College Algebra

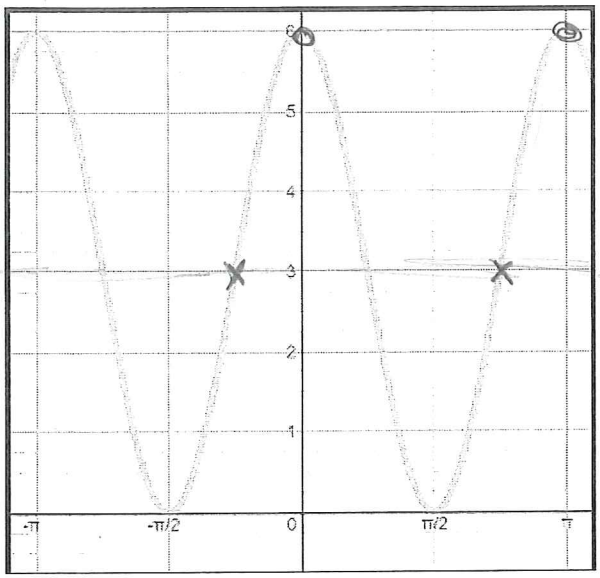
Name: Key

Unit 8 Test Review

Date: _____ Period: _____

**Write the equation for each graph.**

**1.)**




A = 3

P = π

B = 2

• $y = 3\cos 2x + 3$

Equation: _____

× $y = 3\sin 2(x + \frac{\pi}{4}) + 3$

**2.)**

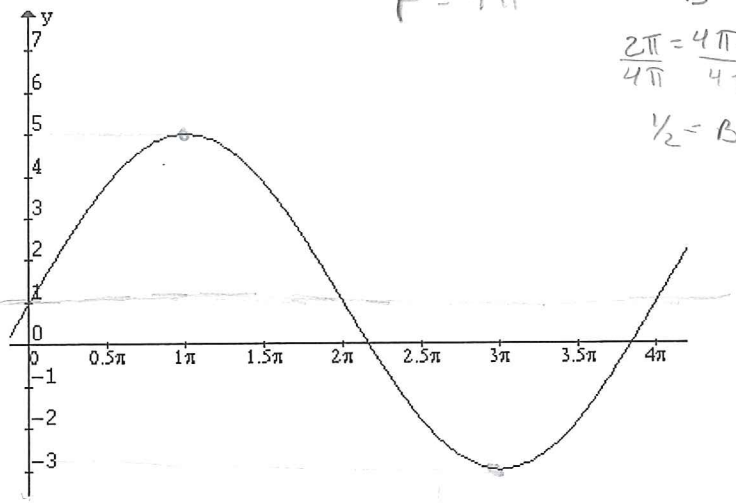
A = 4

P = 4π

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

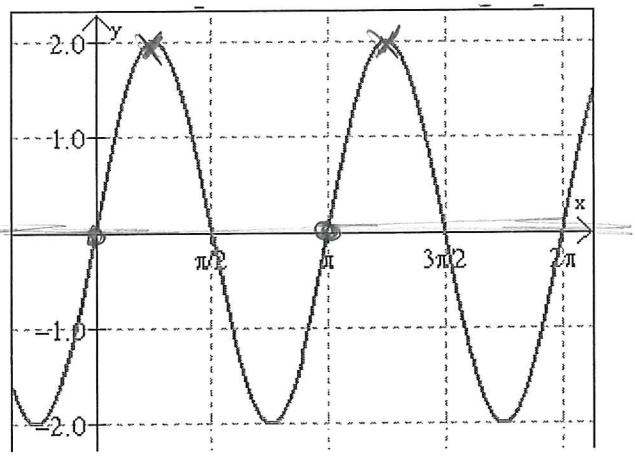
$\frac{2\pi}{4\pi} = \frac{4\pi B}{4\pi}$

