

Review for Test

Writing Trig Equations + Sinusoidal Functions

1. $y = -2 \sin 3(x - \frac{2\pi}{9})$

amp = 2

period = $\frac{2\pi}{3}$

ps = $\frac{2\pi}{9}$

domain = $[\frac{2\pi}{9}, \frac{8\pi}{9}]$

$\frac{2\pi}{9} + \frac{2\pi}{3} = \frac{2\pi}{9} + \frac{6\pi}{9} = \frac{8\pi}{9}$

range = $[-2, 2]$

2. $y = 3 \cos 5(x + \frac{\pi}{20})$

amp = 3

period = $\frac{2\pi}{5}$

ps = $-\frac{\pi}{20}$

domain = $[-\frac{\pi}{20}, \frac{7\pi}{20}]$

$-\frac{\pi}{20} + \frac{2\pi}{5} = -\frac{\pi}{20} + \frac{8\pi}{20} = \frac{7\pi}{20}$

range = $[-3, 3]$

3. amp = $4 - 1 = 3$

period = 120°

ps = none

domain = $[0, 120^\circ]$

range = $[-2, 4]$

4. $y = a \cos b(\theta - c) + d$ (same graph as #3) $b = \frac{360^\circ}{120^\circ} = 3$

$y = 3 \cos 3(\theta) + 1$

$y = -3 \cos 3(\theta - 60^\circ) + 1$

$y = 3 \cos 3(\theta - 120^\circ) + 1$

$y = -3 \sin 3(\theta - 30^\circ) + 1$

$y = 3 \sin 3(\theta - 90^\circ) + 1$

} Answers will vary

5. $y = a \sin b(x-c) + d$

$y = -11 \sin \frac{3}{2}(x) + 6$

$y = 11 \sin \frac{3}{2}(x - \frac{2\pi}{3}) + 6$

$y = -11 \sin \frac{3}{2}(x - \frac{4\pi}{3}) + 6$

$y = -11 \cos \frac{3}{2}(x - \frac{\pi}{3}) + 6$

$y = 11 \cos \frac{3}{2}(x - \pi) + 6$

$y = -11 \cos \frac{3}{2}(x - \frac{5\pi}{3}) + 6$

$\text{Amp} = \frac{17-5}{2} = \frac{22}{2} = 11$

$\text{VS} = \frac{17+5}{2} = \frac{12}{2} = 6$

$\text{Period} = \frac{5\pi}{3} - \frac{\pi}{3} = \frac{4\pi}{3}$

$b = \frac{2\pi}{4\pi/3} = 2\pi \cdot \frac{3}{4\pi} = \frac{3}{2}$

6. $y = a \cos b(\theta-c) + d$

$b = \frac{360^\circ}{90^\circ} = 4$

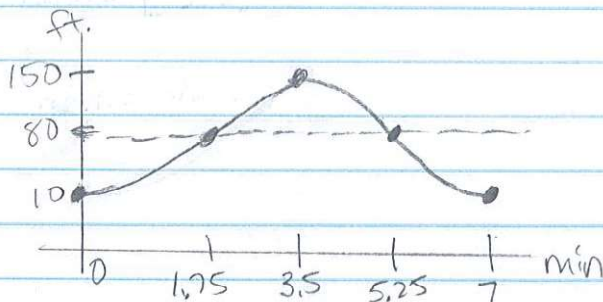
$y = -3 \cos 4(\theta - 60^\circ)$

7. $y = a \sin b(\theta-c) + d$

$b = \frac{360^\circ}{60^\circ} = 6$

$y = \frac{1}{3} \sin 6(\theta + 30^\circ) - 2$

8.



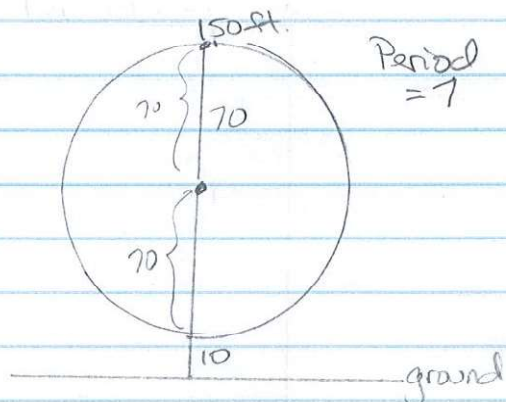
a.

