

Trigonometry Module Test A4**Time: 60 Minutes****30****Name:** _____

- 1) Express the angle $\frac{9\pi}{20}$ in terms of degrees. (2 marks)

$$\frac{9\pi}{20} \text{ rad} \times \frac{180^\circ}{\pi \text{ rad}} = \frac{9}{20} \times \frac{180^\circ}{1} = 81^\circ$$

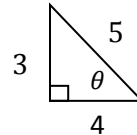
- 2) Express 324° in radian measure as a reduced fraction containing π . (2 marks)

$$324^\circ \times \frac{\pi \text{ rad}}{180^\circ} = \frac{324}{180} \pi \text{ rad} = \frac{108}{60} \pi \text{ rad} = \frac{9}{5} \pi \text{ rad}$$

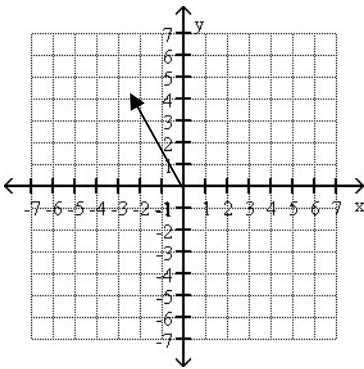
- 3) If $\sin(\theta) = \frac{3}{5}$ find $\tan(\theta)$ for an angle θ in the first quadrant. (2 marks)

$$\theta = \sin^{-1}\left(\frac{3}{5}\right) = 36.87^\circ$$

$$\tan(36.87^\circ) = 0.75 \left(= \frac{3}{4} \right)$$



- 4) If θ is defined by a terminal arm ending at the point $(-2.5, 4.2)$, determine the angle for $0^\circ \leq \theta \leq 360^\circ$ in standard position and then determine $\cos(\theta)$. (2 marks)



$\theta = \tan^{-1}\left(\frac{4.2}{-2.5}\right) = 59.23728047^\circ$ gives us the angle between the positive x-axis and the arm, in standard position our angle will be

$$\theta = 180^\circ - 59.23728047^\circ = 120.7627195^\circ$$

$$\text{Now, } \cos(120.7627195^\circ) = -0.51148 = -0.51$$

- 5) If $\sin(\theta) = 0.45$, find angle θ for $0^\circ \leq \theta \leq 360^\circ$ given $\cos(\theta) < 0$. (2 marks)

$\theta_{ref} = \sin^{-1}(0.45) = 26.74368295^\circ$. Our first answer does not have $\cos(\theta) < 0$. By CAST, the second answer would be in the second quadrant as $\theta_2 = 180^\circ - 26.74368295^\circ = 153.256316^\circ$. Since $\cos(\theta) < 0$ in the second quadrant, this is our answer:

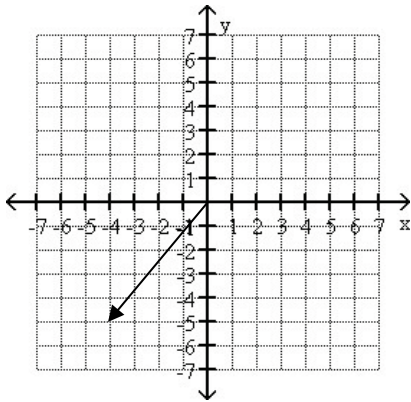
$$\theta = 153.26^\circ$$

- 6) Find both θ for $0^\circ \leq \theta \leq 360^\circ$ given $\cos(\theta) = 0.85$. (2 marks)

$\theta_1 = \cos^{-1}(0.85) = 31.78833^\circ$ (By Calc). The second answer is found by CAST as

$$\theta_2 = 360^\circ - 31.78833^\circ = 328.21^\circ$$

7) State both the positive and negative angles in standard position for the following terminal arm. (2 marks)



$$\theta_{ref} = \tan^{-1}\left(\frac{5}{4}\right) = 51.3402^\circ \text{ and in standard position}$$

$$\theta = 180^\circ + 51.3402^\circ = 231.3402^\circ = 231.3^\circ$$

The same angle as a negative angle is

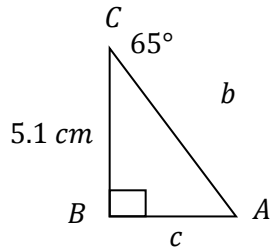
$$\theta = 231.3^\circ - 360^\circ = -128.7^\circ$$