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




Equation: $y = 4\sin \frac{1}{2}x + 1$

**3.)**




P = π

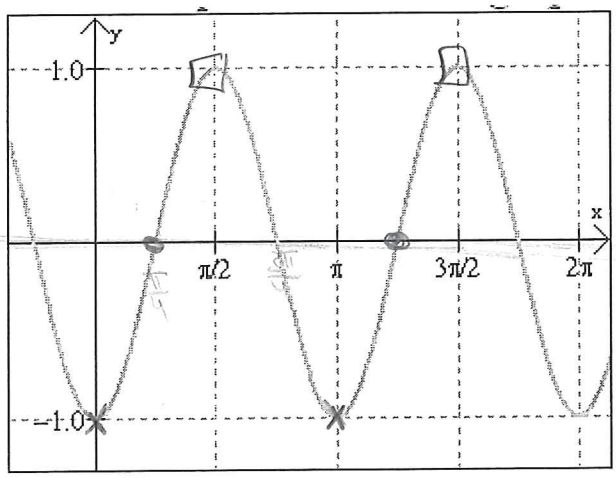
B = 2

• $y = 2\sin x$

Equation: _____

× $y = 2\cos 2(x - \pi/4)$

**4.)**




P = π

B = 2

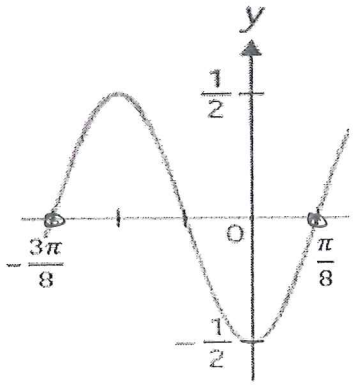
• $y = \sin 2(x - \frac{\pi}{4})$

Equation: × $y = -\cos 2x$

□ $y = \cos 2(x - \frac{\pi}{2})$

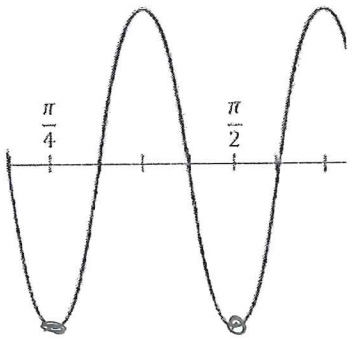
**For each graph in problems 5 - 7, what is the least value for the period? Show how you arrived at your answer.**

