

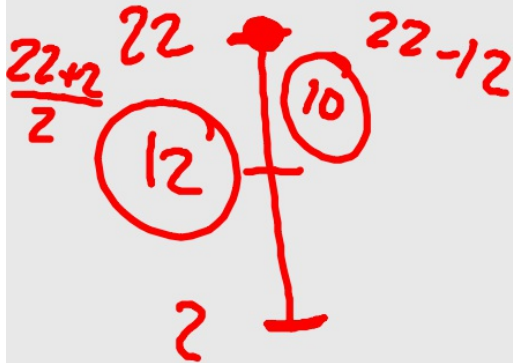
## Warm Up

1) A ferris wheel has a diameter of 90 feet with an axle 50 feet off of the ground. Write an equation to model, if it takes 8 min to rotate.

$$y = -45 \cos\left(\frac{\pi x}{4}\right) + 50$$

Radius       $\frac{2\pi}{8} \leftarrow \text{Rotate}$       Axle

2) The longest day in an Alaskan town is 22 hours, the shortest is 2. Write an equation to model that begins in the summer.



$$y = 10 \cos(2\pi x) + 12$$

3)  $h(t) = 28\sin(2\pi t) + 54$ , models the temp in a town...

a) What season did they begin?

Spring

b) What is the temp at the beginning?

54

c) What is the highest?

$$54 + 28 = 82$$

d) What is the lowest?

$$54 - 28 = 26$$

e) How long is the cycle?

1 year

Identify the transformations in each equation:

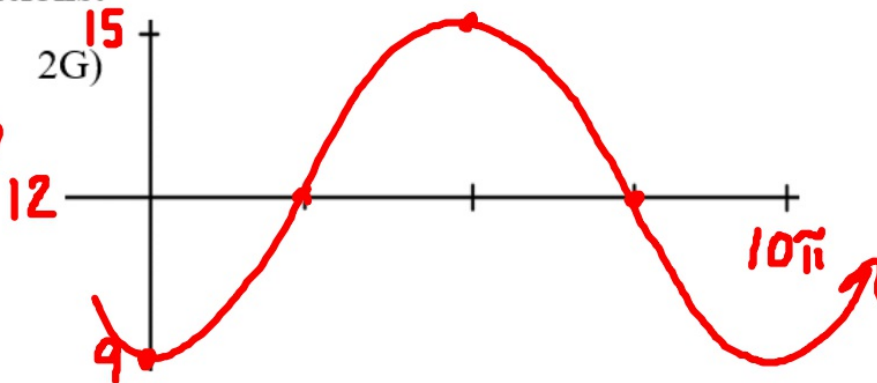
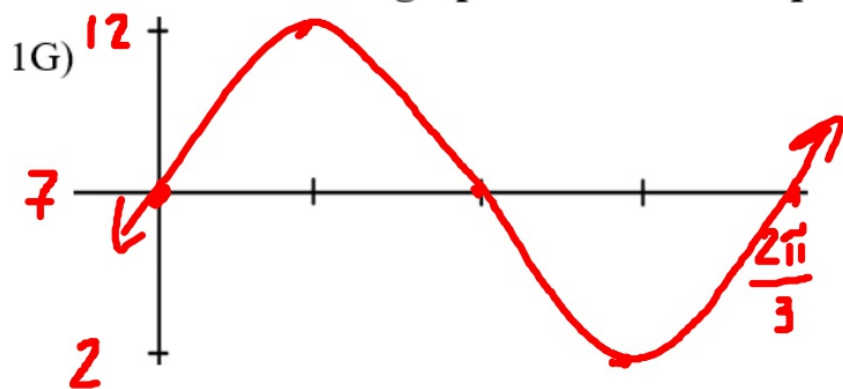
1)  $f(x) = 5\sin(3x) + 7$

