

section 8.1

8.1 U

Sine and Cosine function in General form

in online text

$$y = A \sin(B(x-h)) + k$$

$$y = A \sin(Bx - C) + D$$

$$y = A \cos(B(x-h)) + k$$

$$y = A \cos(Bx - C) + D$$

Amplitude: $|A|$

$|A|$

frequency: $B \rightarrow$ Period: $P = \frac{2\pi}{|B|}$

$$P = \frac{2\pi}{|B|}$$

Phase Shift (Horizontal shift): h

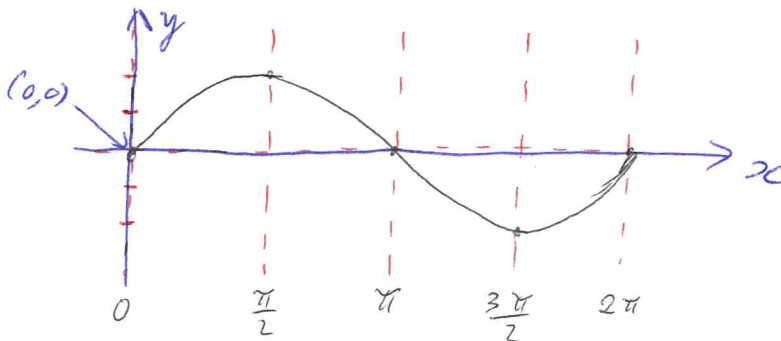
$$\frac{C}{B}$$

Vertical shift: k

D

$$6) f(x) = 2 \sin x = 2 \sin(1(x-(0))) + (0)$$

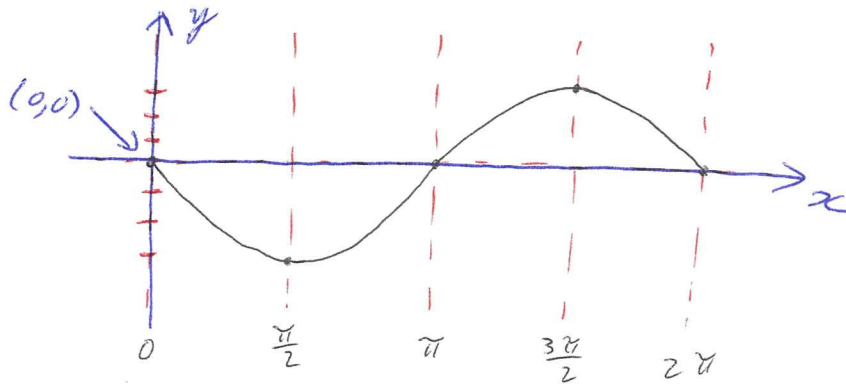
$$|A| = 2 \quad B = 1 \rightarrow P = \frac{2\pi}{|B|} = 2\pi \quad h = 0 \quad k = 0$$



$$8) f(x) = -3 \sin x = -3 \sin(1(x-0)) + 0$$

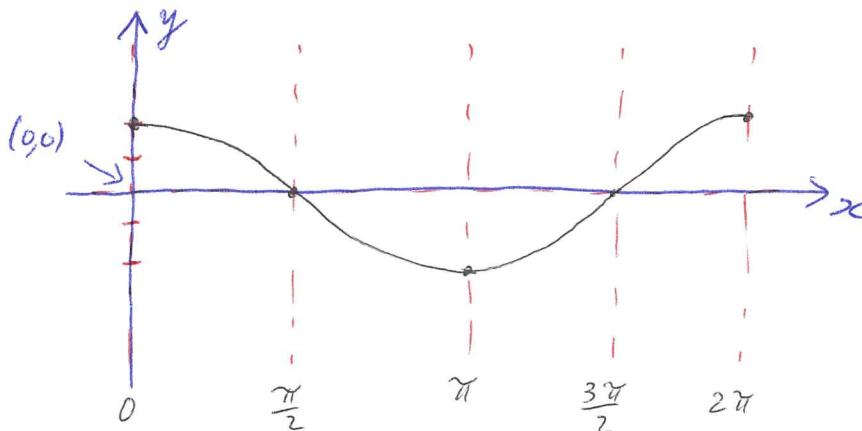
8.1 L2

$$|A| = |-3| = 3 \quad B = 1 \rightarrow P = \frac{2\pi}{|1|} = 2\pi \quad h = 0 \quad k = 0$$



