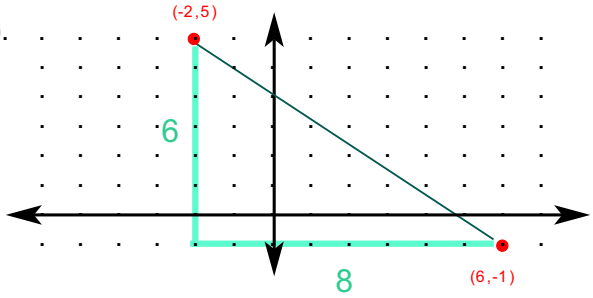
(5) 9. Write a formula which gives the VOLUME of a right circular cylinder with base radius r and height h.

Volume of any cylinder = (area of base) · height = π r^2 · h

What happens to the volume of a cylinder if the base radius is doubled and the height is cut in half?
[circle the LETTER of your selection] The new volume is().
A the same. B 1.5 times as great. (C) 2 times as great. D 2.5 times as great.
E 4 times as great. F 8 times as great. G actually smaller. E insufficient information

If dimensions change from r & h to 2r and h/2 then volume changes
from π r^2 h to π (2r)^2 (h/2) , which is 2 π r^2 h (twice the original volume).

(4) 11. Find the distance between the points (– 2,5) and (6,– 1).



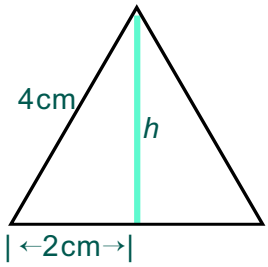
Using the theorem named for Pythagorus:

6^2 + 8^2 = D^2

D = 10

The distance is 10 units

(4) 12. Find the HEIGHT of an equilateral triangle whose sides are 4 cm long.



Using that Pythagorean theorem again:

h^2 + (2 cm)^2 = (4 cm)^2

h^2 + 4 cm^2 = 16 cm^2

h^2 = 12 cm^2

h = $\sqrt{12}$ cm or $2\sqrt{3}$ cm