Amp: 5      Midline Shift: 7  
Period:  $\frac{2\pi}{3}$       Phase Shift: 0

2)  $f(x) = -3\cos(x/5) + 12$

Amp: 3      Midline Shift: 12  
Period:  $10\pi$       Phase Shift: 0

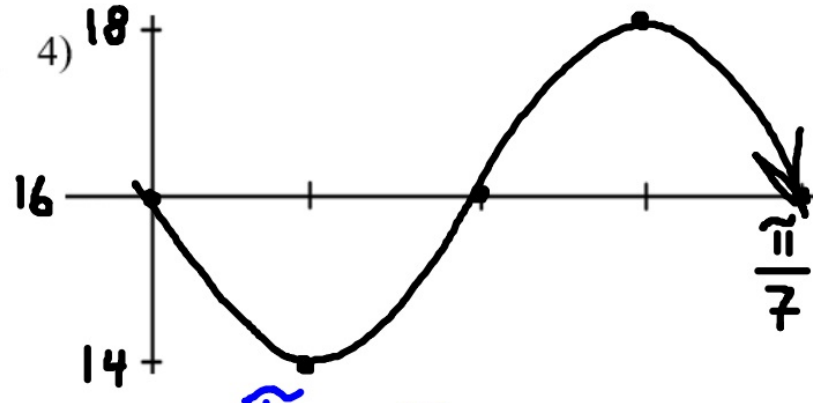
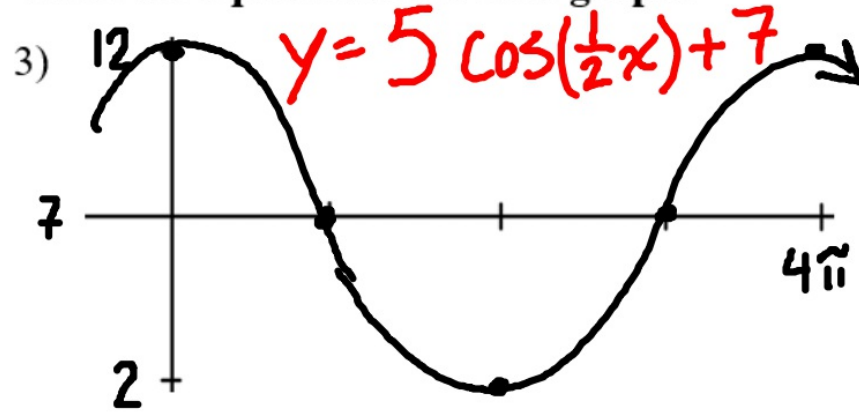
Label and sketch the graph for the above equations:



$$\frac{2\pi}{\text{Per}} = b$$

$$y = -2 \sin 4x + 16$$

Write the equation from each graph:



Write the equation given each set of transformations.

- 5) Amp: 8      Midline Shift: 15  
 Period: 10      Phase Shift: 5

$$y = 8 \sin\left(\frac{\pi}{5}x - \pi\right) + 15$$

$$\frac{2\pi}{10} = \frac{\pi}{5}$$

$$c = -b \cdot \text{PS}$$

- 6) Amp: 4      Midline Shift: -7  
 Period: 1/2      Phase Shift: 0

$$y = 4 \sin(4\pi x) - 7$$

$$\frac{2\pi}{(1/2)}$$

$$-\frac{\pi}{5} \cdot 5$$

**Write the equation to best model each situation described:**

7) A Ferris wheel takes 6 minutes to rotate, its center axle is 60 feet off the ground and has a diameter of 45 feet.

$$y = -22.5 \cos \frac{\pi x}{3} + 60$$

8) The high temperature of Cityville is  $80^\circ$  with a low of  $-10^\circ$ . Write the equation beginning in the summer.

$$y = 45 \cos 2\pi x + 35$$

9) The longest day in Cityton is 18 hours, the shortest is 6. Write the equation beginning in the fall.

$$y = -6 \sin 2\pi x + 12 \quad \frac{18+6}{2}$$

10) A Ferris wheel has a radius of 70 feet, the center axle is 40 feet off of the ground and takes 5 minutes to complete one rotation. Write an equation that would represent the height of someone riding this Ferris wheel.