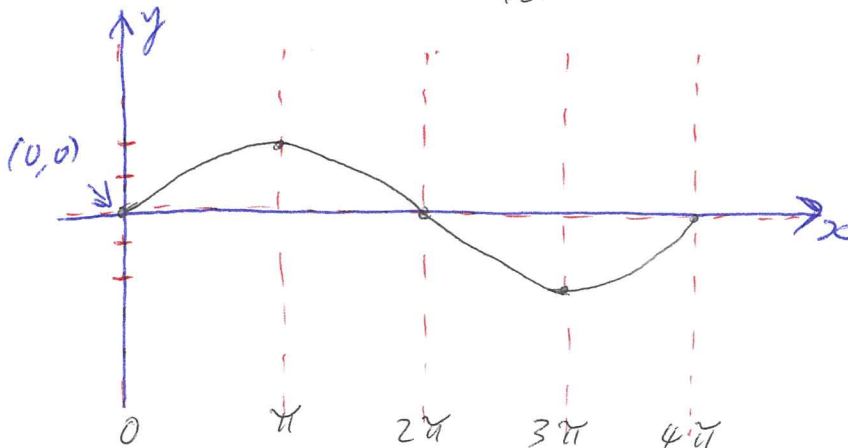
$$10) f(x) = 2 \cos x = 2 \cos(1(x-0)) + 0$$

$$|A| = 2 \quad B = 1 \rightarrow P = \frac{2\pi}{|1|} = 2\pi \quad h = 0 \quad k = 0$$



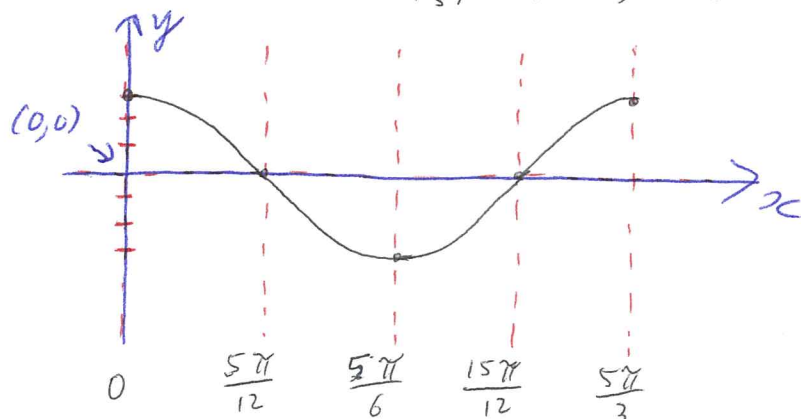
$$12) f(x) = 2 \sin\left(\frac{1}{2}x\right) = 2 \sin\left(\frac{1}{2}(x-0)\right) + 0$$

$$|A| = 2 \quad B = \frac{1}{2} \rightarrow P = \frac{2\pi}{|\frac{1}{2}|} = 4\pi \quad h = 0 \quad k = 0$$



$$14) f(x) = 3 \cos\left(\frac{6}{5}x\right) = 3 \cos\left(\frac{6}{5}(x-(0))\right) + (0)$$

