Name: ____________________________________ Date: _________________

BASIC GRAPHS OF SINE AND COSINE
ALGEBRA 2 WITH TRIGONOMETRY

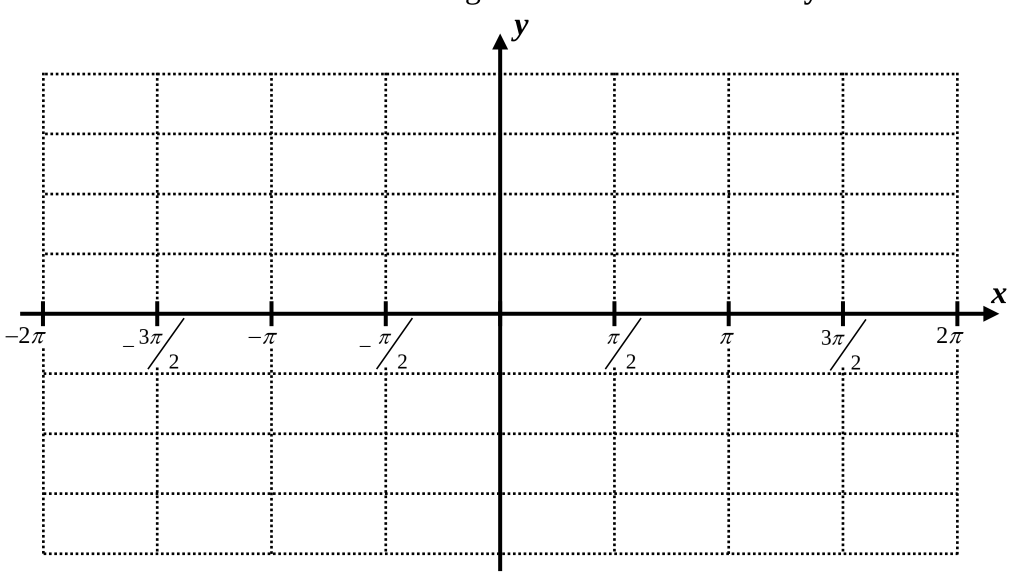
The sine and cosine functions can be easily graphed by considering their values at the quadrantal angles, those that are integer multiples of 90° or $\frac{\pi}{2}$ radians. Due to considerations from physics and calculus, most trigonometric graphing is done with the input angle in units of radians, not degrees.

***Exercise* #1:** Consider the functions $f(x)=\sin(x)$ and $g(x)=\cos(x)$, where x is an angle in radians.

(a) By using the unit circle, fill out the table below for selected quadrantal angles.

x	-2π	$-3\pi/2$	$-\pi$	$-\pi/2$	0	$\pi/2$	π	$3\pi/2$	2π
$\cos(x)$									
$\sin(x)$									

(b) Graph both the sine and cosine curves on the grid shown below. **Clearly** label which curve is which.



(c) The domain and range of the sine and cosine functions are the same. State them below in interval notation.

Domain: Range:

(d) After how much horizontal distance will both sine and cosine repeat its basic pattern? This is called the **period** of the trigonometric graph. Because these graphs have patterns that repeat they are called **periodic**.

Now we would like to explore the effect of changing the coefficient of the trigonometric function. In essence we would like to look at the graphs of functions of the forms:

$$y = A\sin(x) \quad \text{and} \quad y = A\cos(x)$$

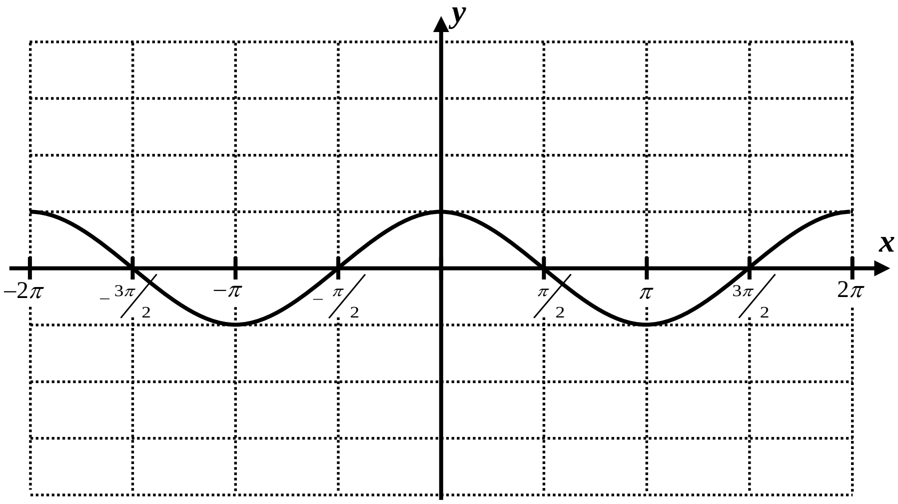
***Exercise* #2:** The grid below shows the graph of $y = \cos(x)$. Use your graphing calculator to sketch and label each of the following equations. Be sure your calculator is in **RADIAN MODE**.