$$y = -70 \cos \frac{2\pi x}{5} + 40$$

Use the equation to answer the questions for each of the following:

11) The equation for a Ferris wheel is as follows;  $h(t) = -20 \cos\left(\frac{2\pi}{3}t\right) + 30$ ,

- a. How high off the ground are you when you get on? 10
- b. What is the highest point on the Ferris wheel? 50
- c. How long does one rotation take (t is in minutes)? 3

$\frac{2\pi}{3}$   
5

12) The equation for the tide at a beach is as follows;  $h(t) = 8 \cos\left(\frac{4\pi}{25}t\right) + 17$ ,

- a. How high was the tide when measurement started? 25
- b. What is the highest the tide reaches? 25
- c. What is the height of low tide? 9
- d. How long does it take from high tide to low tide? 6.25

13) The following equation for the temperatures in Harlan:  $h(t) = 52 \sin(2\pi t) + 44$ .

a. What time of year would the equation begin?

Spring

b. What is the highest temperature reached?

96°

c. What is the lowest temperature reached?

-8°

d. How long does it take for the cycle to complete?

1 year

## **U4: Trig Part II**

# **Last Review**

**Law of Sine**

**Law of Cosine**

**Sinusoidal Functions**



**Test Thursday...**

**Sinusoidal:**

**Word to Equation**

**Word w/ Equation w/ Questions**

**Graph to Equation**

**Equation to Graph**

**Equation to Transformation**

**Transformation to Equation**

**Solving Triangles and Word Problems**

**Probability Review**

1)  $a = 56$ ,  $b = 34$  and  $B = 28^\circ$ . Solve for A.

$$\frac{\sin A}{56} = \frac{\sin 28}{34}$$

$\sin$

$$\sin^{-1}\left(\frac{56 \sin 28}{34}\right)$$

$51^\circ$

2)  $a = 35$ ,  $b = 42$  and  $c = 58$ . Solve for C.

$$58^2 = 35^2 + 42^2 - 2(35)42 \cos C$$

$\cos$

$$\cos^{-1}\left(\frac{58^2 - 35^2 - 42^2}{-2(35)42}\right)$$

$97^\circ$

3) a = 78, A = 110° and B = 25°. Solve for b.

$$\frac{b}{\sin 25} = \frac{78}{\sin 110}$$

sin

$$b = 35.1$$

4) a = 14, b = 17 and C = 80°. Solve for ~~a~~<sup>c</sup>.

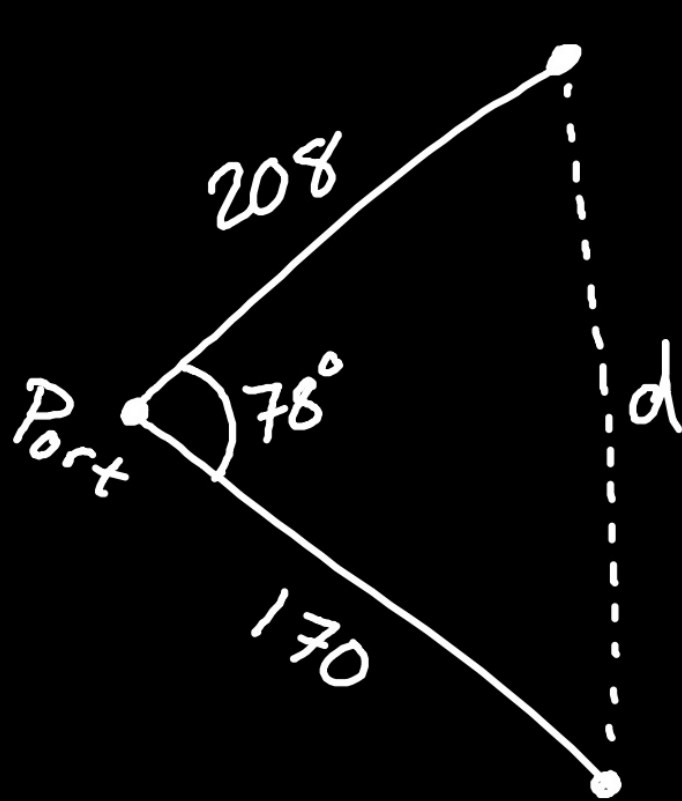
$$c^2 = 14^2 + 17^2 - 2(14)(17)\cos 80$$

cos

√Ans

$$c = 20.1$$

5) Two ships leave the same port straight in different directions. One travels 208 miles, the other 170 miles and an angle between them of  $78^\circ$ . How far apart are the ships now?



