Worksheet #1: Graphing Sine and Cosine

① $y = \sin(4x)$ $\boxed{|A| = 1}$ $B = \frac{2\pi}{NP}$ $\boxed{NP = \frac{\pi}{2}}$

$4 = \frac{2\pi}{NP}$ $\boxed{NP = 90^\circ}$

② $y = \cos(5x)$ $\boxed{|A| = 1}$ $B = \frac{2\pi}{NP}$ $\boxed{NP = \frac{2\pi}{5}}$

$5 = \frac{2\pi}{NP}$ $\boxed{NP = 72^\circ}$

③ $y = 2\sin(x)$ $\boxed{|A| = 2}$ $\boxed{NP = 2\pi}$ $\boxed{NP = 360^\circ}$

④ $y = -4\sin(3x)$ $\boxed{|A| = 4}$ $3 = \frac{2\pi}{NP}$

↑ Reflect x-axis

$\boxed{NP = \frac{2\pi}{3}}$ $\boxed{NP = 120^\circ}$

⑤ $y = 2\sin(-4x)$ $\boxed{|A| = 2}$ $4 = \frac{2\pi}{NP}$

↑ Reflect y-axis

$\boxed{NP = \frac{\pi}{2}}$ $\boxed{NP = 90^\circ}$

⑥ $y = 3\sin\left(\frac{2}{3}x\right)$ $\boxed{|A| = 3}$ $\frac{2}{3} = \frac{2\pi}{NP}$

$\boxed{NP = 3\pi}$ $\boxed{NP = 540^\circ}$

⑦ $|A| = \frac{3-(-3)}{2} = 3$ $\quad NP = \pi$ $\quad B = \frac{2\pi}{\pi}$

$B = 2$

$y = 3\sin(2x)$

$y = 3\cos\left[2\left(x - \frac{\pi}{4}\right)\right]$ shifted $\pi/4 \rightarrow$

⑧ $|A| = \frac{4-(-4)}{4} = 4$ $\quad NP = 2\pi$ $\quad B = 1$

$y = 4\cos(x)$

$y = 4\sin(x + \pi/2)$ or $y = -4\sin(x - \pi/2)$

⑨ $|A| = \frac{2-(-2)}{2} = 2$ $\quad NP = 4\pi$ $\quad B = \frac{2\pi}{4\pi}$

$B = \frac{1}{2}$

$y = 2\sin\left(\frac{1}{2}x\right)$

$y = 2\cos\left[\frac{1}{2}(x - \pi)\right]$ shifted $\pi \rightarrow$

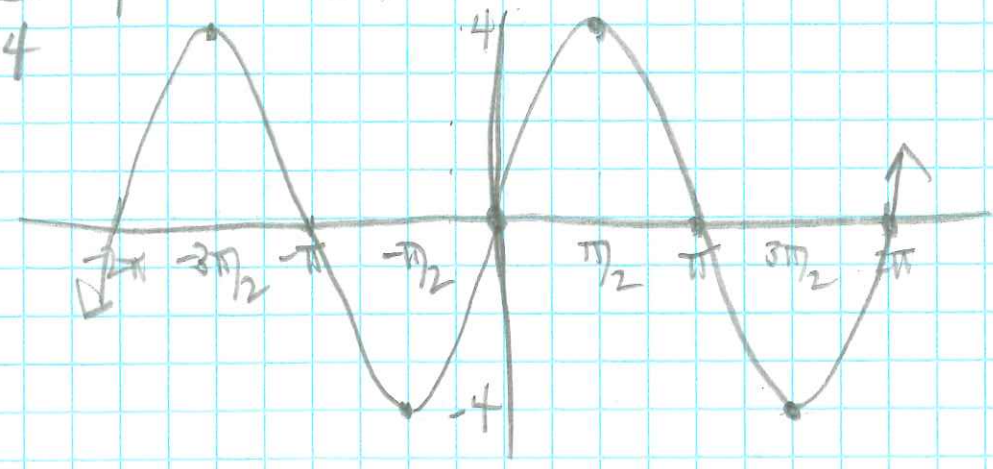
⑩ $|A| = \frac{5-(-5)}{2} = 5$ $\quad NP = 2\pi$ $\quad B = 1$

