

Are there any questions from last day's assigned work you would like to see on the board?

pp. 365-367 # 1, 3, 4def, 6 – 8, 9cef, 15

15a b

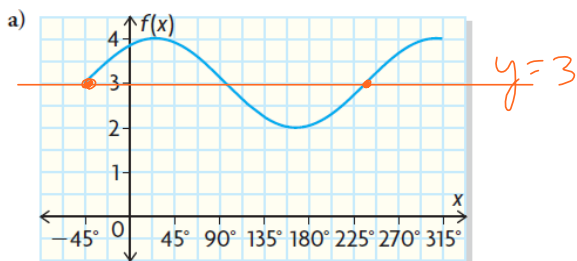
## Today's Learning Goal(s):

By the end of the class, I will be able to:

- a) determine how the value of  $a$  affects the functions  $f(x) = a \sin x$

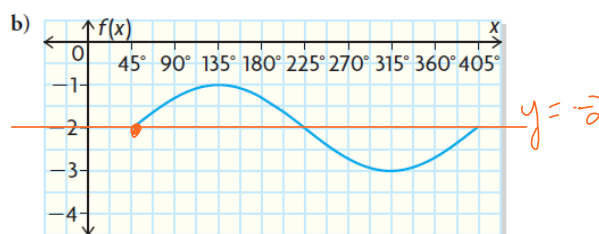
p. 367 #15

15. Write the equation for each sinusoidal function.



$$y = \sin(x - (-45^\circ)) + 3$$

$$= \sin(x + 45^\circ) + 3$$



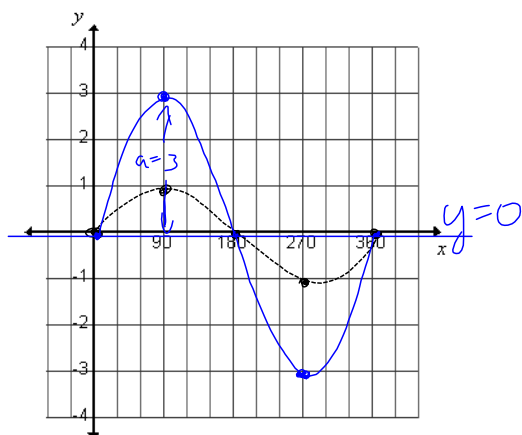
$$y = \sin(x - 45^\circ) - 2$$

MCF 3M1

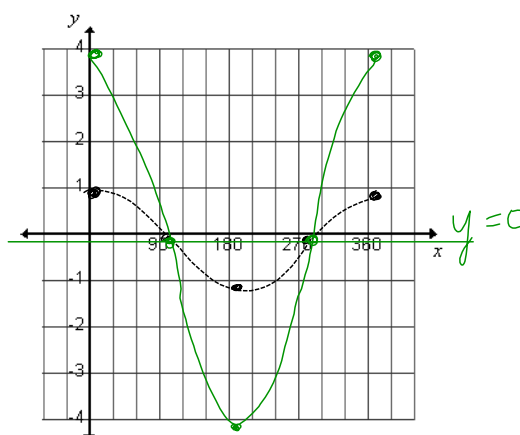
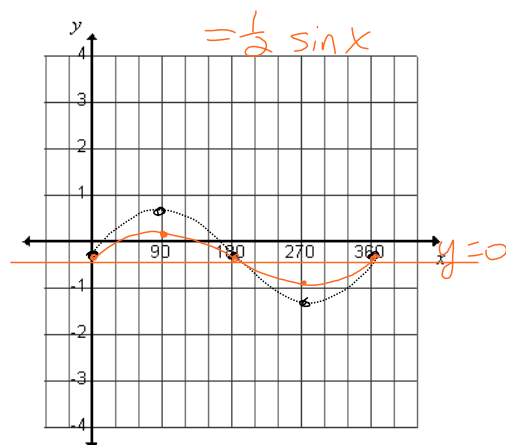
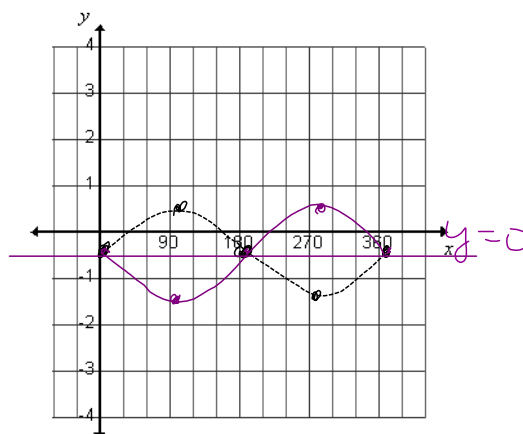
## 6.6 More Transformations of the Sine Function

