Notes Day 11

Reminders about **Amplitude and Midline**

The amplitude can be found by using the following formula:

$$\text{Amplitude} = |a| = \left|\frac{\text{max} - \text{min}}{2}\right|$$

The midline can be found using the following formula:

$$\text{Midline is } y = \frac{(\text{Max} + \text{Min})}{2} \quad \text{OR} \quad y = \text{Min} + \text{Amp}$$

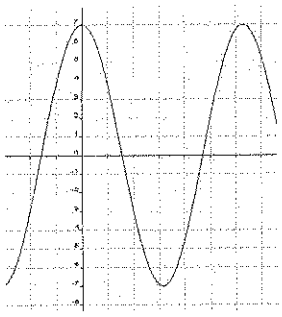
$$\text{Amplitude} = |a| = \left|\frac{\text{max} - \text{min}}{2}\right|$$

$$\text{Midline is } y = \frac{(\text{Max} + \text{Min})}{2} \quad \text{OR} \quad y = \text{Min} + \text{Amp}$$

Together!

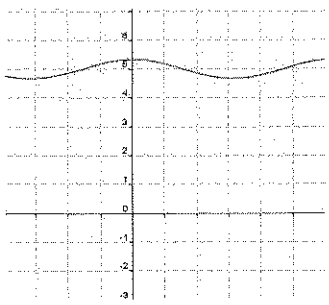
Find the amplitude and midline for each of the following graphs:

1.



max = 7
min = -7

2.



max = $5\frac{1}{3}$
min = $4\frac{2}{3}$

$amp = \frac{7 - -7}{2} = \frac{14}{2} = 7$ (amp)

midline $y = \frac{7 + -7}{2} = \frac{0}{2}$ or $y = -7 + 7 = 0$ ($y = 0$ midline)

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

midline $y = \frac{5\frac{1}{3} + 4\frac{2}{3}}{2} = \frac{10}{2}$

midline $y = 5$ OR $y = 4\frac{2}{3} + \frac{1}{3}$

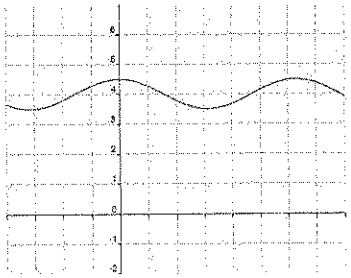
$$\text{Amplitude} = |a| = \left|\frac{\text{max} - \text{min}}{2}\right|$$

$$\text{Midline is } y = \frac{(\text{Max} + \text{Min})}{2} \quad \text{OR} \quad y = \text{Min} + \text{Amp}$$

You Try!!

Find the amplitude and midline for each of the following graphs:

3.



max 4.5

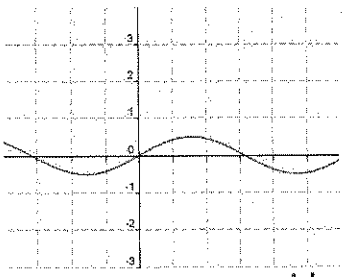
min 3.5

$\text{amp} = \frac{4.5 - 3.5}{2} = \boxed{\frac{1}{2} = \text{amp}}$

$\text{midline } y = \frac{4.5 + 3.5}{2} = \frac{8}{2}$ $\boxed{y = 4 \text{ midline}}$

OR $y = 3.5 + \frac{1}{2} = 4$

4.



max $\frac{1}{2}$

min $-\frac{1}{2}$

$\text{amp} = \frac{\frac{1}{2} - -\frac{1}{2}}{2} = \boxed{\frac{1}{2} = \text{amp}}$

$\text{midline } y = \frac{\frac{1}{2} + -\frac{1}{2}}{2} = \frac{0}{2}$ $\boxed{y = 0 \text{ midline}}$

OR $y = -\frac{1}{2} + \frac{1}{2}$

Whiteboard Review

Determine the Amplitude, Period, and Midline of the Function.