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

$y = 5\sin(x - \pi/2)$ or $y = -5\sin(x + \pi/2)$

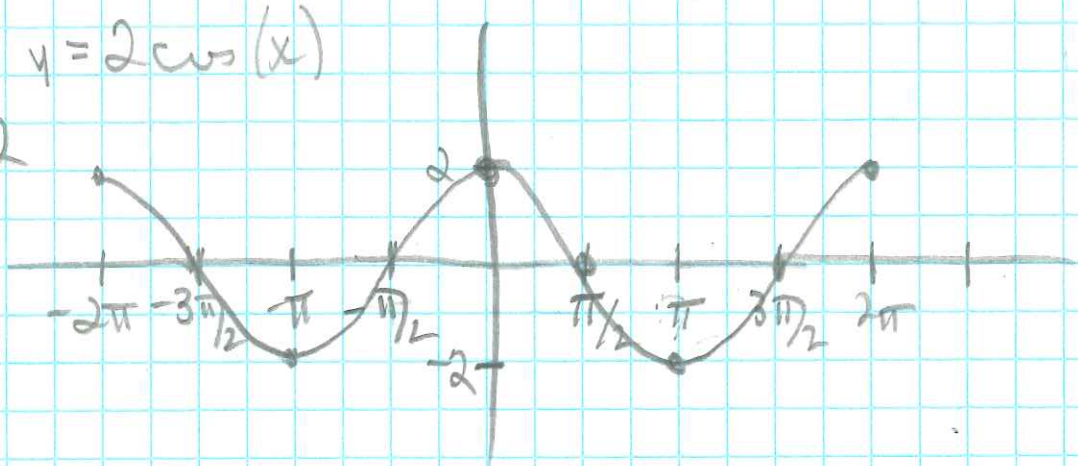
(11) $y = 4\sin(x)$

$|A| = 4$



(12) $y = 2\cos(x)$

$|A| = 2$

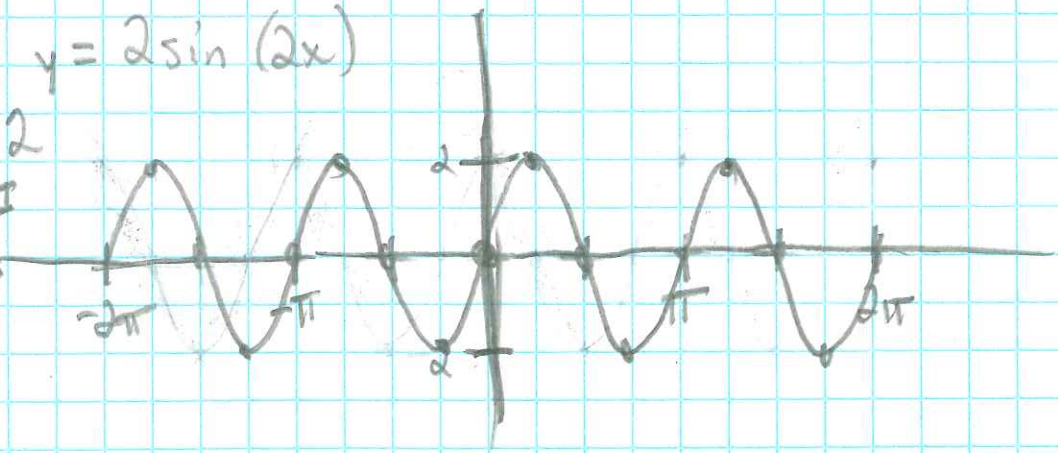


(13) $y = 2\sin(2x)$

$|A| = 2$

$NP = \frac{2\pi}{2}$

$NP = \pi$

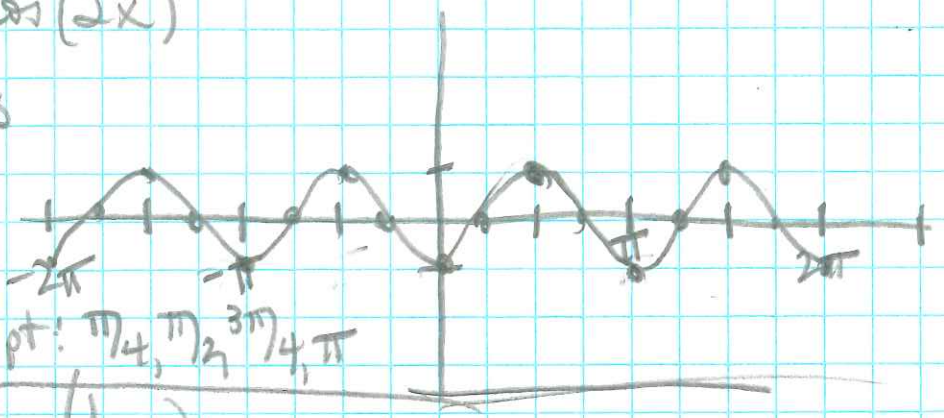


(14) $y = -\cos(2x)$

Reflect x-axis

$NP = \frac{2\pi}{2}$

$NP = \pi$ critical pt: $\pi/4, \pi/2, 3\pi/4, \pi$

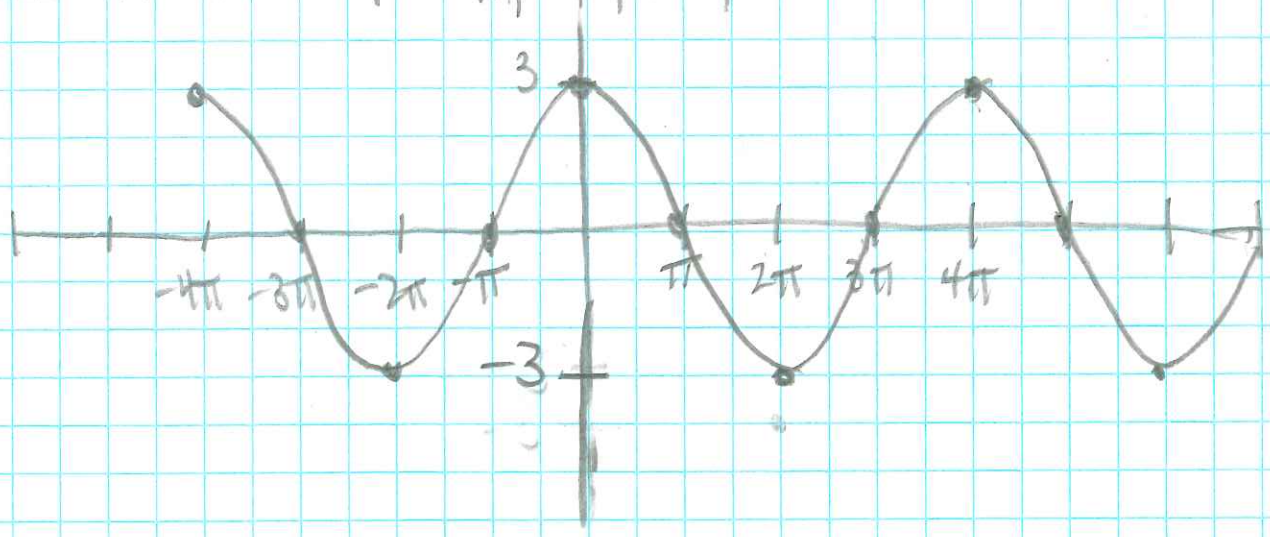


(15) $y = 3\cos\left(\frac{1}{2}x\right)$

$|A| = 3$

$NP = \frac{2\pi}{1/2}$

$NP = 4\pi$ critical pts: $\pi, 2\pi, 3\pi, 4\pi$