Vertical Stretches and Compressions:  $f(x) = a \sin x$ Ex. 1: Vertical Stretches:  $f(x) = a \sin x$ , where  $a > 1$ Date: Nov. 25/19

a)  $f(x) = 3 \sin x$

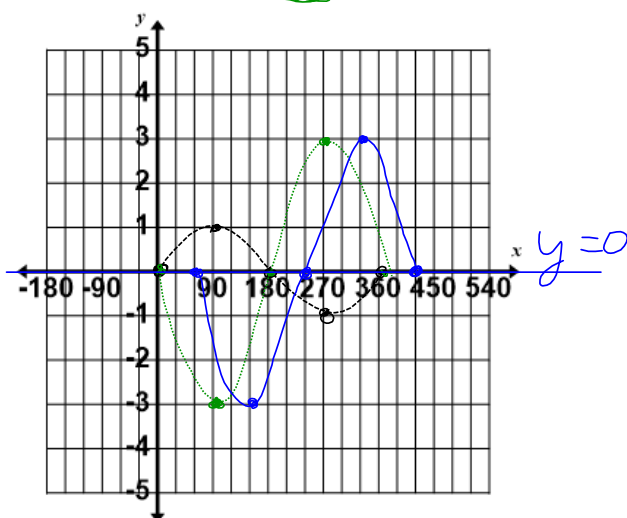
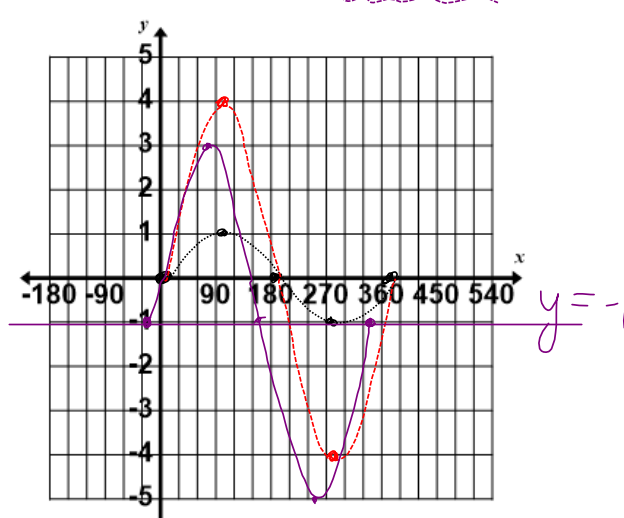
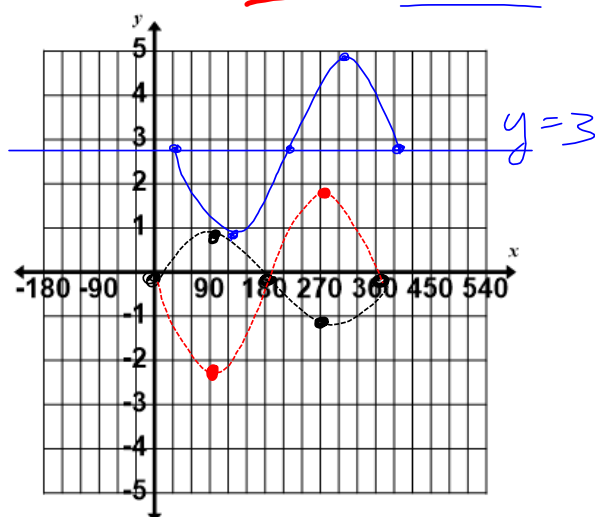
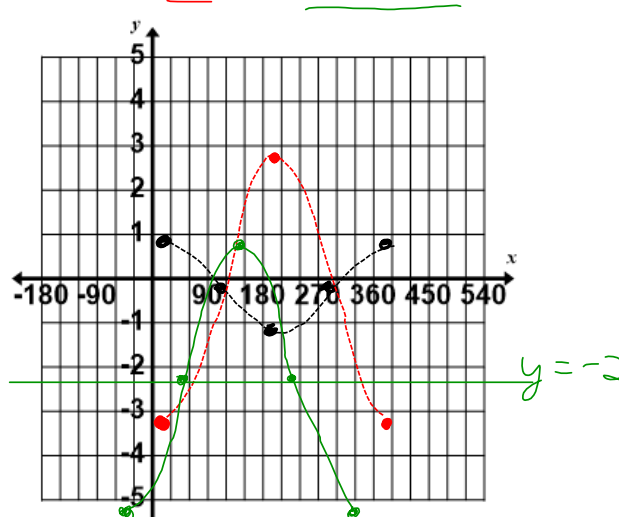
Equation of the axis  $y=0$ Amplitude 3Period:  $360^\circ$ Domain:  $\{x \in \mathbb{R}\}$ Range:  $\{y \in \mathbb{R} \mid -3 \leq y \leq 3\}$ 

b)  $f(x) = 4 \cos x$

Equation of the axis  $y=0$ Amplitude 4Period:  $360^\circ$ Domain:  $\{x \in \mathbb{R}\}$ Range:  $\{y \in \mathbb{R} \mid -4 \leq y \leq 4\}$ Ex. 2: Vertical Compressions:  $f(x) = a \sin x$ , where  $0 < a < 1$ Sketch  $f(x) = 0.5 \sin x$ Equation of the axis  $y=0$ Amplitude 0.5Period:  $360^\circ$ Range:  $\{y \in \mathbb{R} \mid -0.5 \leq y \leq 0.5\}$ Ex. 3: Reflection:  $f(x) = a \sin x$ , where  $a < 0$ Sketch  $f(x) = -\sin x$ Equation of the axis  $y=0$ Amplitude 1Period:  $360^\circ$ Range:  $\{y \in \mathbb{R} \mid -1 \leq y \leq 1\}$

