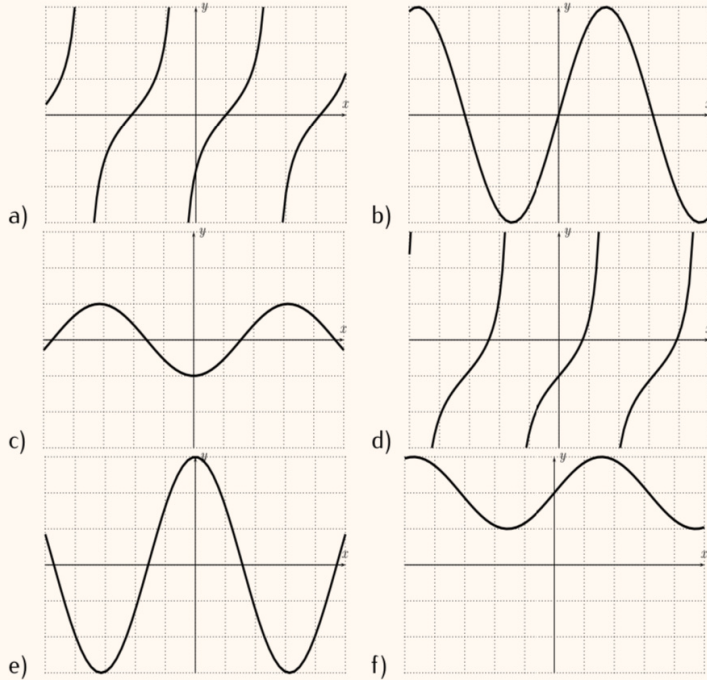


Mat 1375 HW18

Exercise 18.2

Identify the formulas with the graphs.

$$f(x) = \sin(x) + 2, \quad g(x) = \tan(x - 1), \quad h(x) = 3 \sin(x) \\ i(x) = 3 \cos(x), \quad j(x) = \cos(x - \pi), \quad k(x) = \tan(x) - 1$$



$$f(x) = \sin(x) + 2:$$

$\sin(x)$ moves up 2 units \Rightarrow (f)

$$g(x) = \tan(x - 1):$$

$\tan(x)$ moves to the right 1 unit.
 \Rightarrow (a)

$$h(x) = 3 \sin(x):$$

$\sin(x)$ but 3 times higher (lower)
 \Rightarrow (b)

$$i(x) = 3 \cos(x)$$

$\cos(x)$ but 3 times higher (lower)
 \Rightarrow (c)

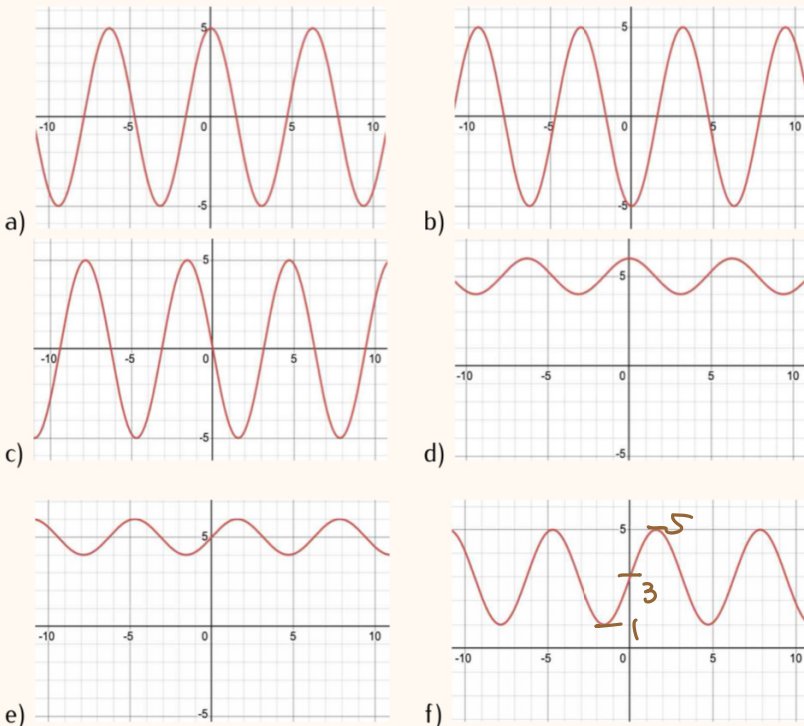
$$j(x) = \cos(x - \pi)$$

$\cos(x)$ moves to the right π units
 \Rightarrow (d)

$$k(x) = \tan(x) - 1: \quad \tan(x) \text{ moves downward 1 unit} \Rightarrow$$

Exercise 18.3

Find the formula of a function whose graph is the one displayed below.



