

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 2

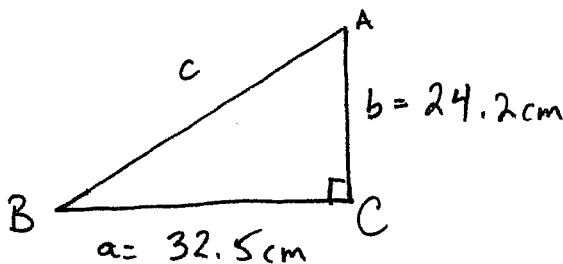
Question 1. (4 marks) The weight of gold is 1206 pounds per cubic foot ($1206 \text{ lb} / \text{ft}^3$).

(a) Convert this weight to kg per cubic cm.

(b) Convert this weight to pounds per cubic inch.

$$\begin{aligned} \text{a) } 1206 \frac{\text{lb}}{\text{ft}^3} &= 1206 \frac{\text{lb}}{\text{ft}^3} \cdot \left(\frac{1 \text{ ft}}{30.5 \text{ cm}} \right)^3 \cdot \left(\frac{1 \text{ kg}}{2.2046} \right) \\ &= 0.01932 \text{ kg} / \text{cm}^3 \end{aligned}$$

$$\text{b) } 1206 \frac{\text{lb}}{\text{ft}^3} = 1206 \frac{\text{lb}}{\text{ft}^3} \cdot \left(\frac{1 \text{ ft}}{12 \text{ in}} \right)^3 = 0.6979$$

Question 2. (4 marks) Solve the right triangle with sides $a = 32.5 \text{ cm}$ and $b = 24.2 \text{ cm}$ (c is the hypotenuse).

$$c^2 = 24.2^2 + 32.5^2$$

$$c = \sqrt{24.2^2 + 32.5^2}$$

$$\underline{c = 40.5 \text{ cm}}$$

$$\tan A = \frac{32.5}{24.2} \Rightarrow A = \tan^{-1} \left(\frac{32.5}{24.2} \right)$$

$$\underline{A = 53.3^\circ}$$

$$C = 90^\circ$$

$$\tan B = \frac{24.2}{32.5} \Rightarrow B = \tan^{-1} \left(\frac{24.2}{32.5} \right)$$

$$\underline{B = 36.7^\circ}$$

Question 3. (4 marks) Evaluate the following without a calculator:

(a) $\tan 60^\circ$

$$= \frac{\sin 60^\circ}{\cos 60^\circ} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$$

(b) $\csc(\pi/4)$

$$\frac{\pi}{4} = \frac{\pi}{4} \left(\frac{180^\circ}{\pi} \right) = 45^\circ \quad \therefore \csc\left(\frac{\pi}{4}\right) = \csc 45^\circ$$

$$= \frac{1}{\sin 45^\circ} = \frac{1}{\frac{\sqrt{2}}{2}} = \frac{2}{\sqrt{2}}$$

Question 4. (6 marks) Find θ given (use the correct number of significant figures):

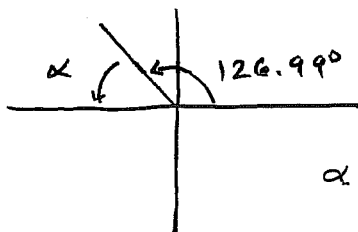
(a) $\sec \theta = -1.662$ and $0^\circ \leq \theta < 360^\circ$.

$$\sec \theta = -1.662$$

$$\frac{1}{\cos \theta} = -1.662$$

$$\therefore \cos \theta = -\frac{1}{1.662}$$

$$\cos^{-1}\left(-\frac{1}{1.662}\right) = 126.99^\circ$$

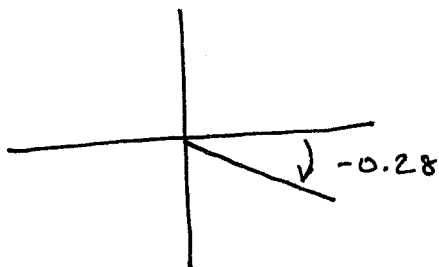


$$\alpha = 180^\circ - 126.99^\circ$$

$$= 53.01^\circ$$

(b) $\tan \theta = -0.29$, $\sin \theta > 0$ and $0 \leq \theta < 2\pi$.

$$\tan^{-1}(-0.29) = -0.28$$



$$\therefore \alpha = -0.28$$

$\tan \theta < 0$ AND $\sin \theta > 0$

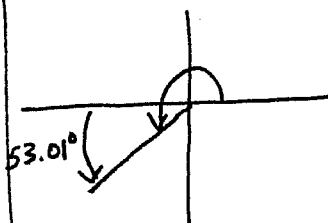
$\therefore \theta$ IS IN

QUADRANT II

$\sec \theta < 0 \Rightarrow \theta$ IS IN QUADRANT II OR III

IN II: $\theta = 126.99$.

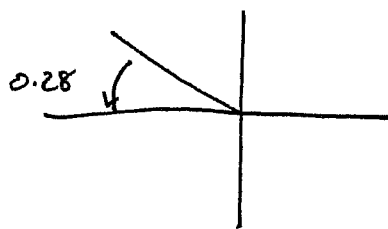
IN III



$$\theta = 180^\circ + 53.01^\circ$$

$$= 233.01^\circ$$

$$\therefore \theta = 126.99 \text{ OR } 233.01^\circ$$



$$\therefore \theta = \pi - 0.28$$

$$= 2.9$$