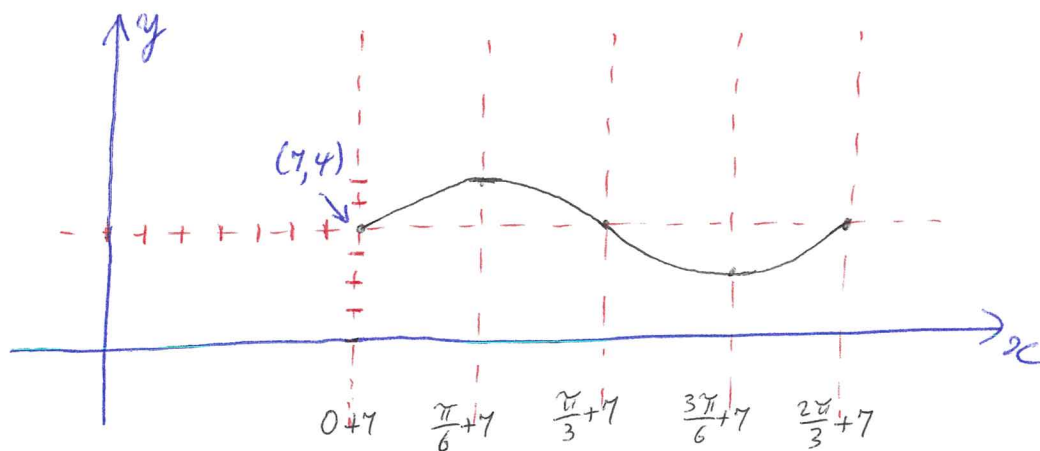
$$|A|=3 \quad B=\frac{6}{5} \rightarrow P=\frac{2\pi}{\frac{6}{5}}=\left(\frac{2\pi}{1}\right)\left(\frac{5}{6}\right)=\frac{5\pi}{3} \quad h=0 \quad k=0$$



$$16) y = 2 \sin(3x - 21) + 4 = 2 \sin(3(x - (7))) + (4)$$

$$|A|=2 \quad B=3 \rightarrow P=\frac{2\pi}{3}=\frac{2\pi}{3} \quad h=+7 \quad k=+4$$

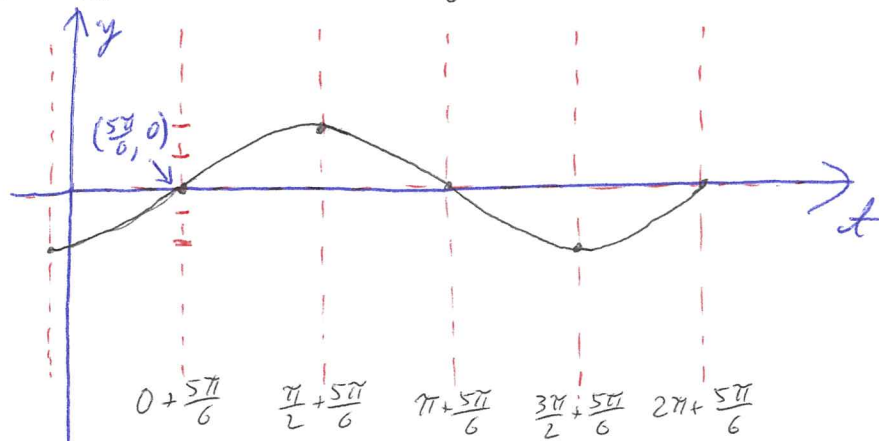
like
 $y = 2 \sin x$



$$18) f(t) = 2 \sin\left(t - \frac{5\pi}{6}\right) = 2 \sin\left(1\left(t - \left(\frac{5\pi}{6}\right)\right)\right) + (0)$$

$$|A|=2 \quad B=1 \rightarrow P=\frac{2\pi}{1}=2\pi \quad h=+\frac{5\pi}{6} \quad k=0$$