Ex. 4:  $f(x) = a \sin(x - c) + d$ 

RST

a) Sketch  $f(x) = -3 \sin(x - 60^\circ)$ Equation of the axis  $y = 0$ Amplitude  $3$ Range:  $\{y \in \mathbb{R} \mid -3 \leq y \leq 3\}$ b)  $f(x) = 4 \sin(x + 30^\circ) - 1$ Equation of the axis  $y = -1$ Amplitude  $4$ Range:  $\{y \in \mathbb{R} \mid -5 \leq y \leq 3\}$ c) Sketch  $f(x) = -2 \sin(x - 30^\circ) + 3$ Equation of the axis  $y = 3$ Amplitude  $2$ Range:  $\{y \in \mathbb{R} \mid 1 \leq y \leq 5\}$ d)  $f(x) = -3 \cos(x + 60^\circ) - 2$ Equation of the axis  $y = -2$ Amplitude  $3$ Range:  $\{y \in \mathbb{R} \mid -5 \leq y \leq 1\}$

- Ex. 5 a) The graph of  $f(x) = \sin x$  has been vertically stretched by a factor of 5, translated to the right  $15^\circ$  and up 6 units.

Write the new equation.

$$f(x) = 5 \sin(x - 15^\circ) + 6$$

$$f(x) = 5 \sin(x - 15^\circ) + 6$$

- b) The graph of  $g(x) = \cos x$  has been vertically compressed by a factor of  $\frac{1}{3}$ , translated down 4 units and to the left  $30^\circ$ .

Write the new equation.

$$g(x) = \frac{1}{3} \cos(x + 30^\circ) - 4$$

$$g(x) = \frac{1}{3} \cos(x + 30^\circ) - 4$$

- c) The graph of  $g(x) = \cos x$  has been vertically stretched by a factor of 2, reflected in the  $x$ -axis, translated up 3 units and to the left  $60^\circ$ .

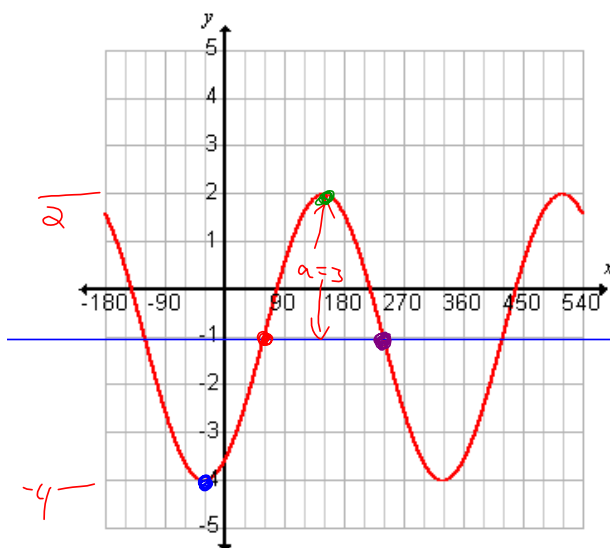
Write the new equation.

$$g(x) = -2 \cos(x + 60^\circ) + 3$$

- d) The graph of  $f(x) = \sin x$  undergoes a horizontal translation of  $15^\circ$ , is reflected in the  $x$ -axis, vertically compressed by a factor of  $\frac{1}{4}$ , and translated down 7 units. Write the new equation.

$$f(x) = -\frac{1}{4} \sin(x - 15^\circ) - 7$$

Ex. 6 Determine four possible equations for the sketch below.



- a) Use  $f(x) = \sin x$  as the base curve.

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

$$= -3 \sin(x - 270^\circ) - 1$$

- b) Use  $g(x) = \cos x$  as the base curve.

$$y = -1$$

$$y = -3 \cos(x + 90^\circ) - 1$$

$$y = 3 \cos(x - 180^\circ) - 1$$

$$a = \frac{2 - (-4)}{2}$$

$$= \frac{6}{2}$$

$$= 3$$

**Review the learning goals. Were we successful today?**

a) determine how the value of  $a$  affects the functions  $f(x) = a \sin x$

**(Inform of graphs on website.)**

**Today's Homework:**

pp. 373-375 # 1 – 3, (4 – 6)abc, 7a, 8ab, 9, 10, 12ab, 13abc

**AND**

**READ** p. 377