(8) 1. Convert each of the following units, showing your work.
   a. \(2.05 \text{ m}^3 = \underline{\text{__________}} \text{ cm}^3\)
      \[2.05 \text{ m}^3 = 2.05 \cdot 100\cdot 100 \cdot 100 \text{ cm}^3 = 2050000 \text{ cm}^3\]
   b. \(7500 \text{ mL water (at } 4 \, ^\circ \text{C)} = \underline{\text{__________}} \text{ kg.}\)
      \[7500 \text{ mL} = 7500 \cdot 1 \text{ g}^* \cdot 1 \text{ kg} = 7.5 \text{ kg}\]
      (* this equivalence good only for substances which have the same density as water at \(4 \, ^\circ \text{C}\))
      or say \(7500 \text{ mL} = 7500 \text{ cm}^3 = 7500 \text{ g} = 7.5 \text{ kg}\)

(8) 2. Place the following measures in increasing order: \(2.5 \text{ ft} \quad 14 \text{ in} \quad 1.5 \text{ m} \quad 2 \text{ dm}\)
   \[2 \text{ dm} < 14 \text{ in} < 2.5 \text{ ft} < 1.5 \text{ m}\]
   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 = 3 ft, a square yd, being a square that's 1 yd by 1 yd, is a square that is 3 ft by 3 ft, and thus contains NINE ft^2, as SHOWN.

(9) 5. Find the surface area of this right triangular prism, showing your work.
   \[SA = \text{Area of triangular ends} + \text{Area of rectangular lateral walls}\]
   \[= 2 \cdot \frac{1}{2} \cdot 4 \text{m} \cdot 3 \text{m} + (3 \text{m} + 4 \text{m} + 5 \text{m}) \cdot 30 \text{m}\]
   \[= 12 \text{ m}^2 + 12 \text{ m} \cdot 30 \text{ m}\]
   \[= 12 \text{ m}^2 + 360 \text{ m}^2\]
   \[= 372 \text{ m}^2\]
6. Find the area of the demilune* window pictured at right, showing your work. 

\[
\text{Area} = \text{Area of the rectangular region} + \text{Area of the semicircular top}
\]

\[
= 8 \text{ ft} \cdot 10 \text{ ft} + \left(\frac{1}{2}\right) \pi (4 \text{ ft})^2
\]

\[
= 80 \text{ ft}^2 + 8 \pi \text{ ft}^2
\]

\[
= (80 + 8 \pi) \text{ ft}^2
\]

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 \(\frac{1}{6}\) of the circle (since \(\frac{60°}{360°} = \frac{1}{6}\)).

\[
\frac{1}{6} \text{ of } 600 \text{ m}^2 = 100 \text{ m}^2
\]

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

\[
\text{Volume of any cylinder} = (\text{area of base}) \cdot \text{height} = \pi r^2 \cdot h
\]

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] 

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 \(2r \& h/2\) then volume changes from \(\pi r^2 h\) to \(\pi (2r)^2 (h/2)\), which is 2 \(\pi r^2 h\) (twice the original volume).

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

12. Find the height of an equilateral triangle whose sides are 4 cm long.

Using that Pythagorean theorem again:

\[
h^2 + (2 \text{ cm})^2 = (4 \text{ cm})^2
\]

\[
h^2 + 4 \text{ cm}^2 = 16 \text{ cm}^2
\]

\[
h^2 = 12 \text{ cm}^2
\]

\[
h = \sqrt{12} \text{ cm} \text{ or } 2\sqrt{3} \text{ cm}
\]