$y = 3\cos(x)$

$y = -4\cos(x)$

$y = \dfrac{3}{2}\cos(x)$

$y = -2\cos(x)$



As we can see, this coefficient controls the height that the cosine curves rises and falls above the *x*-axis. Its absolute value is given the name **amplitude**. In terms of sound waves it indicates the volume of the sound.

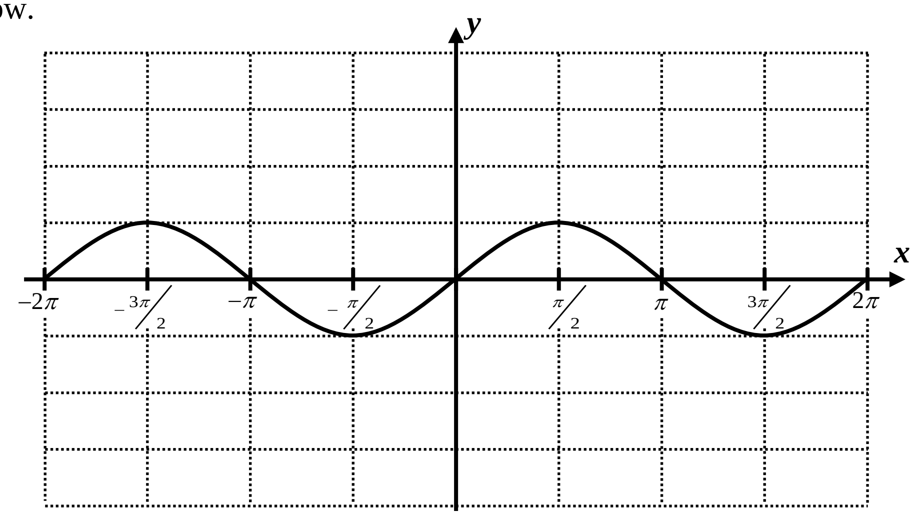
***Exercise* #4:** The basic sine function is graphed below. **Without** the use of your calculator, sketch each of the following sine curves on the axes below.

