TOPIC A: EVALUATING TRIG FUNCTIONS

1. Given sec $\theta = -\frac{6}{5}$ and the angle exists in quadrant III. find the exact value of Cos θ.

2. If angle α has a terminal ray that falls in the fourth quadrant and cos $\alpha = \frac{5}{9}$, then determine the value of sin α in simplest radical form.

3. An angle of 50 degrees intersects the unit circle at the point (0.64, 0.77). What is the value of Sec $(50\degree)$?

4. A circle centered at the origin has a radius of 10 units. The terminal side of an angle, θ, intercepts the circle in Quadrant II at point C. The y-coordinate of point C is 8. What is the value of cos θ?

    (1) $-\frac{3}{5}$ (2) $-\frac{3}{4}$ (3) $\frac{3}{5}$ (4) $\frac{4}{5}$

5. The terminal side of θ, an angle in standard position, intersects the unit circle at P($-\frac{1}{3}$, $-\frac{\sqrt{8}}{3}$). What is the value of sec θ?

    (1) -3   (2) $-\frac{3\sqrt{8}}{8}$ (3) $-\frac{1}{3}$ (4) $-\frac{\sqrt{8}}{3}$

TOPIC B: GRAPHING TRIG FUNCTIONS

1. Which statement regarding the graphs of the functions below is *untrue*?

$f(x) = 3 \sin 2x$, from $-\pi < x < \pi$ $\qquad$ $h(x) = \log_2 x$

$g(x) = (x - 0.5)(x + 4)(x - 2)$ $\qquad$ $j(x) = -|4x - 2| + 3$

(1) $f(x)$ and $j(x)$ have a maximum y-value of 3.

(2) $f(x)$, $h(x)$, and $j(x)$ have one y-intercept.

(3) $g(x)$ and $j(x)$ have the same end behavior as $x \to -\infty$.

(4) $g(x)$, $h(x)$, and $j(x)$ have rational zeros.

2. What is the range of the function $y = 5 \cos \frac{2}{3}x + 1$
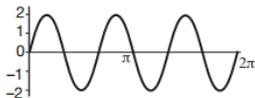
3. An oscillatory movement is expressed by the equation: $f(t) = 160 \sin (500\pi t - 100)$. Find the:

(a) Frequency: _____ (b) Period: _____

(c) Minimum: _____ (d) Phase Shift:: _____

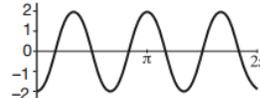4. Which graph represents a cosine function with no horizontal shift, an amplitude of 2, and a period of $\frac{2\pi}{3}$?
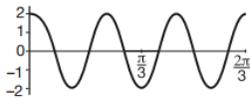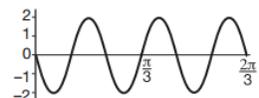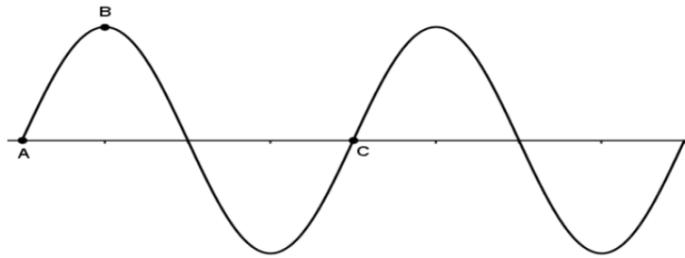

(1) $\qquad$ (2) $\qquad$ (3) $\qquad$ (4)

5. The graph of the cosine and sine functions are waveforms like the figure below. By correctly labelling the coordinates of points A, B, and C you will get the graph of the function given. Given y = 3 Cos 2x and B = (0, 3), find the coordinates of A and C.

2. Many factors influence the deer population in a given habitat: climate, hunting, predators, etc. The following graph shows the evolution of a population of deer as a function of time. Write the rule that can be used to represent this function.
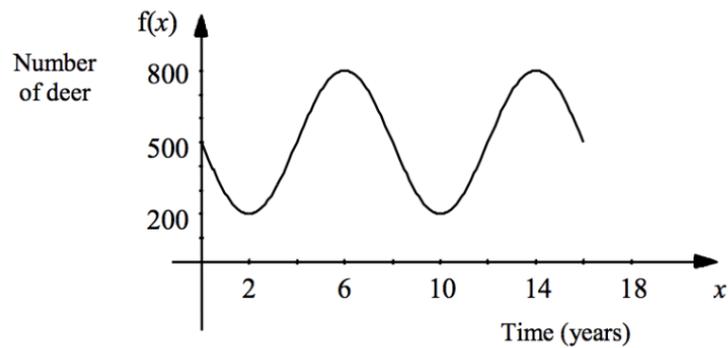
TOPIC C: REAL WORLD TRIG MODELLING

1. The function $f(x) = 2^{-0.25x} \cdot \sin(\frac{\pi}{2}x)$ represents a damped sound wave function. What is the average rate of change for this function on the interval [- 7,7], to the nearest hundredth?

    (1) - 3.66   (2) - 0.30   (3) - 0.26   (4) 3.36

2. A kayaker is drifting on the Atlantic. The ocean is relatively calm and the movements of the waves can be represented by the equation below, where t represents the time in seconds and h(t) represents the height in meters.

$$h(t) = 2\sin\frac{2\pi}{9}\left(t - \frac{\pi}{3}\right)$$

In one minute, how many times did the kayaker reach the top of the wave?

    (a) 14 times   (b) 9 times   (c) 7 times   (d) 6 times

3. Hyun Woo is riding a ferris wheel. H(t) models his height (in m) above the ground, t seconds after the ride starts. Here, t is entered in radians, is the equation $H(t) = -10\cos\left(\frac{2\pi}{150}t\right) + 10$. When does Hyun Woo first reach a height of 16 m?

4. A variable star is one whose brightness alternately increases and decreases. For the variable star Nittany Minor, the time between periods of maximum brightness is 5.4 days. The average brightness of the star is 4.0, and its brightness varies by a magnitude of 0.35.

(a.) If Champion Major is at its brightest at t = 0, find a function that models the brightness as a function of time.

(b.) At what point will the star be at its dimmest? What is its magnitude?

(c.) What is the magnitude of brightness after 2 weeks?