$$a) \cos(x) \text{ with amplitude } = 5 \\ \Rightarrow 5 \cos(x)$$

$$b) 5 \cos(x) \text{ moves to right } \pi \text{ unit} \\ \Rightarrow 5 \cos(x - \pi)$$

$$c) 5 \cos(x) \text{ moves to left } \frac{\pi}{2} \text{ unit} \\ \Rightarrow 5 \cos(x + \frac{\pi}{2})$$

$$d) \cos(x) \text{ moves upward 5 units} \\ \Rightarrow \cos(x) + 5$$

$$e) \sin(x) \text{ moves upward 5 units} \\ \Rightarrow \sin(x) + 5$$

$$f) 2 \sin(x) \text{ moves upward 3 units} \\ \Rightarrow 2 \sin(x) + 3$$

Exercise 18.4

Find the amplitude, period, and phase shift of the function.

✓ a) $f(x) = 5 \sin(2x + \pi)$ ✓ b) $f(x) = 3 \sin(4x - \frac{\pi}{2})$
 ✓ c) $f(x) = 4 \sin(6x)$ ✓ d) $f(x) = 2 \cos(7x + \frac{\pi}{4})$

a) $f(x) = 5 \sin(2(x + \frac{\pi}{2}))$
 amplitude = 5
 period: $\frac{2\pi}{2} = \pi$
 phase shift = $-\frac{\pi}{2}$

b) $f(x) = 3 \sin(4(x - \frac{\pi}{8}))$
 amplitude = 3
 period = $\frac{2\pi}{4} = \frac{\pi}{2}$
 phase shift = $\frac{\pi}{8}$

c) $f(x) = 4 \sin(6x)$
 amplitude = 4
 period = $\frac{2\pi}{6} = \frac{\pi}{3}$
 phase shift = 0 (No phase shift)

d) $f(x) = 2 \cos(7(x + \frac{\pi}{28}))$
 amplitude = 2
 period = $\frac{2\pi}{7}$
 phase shift = $-\frac{\pi}{28}$

Exercise 18.5

Find the amplitude, period, and phase shift of the function. Use this information to graph the function over a full period. Label all roots, maxima, and minima of the function.

- | | | |
|-------------------------------------------------------------------------|-------------------------------------------------------------------------|-------------------------------------------------------------------------|
| a) $y = 5 \cos(2x)$ | b) $y = -4 \sin(\pi x)$ | <input checked="" type="checkbox"/> c) $y = 4 \sin(5x - \pi)$ |
| <input checked="" type="checkbox"/> d) $y = 6 \cos(2x - \pi)$ | <input checked="" type="checkbox"/> e) $y = 5 \sin(2x - \frac{\pi}{2})$ | <input checked="" type="checkbox"/> f) $y = 7 \cos(3x - \frac{\pi}{2})$ |
| <input checked="" type="checkbox"/> g) $y = 5 \sin(3x - \frac{\pi}{4})$ | <input checked="" type="checkbox"/> h) $y = 3 \sin(4x + \pi)$ | <input checked="" type="checkbox"/> i) $y = 2 \cos(5x + \pi)$ |
| <input checked="" type="checkbox"/> j) $y = 4 \sin(2x + \frac{\pi}{2})$ | k) $y = 3 \cos(6x + \frac{\pi}{2})$ | l) $y = 3 \cos(2x + \frac{\pi}{4})$ |

c) $y = 4 \sin(\underline{5}(x - \underline{\frac{\pi}{5}}))$
 $A = 4$ $P = \frac{2\pi}{5}$ \Rightarrow phase shift $= \frac{\pi}{5}$

d) $y =$