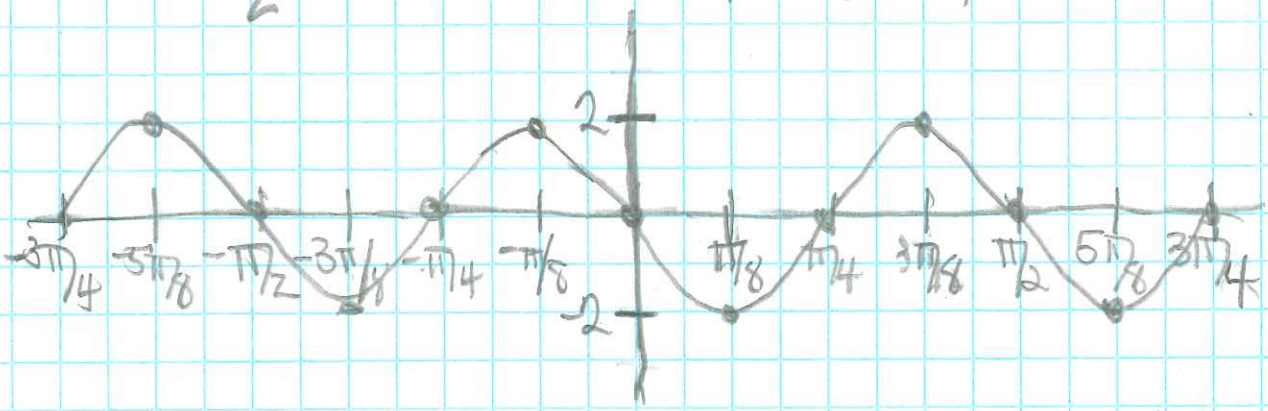
(16) $y = -2\sin(4x)$

Reflect x-axis

$|A| = 2$

$NP = \frac{2\pi}{4}$

$NP = \frac{\pi}{2}$ critical pt: $\pi/8, \pi/4, 3\pi/8, \pi/2$



(17) $y = 2 + 3\sin(4x + \pi/2)$

$y = 3\sin\left[4\left(x + \frac{\pi}{8}\right)\right] + 2$

$|A| = 3$ $NP = \frac{2\pi}{4}$ $PS = \leftarrow \pi/8$ $VS = \uparrow 2$

$NP = \frac{\pi}{2}$

(18) $y = 2\cos(x - \pi)$

$|A| = 2$ $NP = \frac{2\pi}{1}$ $PS = \rightarrow \pi$ $VS = \text{none}$

$= 2\pi$

(19) $y = \frac{1}{2}\cos(2x) - 4$

$|A| = \frac{1}{2}$ $\quad NP = \frac{2\pi}{2}$ $\quad PS = \text{none}$ $\quad VS = \downarrow 4$

