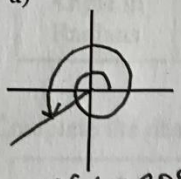
Pre-Calculus Math 12
Unit 5 - Review

Name _____

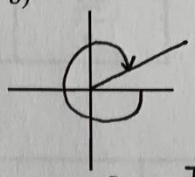
1. Determine the following rotational angles.

a)



ref ∠ = 20°

b)



ref ∠ = π/12

2. Draw the following rotational angles in standard position. Then, state the quadrant the terminal arm is in and the reference angle.

a) 107^o b) -403^o c) $\frac{5\pi}{4}$

3. Name two angles that are co-terminal with 37^o and with $\frac{\pi}{8}$.

4. An angle, A, in standard position has a terminal arm that goes through (-2, -5). Find all six trigonometric ratios for angle A.

5. If $\cos A = -\frac{5}{13}$, and $\cot A$ is positive, find a ratio for $\csc A$ as an exact value.

6. Find the measure(s) of θ to the nearest degree if $0^o \le \theta \le 360^o$.

(Be sure to find your reference angle and the quadrant)

a) $\cos\theta = 0.8219$ b) $\csc\theta = -1.0138$ c) $\tan^2\theta = 3$

7. Convert the following to the other measure (degrees or radians)

Angle in Degrees	225	130		
Angle in Radians			$\frac{\pi}{8}$	$\frac{5\pi}{6}$

8. Complete the chart, using exact values.

Angle (degrees)	Angle (radians)	sin	cos	tan
0				
30				
45				
60				
90				

9. Find the exact value of the following angles.

a) $\sin 135^{o}$ b) $\tan\frac{-7\pi}{6}$ c) $\sec^{2}\frac{2\pi}{3}$

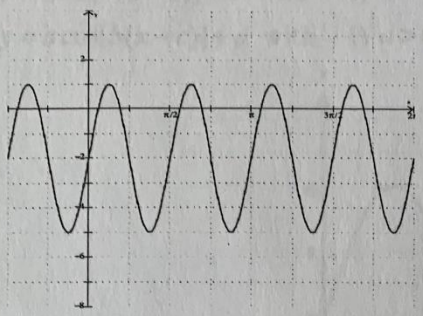
10. Determine the measure of angle A, when $0 \le A \le 2\pi$.

(Be sure to find your reference angle and the quadrant)

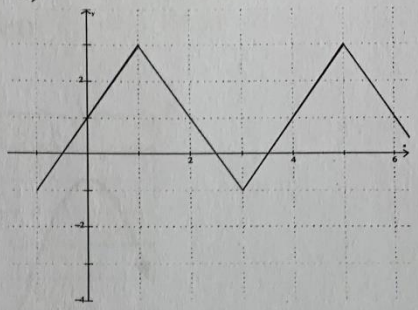
a) $\sin A = \frac{1}{\sqrt{2}}$ b) $\sec A + 2 = 0$ c) $3\tan^{2} A = 1$

11. For each of the following determine the period and the amplitude.

a)



b)



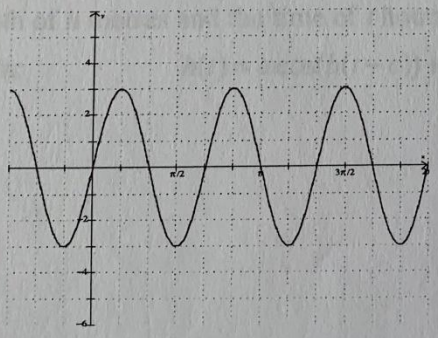
12. For each of the following state the period, the amplitude, horizontal phase shift and the vertical displacement.

a) $y=\frac{1}{2}\sin 2x$ b) $y=-5\cos\left(\frac{1}{3}\left(x-\frac{\pi}{4}\right)\right)+3$ c) $y=\sin\left(3x-\frac{\pi}{6}\right)+\frac{\pi}{3}$.

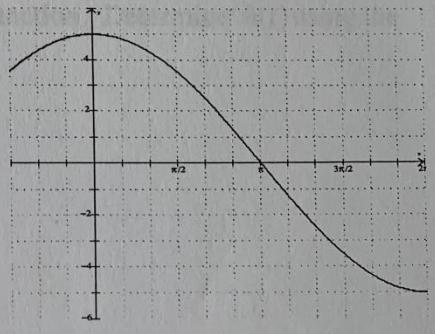
13. For each of the following, write the equation of the trigonometric function.

a) A sine function with amplitude of 3, a reflection on the x-axis and a period of 3π.

