Trigonometry Module Test A1 _____ **Name: SOLUTIONS**
Time: 60 Minutes **30**

1) Express the angle $\frac{17\pi}{18}$ in terms of degrees. (2 marks)

$\frac{17\pi}{18} rad \times \frac{180°}{\pi\, rad} = \frac{17}{18} \times \frac{180°}{1} = 170°$

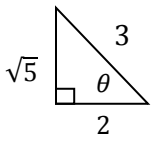
2) Express 252° in radian measure as a reduced fraction containing π. (2 marks)

$252° \times \frac{\pi\, rad}{180°} = \frac{252}{180}\pi\, rad = \frac{126}{90}\pi\, rad = \frac{63}{45}\pi\, rad = \frac{21}{15}\pi\, rad = \frac{7}{5}\pi\, rad$

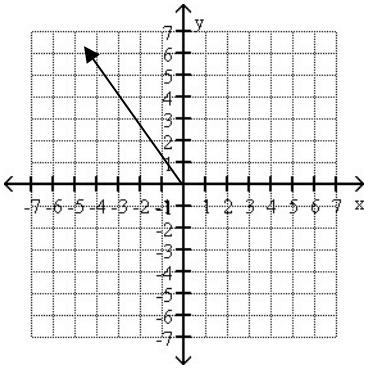
3) If $\cos(\theta) = \frac{2}{3}$ find $\tan(\theta)$ for an angle θ in the first quadrant. (2 marks)

$\theta = \cos^{-1}\left(\frac{2}{3}\right) = 48.1896851°$

$\tan(48.1896851°) = 1.118033989 = 1.118\left(= \frac{\sqrt{5}}{2}\right)$



4) If θ is defined by a terminal arm ending at the point $(-4.5, 6.3)$, determine the angle for $0° \le \theta \le 360°$ in standard position and then determine $\sin(\theta)$. (2 marks)



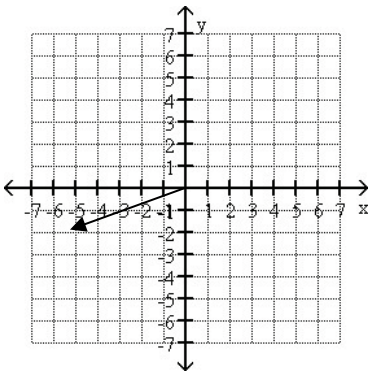
$\theta = \tan^{-1}\left(\frac{6.3}{4.5}\right) = 54.46232221°$ gives us the angle between the negative x-axis and the arm, in standard position our angle will be
$\theta = 180° - 54.46232221° = 125.538°$
Now, $\sin(125.538°) = 0.813733471 = 0.814$

5) If $\sin(\theta) = 0.3$, find angle θ for $0° \le \theta \le 360°$ given $\cos(\theta) < 0$. (2 marks)

$\theta_{ref} = \sin^{-1}(0.3) = 17.45760312°$. Our first answer does not have $\cos(\theta) < 0$. By CAST, the second answer would be in the second quadrant as $\theta_2 = 180° - 17.45760312° = 162.5423969°$. Since $\cos(\theta) < 0$ in the second quadrant, this is our answer:
$\theta = 162.5423969°$

6) Find θ for $0° \le \theta \le 360°$ given $\tan(\theta) = 3.033$. (2 marks)
$\theta_1 = \tan^{-1}(3.033) = 71.752°$ (By Calc). The second answer is found by CAST as
$\theta_2 = 180° + 71.752° = 251.752°$

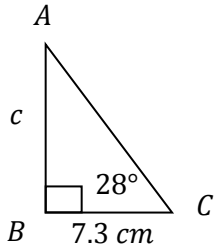
7) State both the positive and negative angles in standard position for the following terminal arm. (2 marks)



$\theta = \tan^{-1}\left(\frac{2}{5}\right) = 21.80140949°$ and in standard position
$\theta = 180° + 21.801° = 201.801°$
The same angle as a negative is
$\theta = 201.801° - 360° = -158.199°$

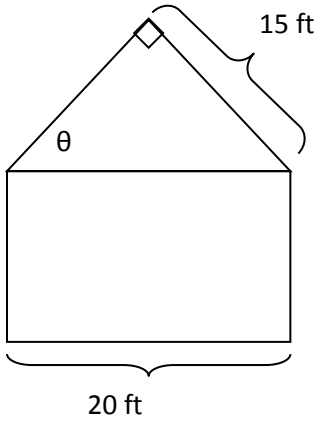
8) Use the following information to draw a right angled triangle and solve for the desired missing side c. (2 marks)

$\angle B = 90°$
$\angle C = 28°$
$a = 7.3\ cm$



$\tan(28°) = \frac{c}{7.3}$
$c = 7.3\tan(28°) = 3.881478851 = 3.88\ cm$

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



$\theta = \sin^{-1}\left(\frac{15}{20}\right) = 48.590°$

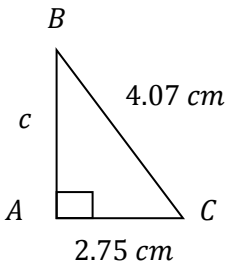
10) Use your calculator to find: (2 marks)

a) $\cos(223°) = -0.731353702$

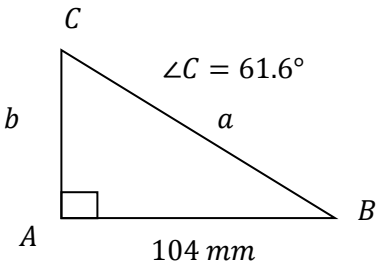
b) $\tan(3.5) = 0.375$ (note angle is in rads since no degrees symbol)

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

a)



b)



$c = \sqrt{4.07^2 - 2.75^2} = 3.00\ cm$

$\angle C = \cos^{-1}\left(\frac{2.75}{4.07}\right) = 47.49°$

$\angle B = 90° - 47.49° = 42.51°$

$\tan(61.6°) = \frac{104}{b}$

$b = \frac{104}{\tan(61.6°)} = 56.232\ mm$

$\angle B = 90° - 61.6° = 28.4°$

$a = \sqrt{104^2 + 56.272^2} = 118.248\ mm$

12) Complete the table of values and graph for $y = -2\sin(\theta)$ 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
$-2\sin(\theta)$	0	−1.4	−2	−1.4	0	1.4	2	1.4	0	−1.4	−2	−1.4	0	1.4	2	1.4	0