like
 $y = 2 \sin t$

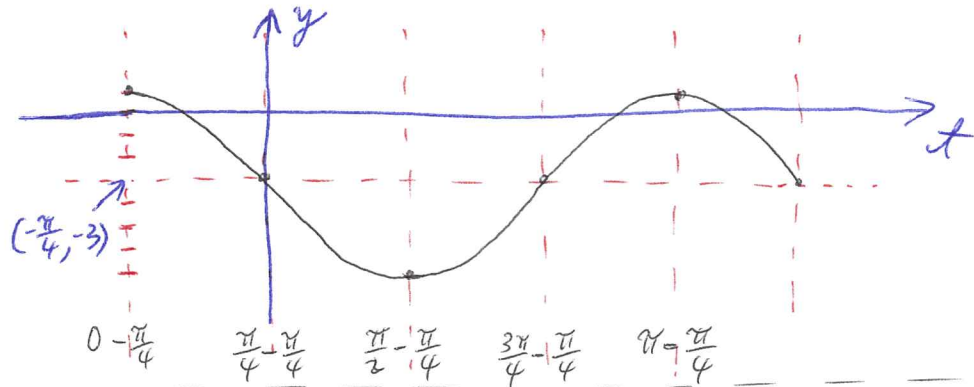


$$20) f(t) = 4 \cos(2(t + \frac{\pi}{4})) - 3 = 4 \cos(2(t - (-\frac{\pi}{4}))) + (-3)$$

8.14

$$|A| = 4 \quad B = 2 \rightarrow P = \frac{2\pi}{|2|} = \pi \quad h = -\frac{\pi}{4} \quad k = -3$$

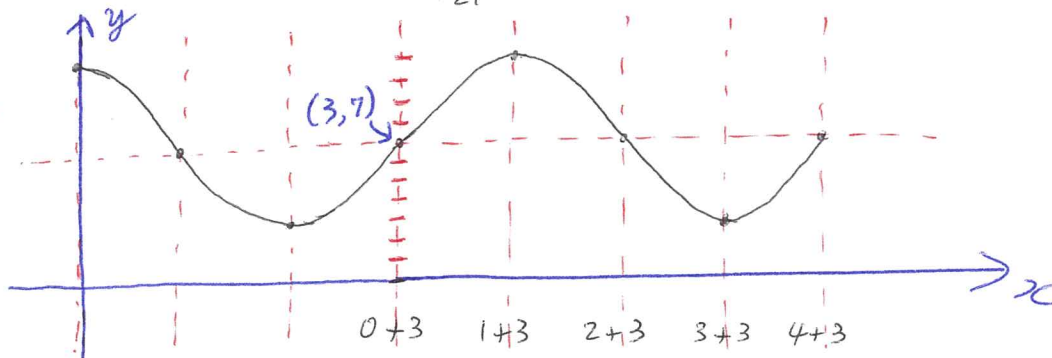
like
 $y = 4 \cos x$



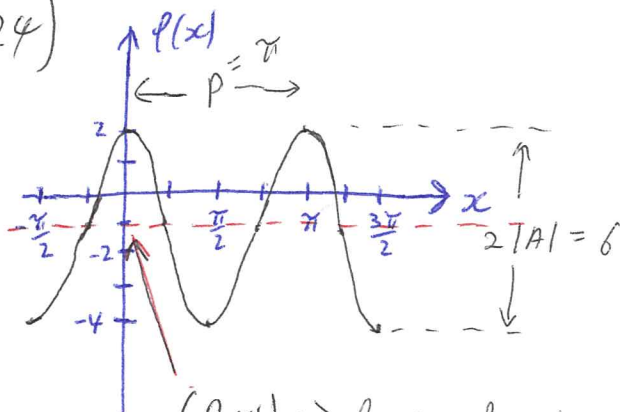
$$22) f(x) = 4 \sin(\frac{\pi}{2}(x-3)) + 7 = 4 \sin(\frac{\pi}{2}(x - (3))) + (7)$$

$$|A| = 4 \quad B = \frac{\pi}{2} \rightarrow P = \frac{2\pi}{|\frac{\pi}{2}|} = 4 \quad h = +3 \quad k = +7$$

like
 $y = \sin x$



24)