$y = 2\sin(x)$

$y = 4\sin(x)$

$y = -3\sin(x)$

$y = -\dfrac{1}{2}\sin(x)$



Name: ___________________________________ Date: _________________

BASIC GRAPHS OF SINE AND COSINE
ALGEBRA 2 WITH TRIGONOMETRY - HOMEWORK

SKILLS

1. On the grid below, sketch the graphs of each of the following equations based on the basic sine function.

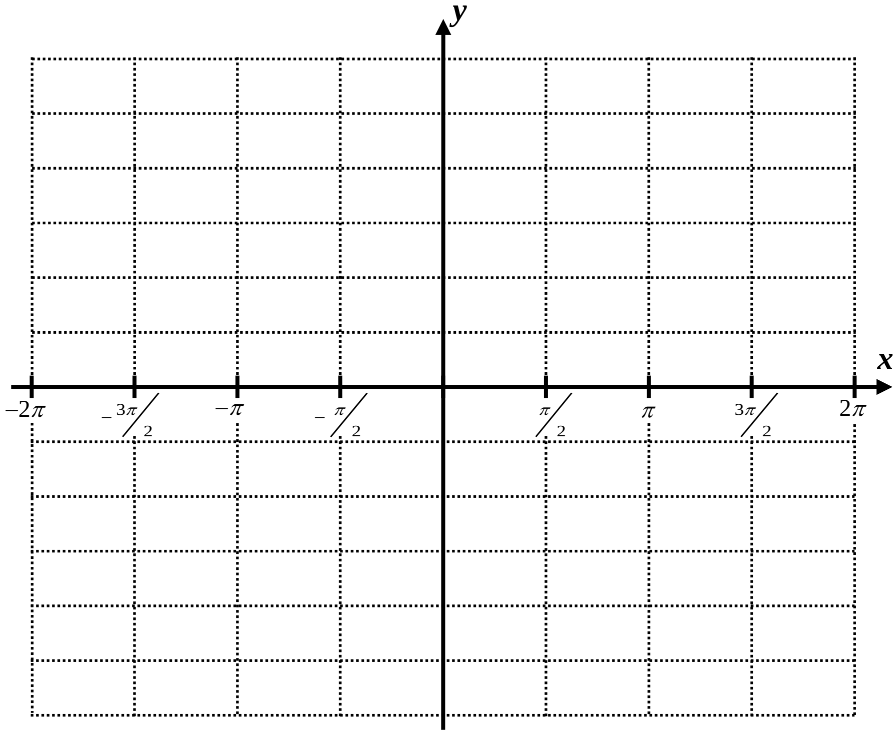
$y = \sin(x)$

$y = 3\sin(x)$

$y = -\sin(x)$

$y = -5\sin(x)$

$y = \frac{7}{2}\sin(x)$



2. On the grid below, sketch the graphs of each of the following equations based on the basic cosine function.

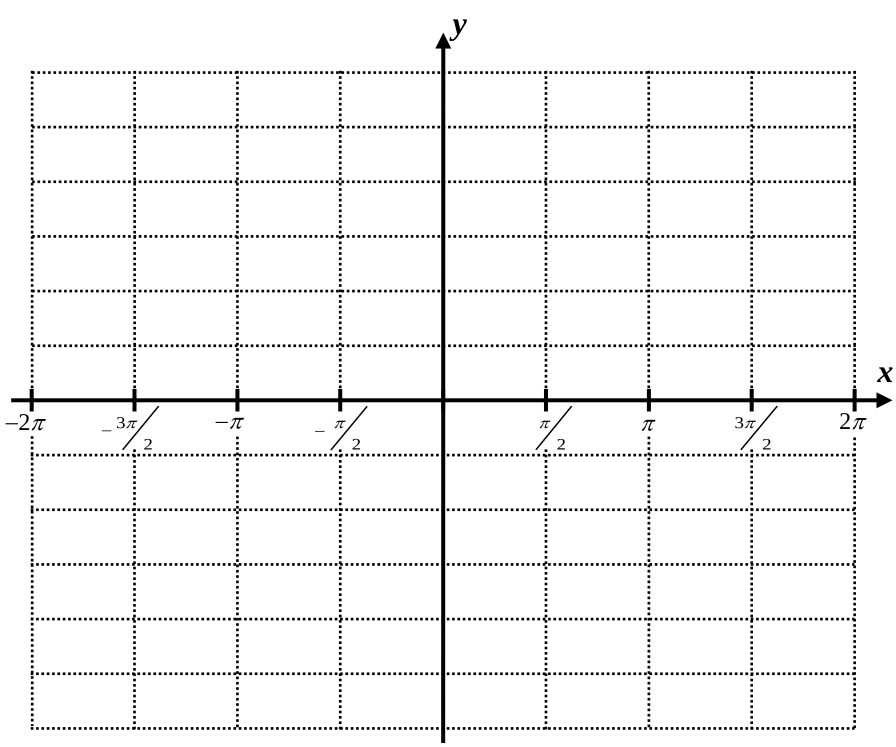
$y = \cos(x)$

$y = 4\cos(x)$

$y = -3\cos(x)$

$y = 2.5\cos(x)$

$y = -5.5\cos(x)$



3. Which of the following represents the *range* of the trigonometric function $y = 7\sin(x)$?

(1) $(-7, 7)$ (3) $[0, 7)$

(2) $[-7, 7]$ (4) $(-7, 7]$

4. Which of the following is the period of $y = \cos(x)$?

(1) π (3) 2π

(2) 2 (4) $\dfrac{3\pi}{2}$

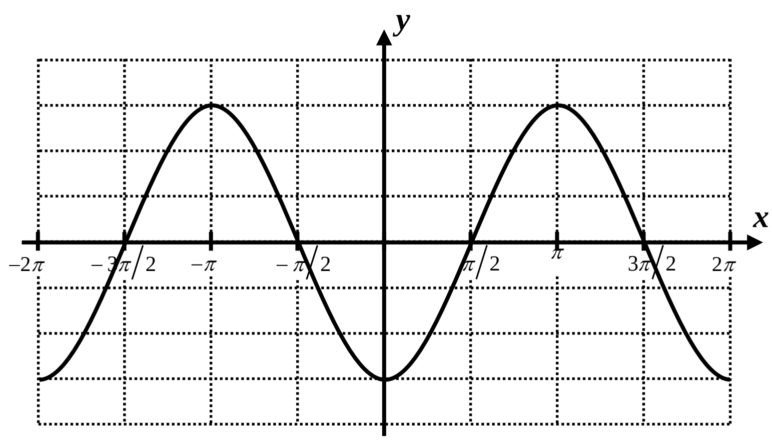
5. Which of the following equations describes the graph shown below?

(1) $y = 3\cos(x)$

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

(3) $y = 3\sin(x)$

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



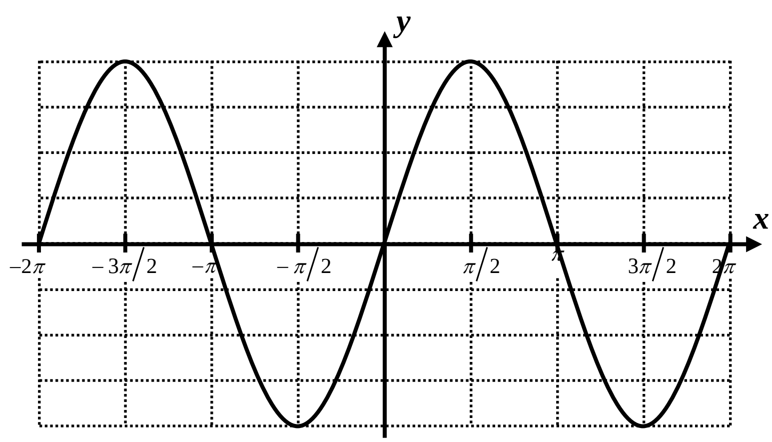
6. Which of the following equations represents the periodic curve shown below?

(1) $y = 4\cos(x)$

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

(3) $y = 4\sin(x)$

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



7. Which of the following lines when drawn would *not* intersect the graph of $y = 6\sin(x)$?

(1) $x = 8$ (3) $y = -4$

(2) $x = 3$ (4) $y = 9$