b) $y=a\cos b(x-c)$



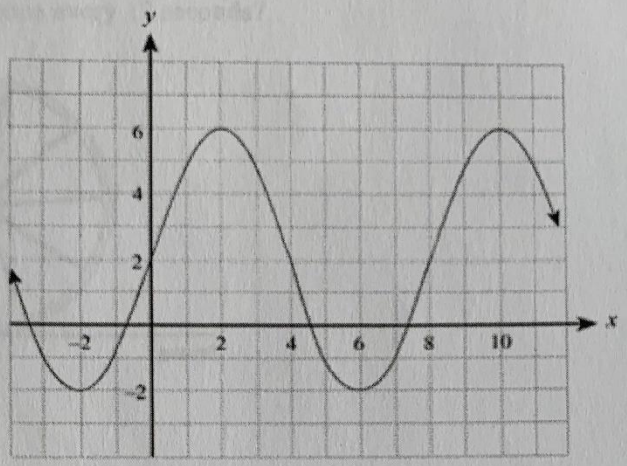
c) $y=a\sin b(x-c)$, $a<0$



14. Assuming a minimum possible phase shift, write the equation of the graph in the form

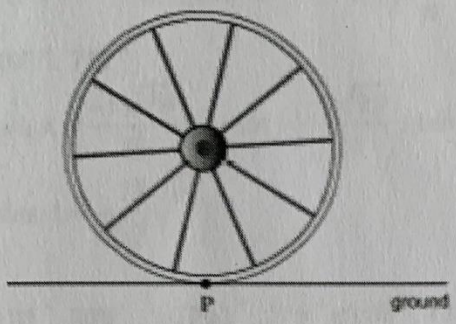
a) $y = a\sin[b(x-c)]+d$ with i) $a>0$ ii) $a<0$

b) $y = a\cos[b(x-c)]+d$ with i) $a>0$ ii) $a<0$



15. At a seaport, the water has a maximum depth of 18 m at 3 am. After this maximum depth, the first minimum depth of 4 m occurs at 9:30 am. Assume that the relation between the depth of h metres and the time of t hours, is a sinusoidal function. Determine $h(t)$ using the form: $h(t) = a\cos(b(t-c))+d$.

16. A wheel with diameter 10 cm is rolling along the ground. Point P on the edge of the wheel is on the ground as shown at $t = 0$ seconds. Write the equation in the form $h(t) = a\sin(b(t-c)) + d$ which gives the height, h, of point P above the ground at time, t, if the wheel rotates once every 12 seconds?



17. A ferris wheel has a radius of 26 m and its centre is 29 m above the ground. It rotates once every 48 seconds. Sandy gets on the Ferris wheel at its lowest point, and then the wheel starts to rotate.
    a) Determine the sinusoidal equation of the form $h(t) = a\cos(b(t+c)) + d$ that gives Sandy's height h in metres above the ground as a function of the elapsed time t in seconds.
    b) Determine the first time (in seconds) when Sandy will be 36 m above the ground.

Answer Key

1a) 560° b) $-\frac{23\pi}{12}$

2a) QII, 73° b) QIV, 43° c) QIII, $\frac{\pi}{4}$

3. $397^\circ, 757^\circ$

4. $\sin A = \frac{-5\sqrt{29}}{29}$, $\cos A = \frac{-2\sqrt{29}}{29}$, $\tan A = \frac{5}{2}$, $\csc A = -\frac{\sqrt{29}}{5}$, $\sec A = -\frac{\sqrt{29}}{2}$, $\cot A = \frac{2}{5}$

5. $\csc A = -\frac{13}{12}$

6a) $35^\circ, 325^\circ$ b) $261^\circ, 279^\circ$ c) $60^\circ, 120^\circ, 240^\circ, 300^\circ$

7. $\frac{5\pi}{4}, \frac{13\pi}{18}, 22.5^\circ, 150^\circ$

8. See page 536 of your workbook

9a) $\frac{\sqrt{2}}{2}$ b) $-\frac{\sqrt{3}}{3}$ c) 4

10a) $\frac{\pi}{4}, \frac{3\pi}{4}$ b) $\frac{2\pi}{3}, \frac{4\pi}{3}$ c) $\frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

11a) period = $\frac{\pi}{2}$, amplitude = 3 b) period = 4, amplitude = 2

12a) period = π
amplitude = $\frac{1}{2}$

b) period = 6π
amplitude = 5
HPS = $\frac{\pi}{4}$ right
VD = 3 units up

c) period = $\frac{2\pi}{3}$
amplitude = 1
HPS = $\frac{\pi}{18}$ right
VD = $\frac{\pi}{3}$ units up

13a) $y = -3\sin\left(\frac{2}{3}x\right)$ b) $y = 3\cos\left(3(x - \frac{\pi}{6})\right)$ c) $y = -5\sin\left(\frac{1}{2}(x - \pi)\right)$

14a) i) $y = 4\sin\left(\frac{\pi}{4}x\right) + 2$ ii) $y = -4\sin\left(\frac{\pi}{4}(x \pm 4)\right) + 2$

14b) i) $y = 4\cos\left(\frac{\pi}{4}(x-2)\right) + 2$ ii) $y = -4\cos\left(\frac{\pi}{4}(x+2)\right) + 2$

15. $h(t) = 7\cos\left(\frac{2\pi}{13}(t-3)\right) + 11$ 16. $h(t) = 5\sin\left(\frac{\pi}{6}(t-3)\right) + 5$

17a) $h(t) = 26\cos\left(\frac{\pi}{24}(t-24)\right) + 29$ or $h(t) = -26\cos\left(\frac{\pi}{24}t\right) + 29$ b) 14.1 seconds