$y = -4 \cos(3x)$

amp $= |-4| = 4$

per $= \frac{360}{3} = 120°$

midline $y = 0$

$y = 3 \sin(2x) + 1$

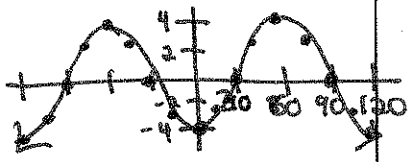
amp $= |3| = 3$

per $= \frac{360}{2} = 180°$

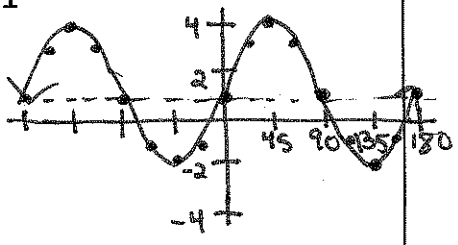
midline $y = 1$

Graph each Trig Function with 1 cycle in the negative direction and 1 cycle in the positive direction.

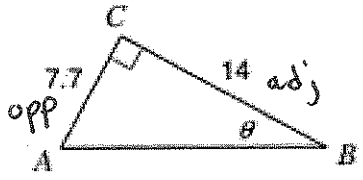
$y = -4 \cos(3x)$



$y = 3 \sin(2x) + 1$



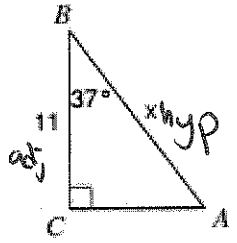
Find the missing measure.



$\tan\theta = \frac{7.7}{14}$

$\theta = \tan^{-1}\left(\frac{7.7}{14}\right)$

$\theta = 28.8°$



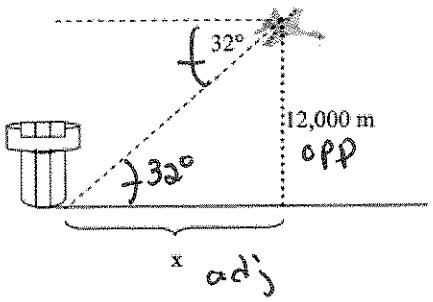
$\frac{\cos(37)}{1} = \frac{11}{x}$

$x\cos(37) = 11$

$\frac{x\cos(37)}{\cos(37)} = \frac{11}{\cos(37)}$

$x = 13.8$

A plane is flying at an altitude of 12,000 m. From the pilot, the angle of depression to the airport tower is 32°. How far is the tower from a point directly beneath the plane?



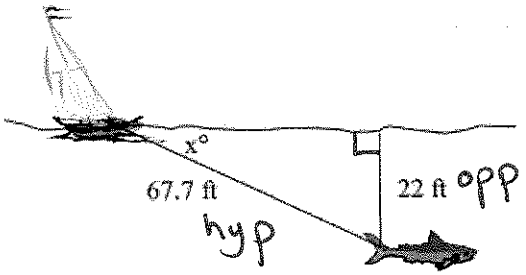
$\frac{\tan(32)}{1} = \frac{12000}{x}$

$x\tan(32) = 12000$

$\frac{x\tan(32)}{\tan(32)} = \frac{12000}{\tan(32)}$

$x = 19204.0\text{ m}$

A great white shark swims 22 feet below sea level. If the shark is 67.7 feet from the sailboat, what is the angle of depression of the boat to the shark?



$$\sin(x) = \frac{22}{67.7}$$

$$x = \sin^{-1}\left(\frac{22}{67.7}\right)$$

$$x = 18.96 \text{ ft}$$

Solve the equation for x.

$$\cos 2x = \frac{\sqrt{3}}{2}$$

$$2x = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$$

$$\frac{2x}{2} = \frac{30^\circ}{2}$$

$$x = 15^\circ$$

Solve the equation for x.

$$\cos x - \sin x \cos x = 0$$

$\cos x(1 - \sin x) = 0$

$\cos x = 0$

$x = \cos^{-1}(0)$

90°

$1 - \sin x = 0$

$1 = \sin x$

$\sin^{-1}(1) = x$

$\boxed{90^\circ}$

Come up with two trig functions (one cosine, one sine) that will equal the same ratio.

$\sin(30^\circ)$

$\cos(60^\circ)$

any sine & cosine pair with complementary angles