Pre-Calculus – Unit 10

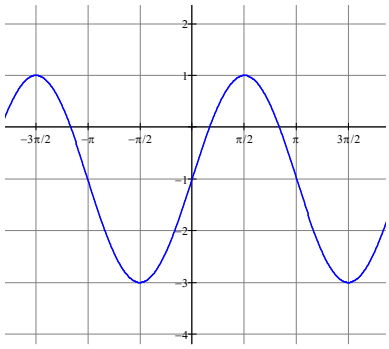
Name: _____ Date:_____ Period: _____

Unit 10 REVIEW – Graphing Trig Functions

Pre-Calculus

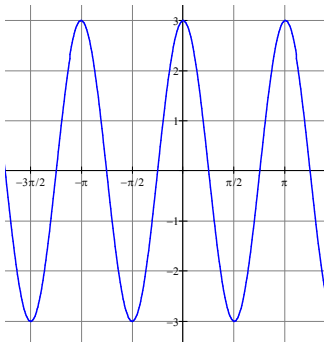
For 1-3, write the given function for each graph. Use a phase shift, not a negative coefficient.

1)



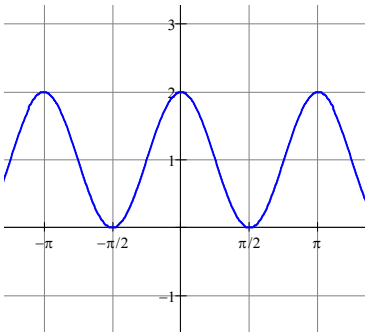
SINE: $y =$

2)



COSINE: $y =$

3)



SINE: $y =$

4) Write the equation of a **sine** curve with the following transformations:

- One full period occurs 6 times between 0 and 2π.
- Stretch vertically 2.

$y =$

For 5-6, state the amplitude, period, phase shift, and vertical shift.

5) $y = 3\cos(5x - \pi)$

amp = period =

p.s. = v.s. =

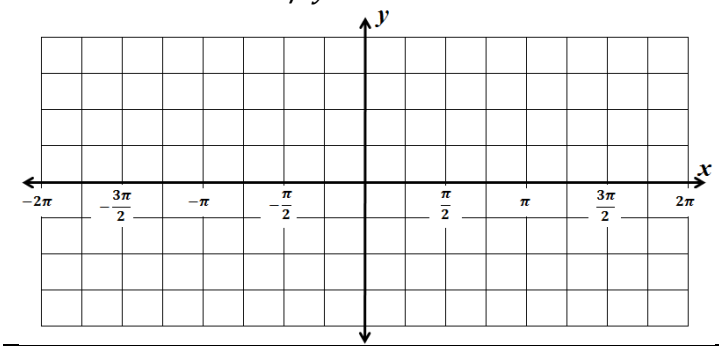
6) $y = \frac{1}{2}\sin 4x - 2$

amp = period =

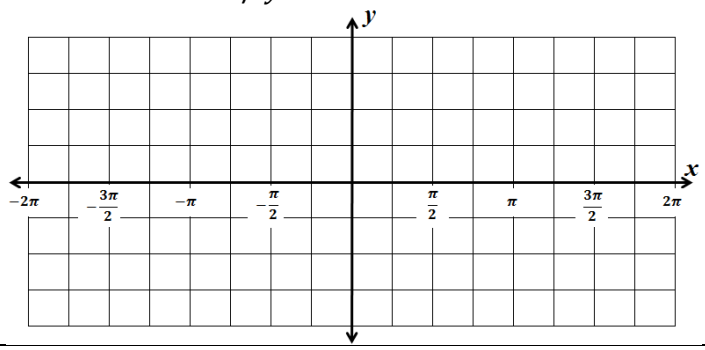
p.s. = v.s. =

For 7-14, graph the function. Use the entire grid left to right.