$$(0, -1) \Rightarrow h = 0 \quad k = -1$$

like $y = \cos x$

$$2|A| = 6$$

$$|A| = 3$$

$$P = \pi$$

$$\frac{2\pi}{|B|} = \pi$$

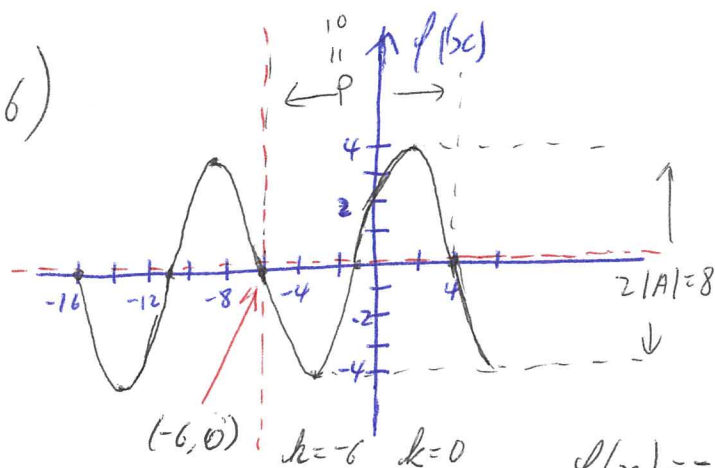
$$2\pi = \pi |B|$$

$$2 = |B|$$

$$f(x) = 3 \cos(2(x-0)) + (-1)$$

$$\underline{\underline{f(x) = 3 \cos(2x) - 1}}$$

26)

like $y = -\sin x$

$$2|A| = 8$$

$$|A| = 4$$

$$P = 10$$

$$\frac{2\pi}{|B|} = 10$$

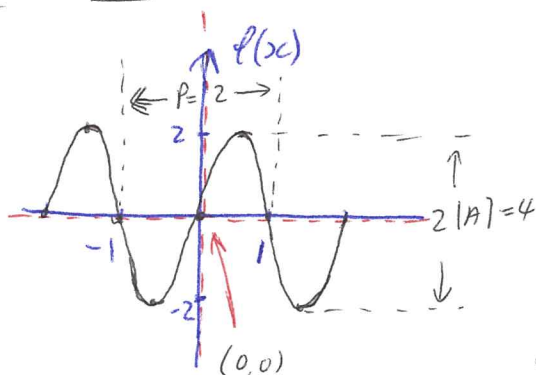
$$2\pi = 10|B|$$

$$\frac{2\pi}{10} = |B| \rightarrow |B| = \frac{2\pi}{5}$$

$$f(x) = -(4) \sin\left(\frac{2\pi}{5}(x - (-6))\right) + (0)$$

$$\underline{\underline{f(x) = -4 \sin\left(\frac{2\pi}{5}(x + 6)\right)}}$$

28)

like $y = \sin x$

$$2|A| = 4$$

$$|A| = 2$$

$$P = 2$$

$$\frac{2\pi}{|B|} = 2$$

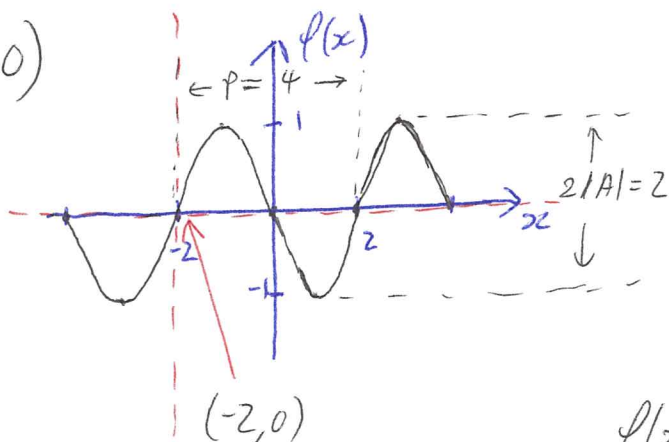
$$2\pi = 2|B|$$

$$\pi = |B| \rightarrow B = \pi$$

$$f(x) = (2) \sin(\pi(x - (0))) + (0)$$

$$\underline{\underline{f(x) = 2 \sin(\pi x)}}$$

30)

