

## CALCULATOR APPLICATIONS TIPS (OCTOBER 2020)

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1. Mark weighs 14% more than Adam and Adam weighs 7% more than Montel. Calculate what percent Mark's weight is more than Montel's.

$$1 = \underline{\hspace{2cm}} \%$$

Let M = Mark's weight, A = Adam's weight and  
P = Montel's weight

$$M = 1.14A \quad ; \quad A = 1.07P$$

Substituting for A in the first equation gives  
 $M = (1.14)(1.07)P$

$$100[(1.14)(1.07) - 1] = 22.0\%$$

2. An obtuse scalene triangle has area of 163284. If two of its sides are 511 and 811, find the measure of the angle formed by those two sides (angle is obtuse).

$$2 = \underline{\hspace{2cm}}$$

The area of a triangle is equal to one-half the product of Two sides and the sine of the included angle.

$$\text{Area} = (1/2)ab\text{Sin}C$$

$$163284 = (1/2)(511)(811)\text{Sin}C$$

$$\text{Sin}C = \frac{2(163284)}{(511)(811)}$$

$$C = \text{Sin}^{-1}\left(\frac{2(163284)}{(511)(811)}\right) = 52.0^\circ \quad ; \quad \text{Since the angle is obtuse,}$$

Find the supplement of  $52.0^\circ$ .

Answer:  $128^\circ$

3. A sphere is inscribed in a cube whose edge is 322. Find the ratio of the volume of the cube to the volume of the sphere.

$$3 = \underline{\hspace{2cm}}$$

Let  $R$  = radius of the circle which means its diameter is  $2R$ .  
 $2R$  = edge of the cube.

$$\frac{\text{VolumeOfCube}}{\text{VolumeOfSphere}} = \frac{(2R)^3}{\frac{4}{3}\pi R^3} = \frac{8R^3}{\frac{4}{3}\pi R^3} = 6\left(\frac{R^3}{\pi R^3}\right) = \frac{6}{\pi}$$

$$6/\pi = 1.91$$

4. A right circular cylindrical tank holds 5,000 gallons. If the height and diameter of the tank are equal, calculate the circumference of the tank.

$$4 = \underline{\hspace{2cm}} \text{ in}$$

$$1 \text{ gallon} = 231 \text{ cubic inches}$$

$$\text{Volume} = \pi(\text{radius})^2(\text{height})$$

Let  $R$  = radius

$$5000(231) = \pi(R)^2(2R)$$

$$2\pi R^3 = 5000(231) \quad ; \quad R^3 = \frac{5000(231)}{2\pi} \quad ; \quad R = \sqrt[3]{\frac{5000(231)}{2\pi}}$$

$$\text{Circumference} = 2\pi(\text{radius}) = 2\pi \sqrt[3]{\frac{5000(231)}{2\pi}} = 357$$

Answer: 357

5. Find the area of a regular decagon whose side has length  $3\pi$ .

$$5 = \underline{\hspace{10em}}$$

$$\text{Area} = \frac{n \text{side}^2}{4 \tan\left(\frac{180}{n}\right)} = \frac{10(3\pi)^2}{4 \tan\left(\frac{180}{10}\right)} = 683 \ ;$$

Answer : 683