$\text{amp} = \frac{150-10}{2} = \frac{140}{2} = 70$

$\text{period} = 7 \quad b = \frac{2\pi}{7}$

$\text{VS} = \frac{150+10}{2} = \frac{160}{2} = 80$

$y = -70 \cos \frac{2\pi}{7}(x) + 80$



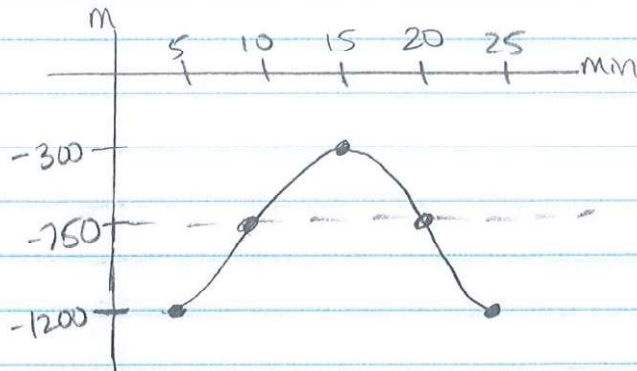
b. 2nd Calc - Value $x=5$

$y = 95.6 \text{ ft.}$

c. 2nd Calc - Intersection

$x = .86 \text{ minutes}$

9.



$$\text{amp} = \frac{-300 - (-1200)}{2} = 450$$

$$\text{period} = 25 - 5 = 20$$

$$b = \frac{2\pi}{20} = \frac{\pi}{10}$$

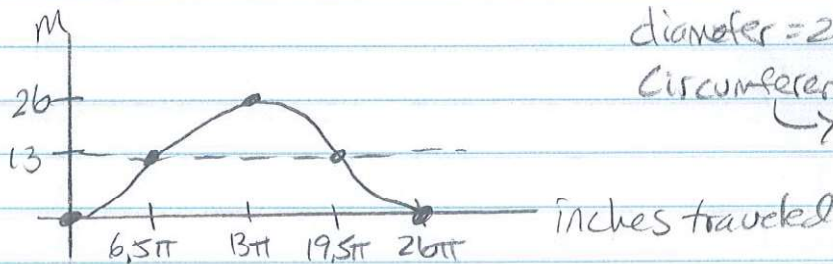
$$VS = \frac{-300 + (-1200)}{2} = -750$$

a. $y = -450 \cos \frac{\pi}{10} (x - 5) - 750$

b. 2nd Calc-Value At $x=0$, $y=-750$ m. The submarine is too deep at -750 m to communicate with ships on the surface.

c. graph $y = -400$ The submarine can communicate between 12.8 min and 17.2 min.

10.



diameter = 26 in

$$\text{Circumference} = \pi d = 26\pi$$

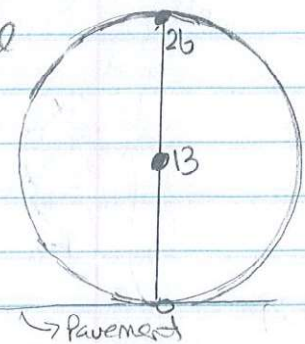
$$\rightarrow \text{Period} = 26\pi$$

a. $\text{amp} = \frac{26 - 0}{2} = 13$

$$\text{period} = 26\pi \quad b = \frac{2\pi}{26\pi} = \frac{1}{13}$$

$$VS = 13$$

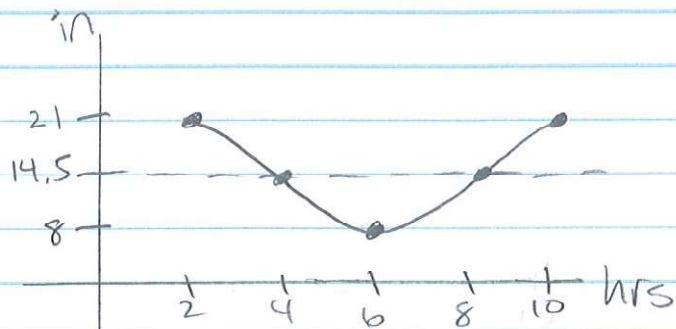
$$y = -13 \cos \frac{1}{13} (x) + 13$$



b. 2nd Calc-value $x=14$ $y=6.8$ m

c. graph $y=10$ 1st 2 distances are 17.4 m & 64.3 m.

11.



$$a. \text{ amp} = \frac{21-8}{2} = 6.5$$

$$\text{Period} = 10 - 2 = 8 \quad b = \frac{2\pi}{8} = \frac{\pi}{4}$$

$$vs = \frac{21+8}{2} = \frac{29}{2} = 14.5$$

$$ps = 2$$

$$y = 6.5 \cos \frac{\pi}{4} (x-2) + 14.5$$

$$b. \text{ 2}^{\text{nd}} \text{ Calc-value } x = 22.3 \quad y = 8.18 \text{ m}$$

$$c. \text{ 2}^{\text{nd}} \text{ Calc-intersection } x = 3.28 \text{ hours}$$