like $y = \sin x$

$$2|A| = 2$$

$$|A| = 1$$

$$P = 4$$

$$\frac{2\pi}{|B|} = 4$$

$$2\pi = 4|B|$$

$$\frac{2\pi}{4} = |B|$$

$$\frac{\pi}{2} = |B| \rightarrow B = \frac{\pi}{2}$$

$$f(x) = (1) \sin\left(\frac{\pi}{2}(x - (-2))\right) + (0)$$

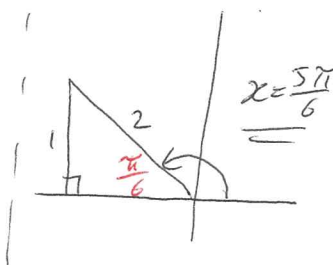
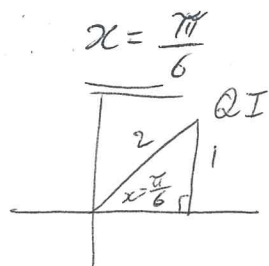
$$\underline{\underline{f(x) = \sin\left(\frac{\pi}{2}(x + 2)\right)}}$$

$$f(x) = \sin x \quad \text{on } [0, 2\pi)$$

8.16

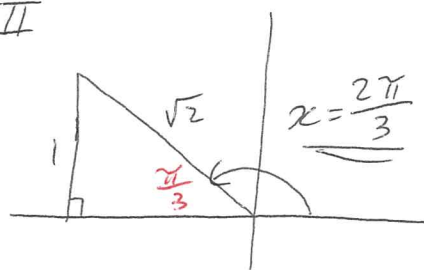
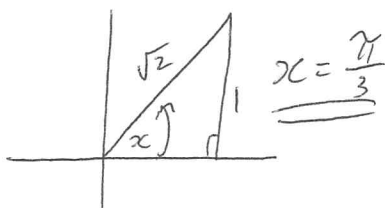
$$32) f(x) = \frac{1}{2} \quad \sin x = \frac{1}{2} > 0$$

Q I (also reference angle) | Q II



$$34) f(x) = \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}} \quad \sin x = \frac{1}{\sqrt{2}} > 0$$

Q I (reference angle) | Q II



$$36) \text{ minimum value occurs on } \sin\left(\frac{3\pi}{2}\right) = -1$$

$$x = \frac{3\pi}{2}$$

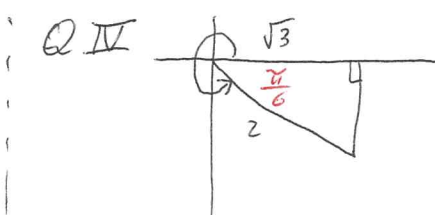
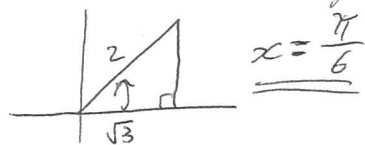
$$f(x) = \cos x \quad \text{on } [0, 2\pi)$$

$$38) f(x) = \cos x = 0 \rightarrow x = \frac{\pi}{2}, x = \frac{3\pi}{2}$$

$$40) x\text{-int of } f(x) = \cos x \rightarrow \left(\frac{\pi}{2}, 0\right), \left(\frac{3\pi}{2}, 0\right)$$

$$42) f(x) = \frac{\sqrt{3}}{2} \rightarrow \cos x = \frac{\sqrt{3}}{2} > 0$$

Q I (reference angle) | Q IV



$$x = \frac{11\pi}{6}$$