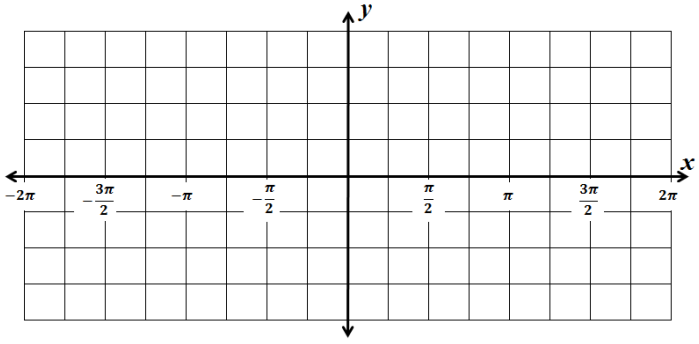
7) $y = 2\cos x$



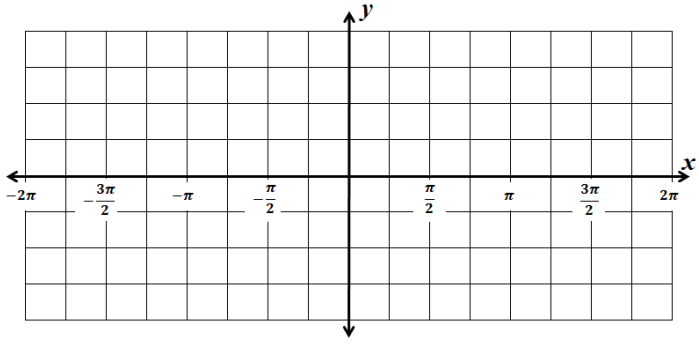
8) $y = 3\sin 2x - 1$



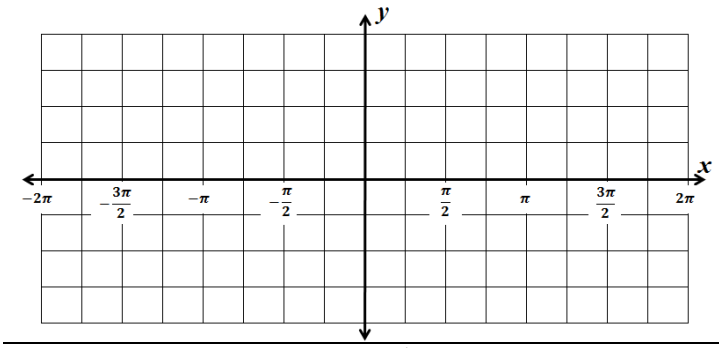
9) $y = -\sin(2x + \pi)$



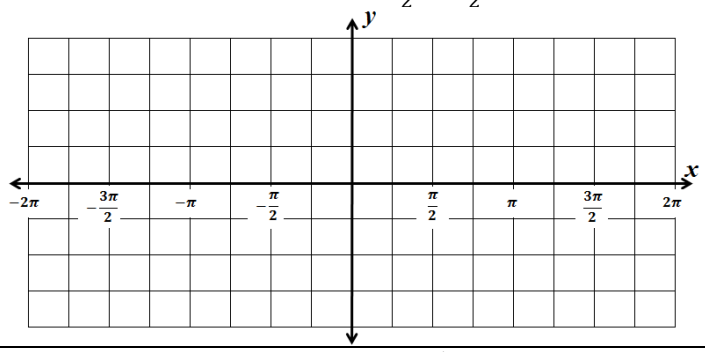
10) $y = 2\cos(4x - 2\pi) - 1$



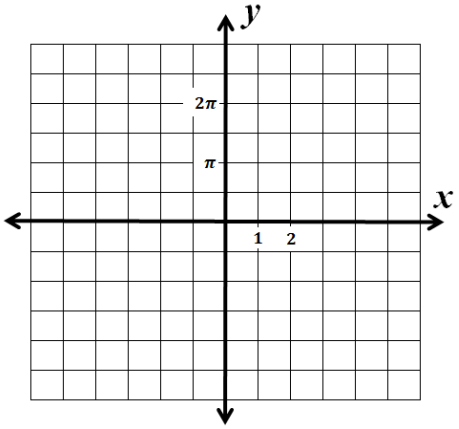
11) $y = 3\csc x$



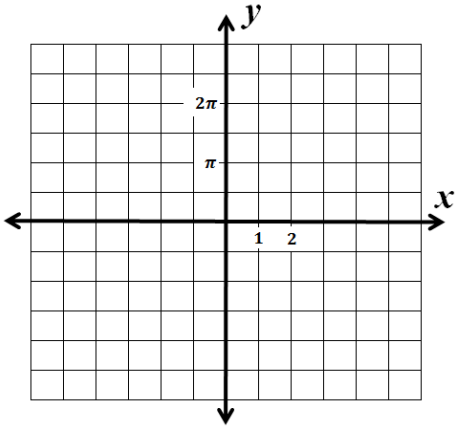
12) $y = 1 + \frac{1}{2}\sec\frac{x}{2}$



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



14) $y = 2\tan^{-1} x$



For 16 – 18, find the exact value of the expression.

16) $\cos\left(\arcsin\left(\frac{\sqrt{3}}{2}\right)\right)$

17) $\tan\left(\arcsin\left(\frac{1}{2}\right)\right)$

18) $\tan\left(\arccos\left(\frac{\sqrt{2}}{2}\right)\right)$

For 19 – 21, find the approximate value by using a calculator. Use degree mode.

19) $\cot^{-1}\left(\frac{13}{10}\right)$

20) $\csc(68^\circ)$

21) $\sec^{-1}(6)$

For 22 – 24, use a reference triangle to find the exact value of the expression. Draw a triangle!

22) $\tan\left(\sin^{-1}\frac{12}{13}\right)$

23) $\sec\left(\operatorname{arccsc}\frac{10}{6}\right)$

24) $\cot\left(\csc^{-1}\frac{3}{2}\right)$

Application from Unit 10

This is just practice and a reminder. These problems will **NOT** necessarily match what is on the test.

1. You are standing 150 feet from the base of a 73 foot cliff. Your friend is rappelling down the cliff.
   a. Write a model that gives your friend's distance d (in feet) from the ***top*** of the cliff as a function of the angle of elevation θ.

2. Suppose you are riding a Ferris wheel. After everyone is loaded, the wheel starts to turn and the ride lasts for 105 seconds. Your height h (in feet) above the ground at any time t (in seconds) can be modeled by the equation $h(t) = 50\sin\left[\frac{\pi}{10}(t-4)\right] + 65$. You do not need a calculator for any question except the last two.
   a. What is the period?
   b. What does the period represent?
   c. What is the frequency?
   d. What does the frequency represent?
   e. What is your maximum height?
   f. What is your minimum height?
   g. How many circles will the Ferris Wheel make during the ride?

   h. How high are you when the ride begins? (Use radians.)

   i. What is your height when the ride stops?

3. When an earthquake hits and creates a tsunami, the water first goes down from its normal level, and then rises an equal distance above its normal level, then returns to its normal level. A tsunami is approaching Trig Island and is modeled by:

$$d = 10\sin\left[\frac{2\pi}{15}(t-7.5)\right] + 11$$

where d is the water's depth in meters and t is the time in minutes since the earthquake. This model only works for one cycle!

   a. What is the maximum height of the tsunami wave from the sea floor?
   b. What is the normal depth of water at Trig Island?
   c. What is the period of this function?
   d. What does this mean in the context of this problem?
   e. Graph in the calculator showing the depth of water from the moment the earthquake struck ($t = 0$) to 15 minutes later. Sketch the graph to the right.