8) Use the following information to draw a right angled triangle and solve for the desired missing side c . (2 marks)

$$\angle B = 90^\circ$$

$$\angle C = 65^\circ$$

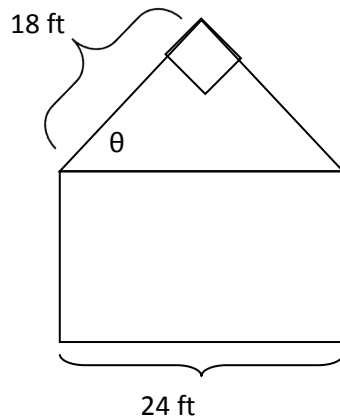
$$a = 5.1 \text{ cm}$$



$$\tan(65^\circ) = \frac{c}{5.1}$$

$$c = 5.1 \tan(65^\circ) = 10.93698529 = 10.94 \text{ cm}$$

9) Find θ in the following diagram: (2 marks)



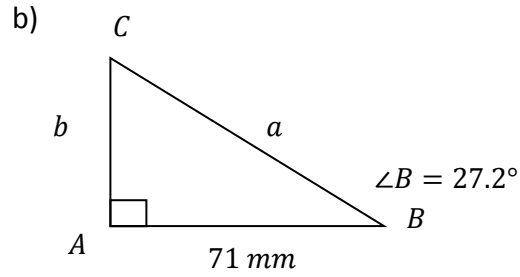
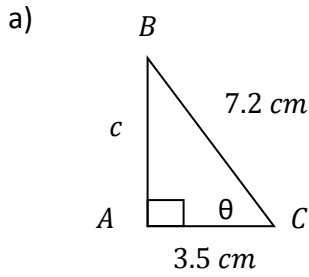
$$\theta = \cos^{-1}\left(\frac{18}{24}\right) = 41.41^\circ$$

10) Use your calculator to find: (2 marks)

a) $\tan(13^\circ) = 0.230868$

b) $\sin(5) = -0.958924274$ (note angle is in rads since no degrees symbol)

11) Solve the following triangles for all missing sides and angles. (3 marks each)



$$\cos(\theta) = \frac{3.5}{7.2}$$

$$\angle C = \cos^{-1}\left(\frac{3.5}{7.2}\right) = 60.915^\circ$$

$$\angle B = 90^\circ - 60.9^\circ = 29.1^\circ$$

$$c = \sqrt{7.2^2 - 3.5^2} = 6.29 \text{ cm}$$

$$\tan(27.2^\circ) = \frac{b}{71} \rightarrow b = 71 \tan(27.2^\circ) = 36.5 \text{ mm}$$

$$\angle C = 90^\circ - 27.2^\circ = 62.8^\circ$$

$$a = \sqrt{71^2 + 36.5^2} = 79.83 \text{ mm}$$

12) Complete the table of values and graph for $y = 3 \sin(\theta)$ for $-2\pi \leq \theta \leq 2\pi$. (4 marks)

θ	-2π	$-\frac{7\pi}{4}$	$-\frac{3\pi}{2}$	$-\frac{5\pi}{4}$	$-\pi$	$-\frac{3\pi}{4}$	$-\frac{\pi}{2}$	$-\frac{\pi}{4}$	0	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{3\pi}{4}$	π	$\frac{5\pi}{4}$	$\frac{3\pi}{2}$	$\frac{7\pi}{4}$	2π
$3 \sin(\theta)$	0	2.6	3	2.6	0	-2.6	-3	-2.6	0	2.6	3	2.6	0	-2.6	-3	-2.6	0