$$d^2 = 208^2 + 170^2 - 2(208)(170)\cos 78$$

$$\sqrt{\text{Ans}}$$

239.7 miles

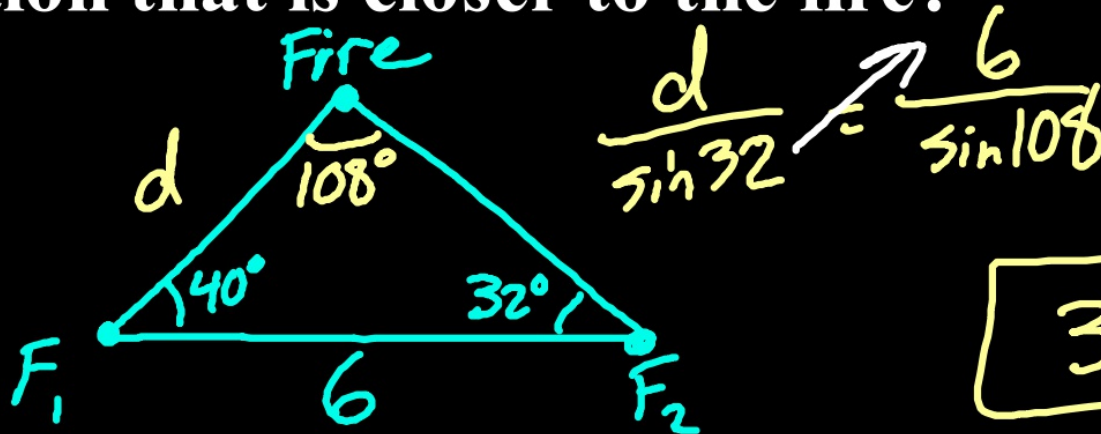
6) Jill looks out her apartment window. The angle of elevation to the top of the next building is  $34^\circ$  and the angle of depression to the bottom is  $20^\circ$ . She knows the building is 280 feet away. How tall is the other building?

$$280 \tan 34 + 280 \tan 20$$

TANGENT

290.8 feet

7) Two fire stations are 6 miles apart. There is a fire off between the stations with angles of  $40^\circ$  and  $32^\circ$  from each station to the fire. How far is the station that is closer to the fire?



$$\frac{d}{\sin 32} = \frac{6}{\sin 108}$$

3.3 miles

8) The chances of winning a game are  $\frac{4}{7}$ . What is the probability of winning exactly 6 of the next 10 games?

$${}_{10}C_6 \left(\frac{4}{7}\right)^6 \left(\frac{3}{7}\right)^4$$

0.25

9) A spinner has 8 equal sections; two are \$0, 3 say win \$20 and 3 say win \$40. If it costs \$25 to play is it worthwhile? What is the **expected value?**

$$\frac{0 \times \frac{2}{8}}{0} + \frac{20 \times \frac{3}{8}}{7.5} + \frac{40 \times \frac{3}{8}}{15} = 22.5 - 25 = \boxed{-2.5}$$

*No*

10) There is a stack of cards numbered 1 to 100. What is the probability of selecting an even number **or** a number greater than 50?

$$\frac{50}{100} + \frac{50}{100} - \frac{25}{100} = \frac{3}{4}$$

If you see that the card had a 2 in the ones place, what is the probability it is also over 50?

$$\frac{5}{100} = \frac{1}{20}$$

*Both Known*

# **Assignments::**

**Midterm Review 1 (Wed)**

**Midterm Review 2 (Thu)**