

NAME: _____ STUDENT #: _____

Question 1

A particle makes 15 rotations around a unit circle in minute.

- (a) What is the period (T)? _____
- (b) What is the equation of the sine function, $f(t)$ for this particle? _____
- (c) Sketch the graph of the sine function, $f(t)$ for this particle. Clearly label your axis.



A second particle lags the first one by $1/2$ second.

- (d) What is the equation for the sine function, $g(t)$ for the second particle? _____
- (e) What is the phase angle shift for the second particle? _____
- (f) Sketch the graph for the sine function $g(t)$ on the same graph above. Label the graphs as $f(t)$ and $g(t)$.

Question 2

Determine the indicated quantities. Include units.

(a) If $f = 200$ Hz, find $\omega =$ _____ and $T =$ _____

(b) If $T = 50$ ms, find $\omega =$ _____ and $f =$ _____

(c) If $V = 80 \sin(120\pi t + \pi/6)$, find $T =$ _____ and $V_{RMS} =$ _____

(d) If $I = 2.4 \sin(60\pi t) + 1.2$, find $T =$ _____ and $I_{RMS} =$ _____

(e) If $I = 2.4 \sin(60\pi t) + 1.2$, and $t = 20ms$ find the current $I =$ _____

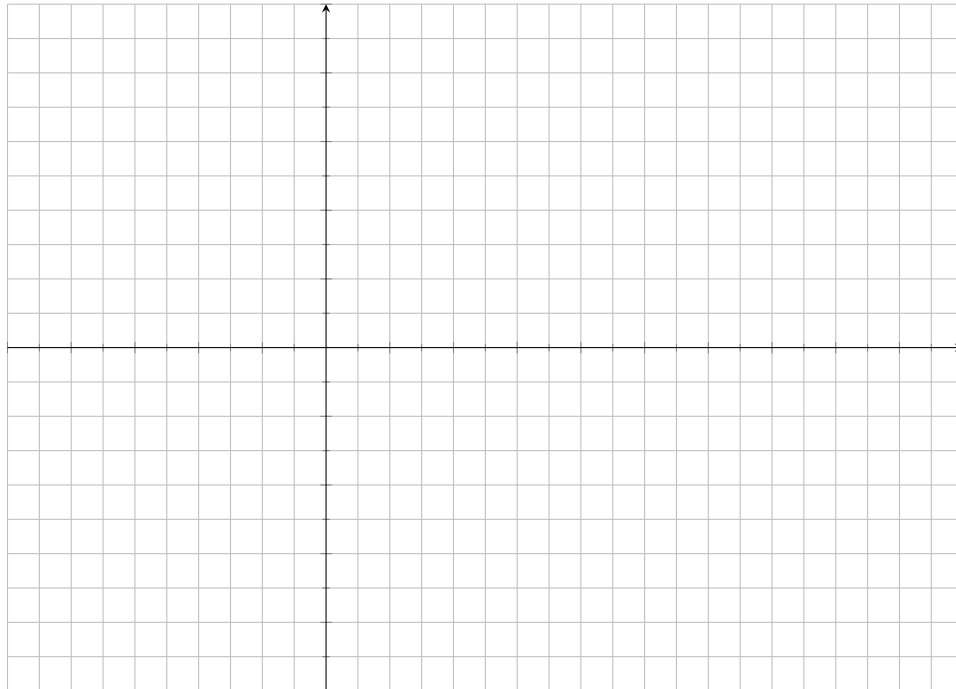
Question 3

Given the function, $f(t) = 3 \sin\left(\frac{\pi}{6}t + \frac{\pi}{2}\right)$

(a) What is the phase shift? $\phi =$ _____

(b) What is the time shift? $t_\phi =$ _____

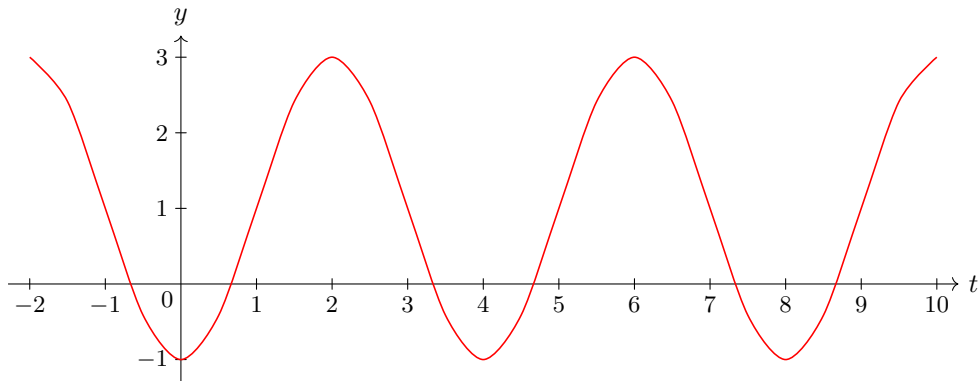
(c) Sketch one cycle of the graph of $f(t)$.



(d) On the same graph, sketch one cycle of the function $g(t) = 3 \sin\left(\frac{\pi}{6}t + \frac{\pi}{2}\right) - 1$

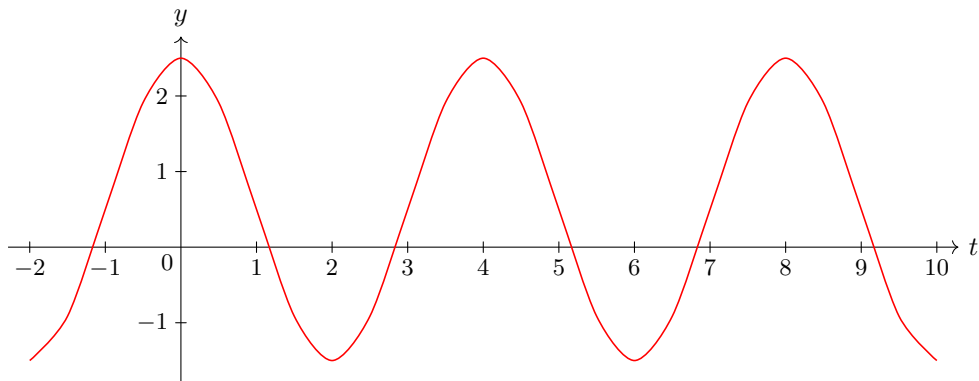
Question 4

Find the equations of the following functions as $y = A \sin(\omega t + \varphi) + B$: _____



Question 5

Find the equations of the following functions as $y = A \cos(\omega t + \varphi) + B$: _____



Question 6

For the ac current wave, $i = 2.0 \sin(100\pi t)$, find the two values of t in the first cycle when $i = -1.0$ A.
 $t_1 =$ _____, $t_2 =$ _____

Question 7

Given the series circuit below with $R_1 = 450\Omega$, $R_2 = 1.0k\Omega$, $R_3 = 1.2k\Omega$ and (RMS) source voltage $V = 120V$, determine:

- (a) The current I_{RMS} and the voltage drops across each resistor (RMS).
- (b) The power dissipated by each resistor and the total power.