$NP = \pi$

(20) $y = 3 + 4\sin(x - \pi)$

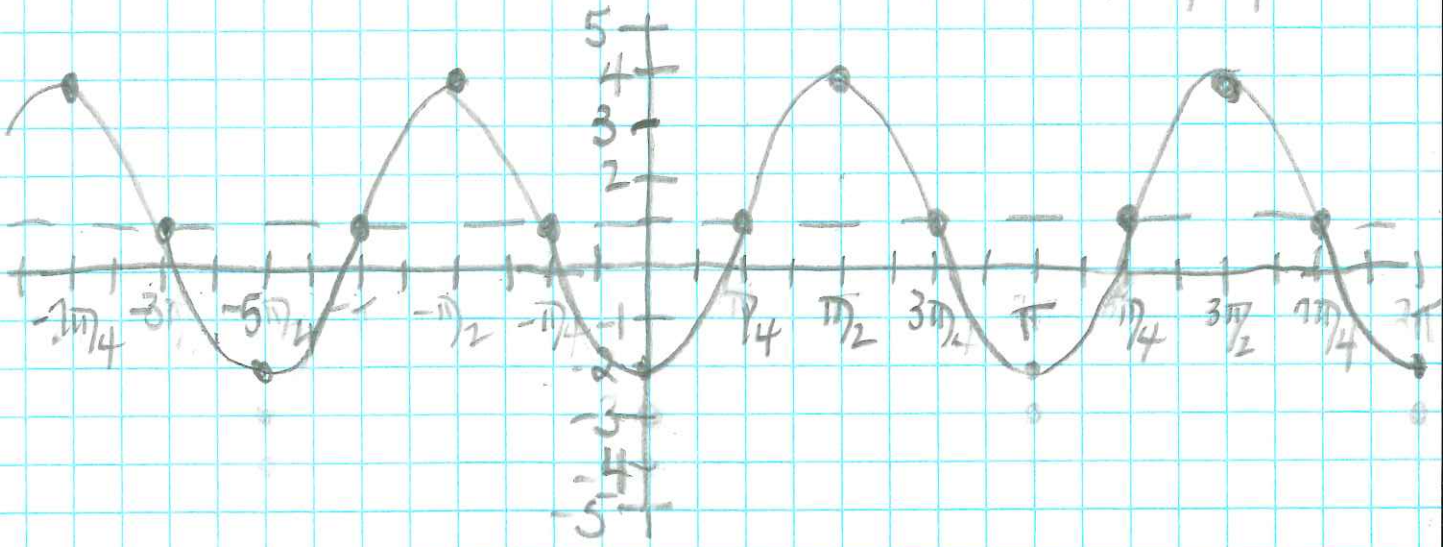
$|A| = 4$ $\quad NP = \frac{2\pi}{1}$ $\quad PS = \rightarrow \pi$ $\quad VS = \uparrow 3$

$= 2\pi$

(21) $y = 1 + 3\sin(2x - \frac{\pi}{2}) \rightarrow y = 3\sin\left[2\left(\pi - \frac{\pi}{4}\right)\right] + 1$

$|A| = 3$ $\quad NP = \frac{2\pi}{2}$ $\quad PS = \rightarrow \frac{\pi}{4}$ $\quad VS = \uparrow 1$

$= \pi$ critical pts: $\pi/4, \pi/2, 3\pi/4, \pi$, etc



(22) $y = 2\cos(x+\pi) - 2$

$|A| = 2$ $\quad NP = \frac{2\pi}{1}$ $\quad PS: \leftarrow \pi$ $\quad VS = \downarrow 2$

$NP = 2\pi$ critical pts: $-\pi, -\pi/2, 0, \pi/2, \pi$