**5.)**



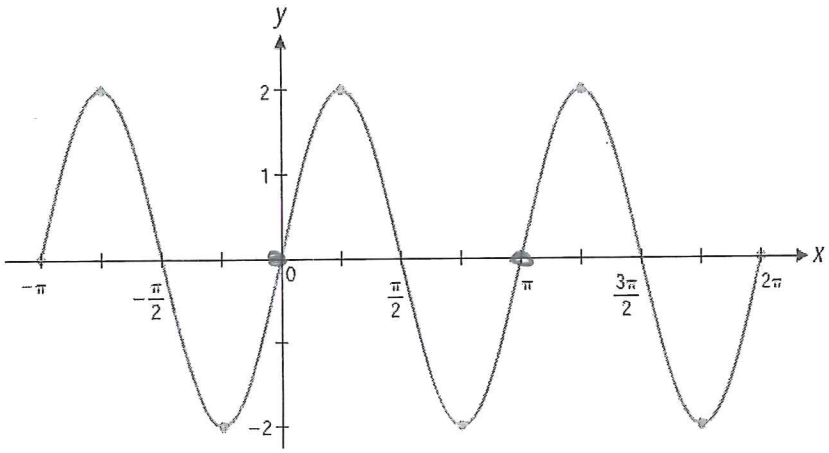

$\frac{\pi}{8} - \frac{-3\pi}{8} = \boxed{\frac{\pi}{2}}$

**6.)**




$\frac{\pi}{2} - \frac{\pi}{4} = \boxed{\frac{\pi}{4}}$

**7.)**




$\pi - 0 = \boxed{\pi}$

**List the important information for each equation.**

**8.)** $y = 3\tan\frac{1}{3}x - 2$

Amplitude: DNE

Period: $\pi/\frac{1}{3} = 3\pi$

H.S.: none

V.S.: $\downarrow 2$

Asymp.: $-\frac{3\pi}{2}, \frac{3\pi}{2}$

Domain: $\left(\frac{-3\pi}{2}, \frac{3\pi}{2}\right)$

Range: $(-\infty, \infty)$

**9.)** $y = -\cot(2x + \pi) + 3$ $\quad 2(x + \pi/2)$

Amplitude: DNE

Period: $\frac{\pi}{2}$

H.S.: $\leftarrow \frac{\pi}{2}$

V.S.: $\uparrow 3$

Asymp.: $-\frac{\pi}{2}, 0, \frac{\pi}{2}$

Domain: $\left(-\frac{\pi}{2}, 0\right)$

Range: $(-\infty, \infty)$

**10.)** $y = -\tan\left(2x - \frac{\pi}{2}\right)$ $\quad 2(x - \pi/4)$

Amplitude: DNE

Period: $\frac{2\pi}{2} = \pi$

H.S.: $\rightarrow \pi/4$

V.S.: none

Asymp.: $-\pi/4, 3\pi/4$

Domain: $\left(-\pi/4, \frac{3\pi}{4}\right)$

Range: $(-\infty, \infty)$

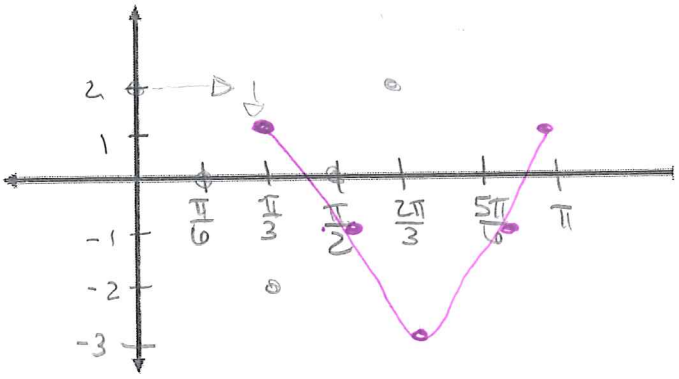
**Identify the amplitude, period, and any shifts for each equation. Then graph. Be sure to clearly indicate the location of the asymptotes, if any.**

**11.)** $y = 2\cos 3\left(x - \frac{\pi}{3}\right) - 1$

Amplitude: 2 Period: $\frac{2\pi}{3}$

H.S: $\frac{\pi}{3}$ → V.S.: ↓ 1

Domain: $(-\infty, \infty)$ Range: $[-3, 1]$

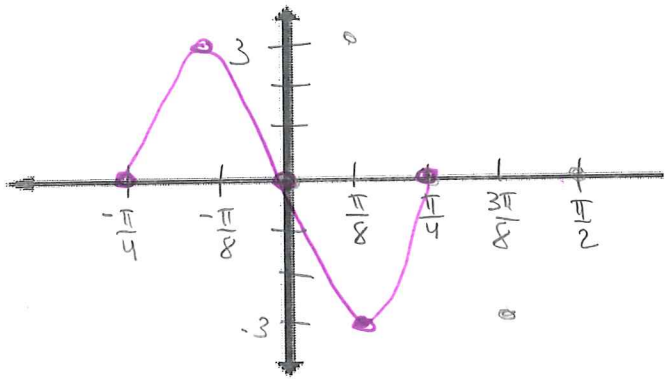



**12.)** $y = 3\sin(4x + \pi)$ $4(x + \pi/4)$

Amplitude: 3 Period: $\frac{2\pi}{4} = \frac{\pi}{2}$

H.S: $\frac{\pi}{4}$ ← V.S.: none

Domain: $(-\infty, \infty)$ Range: $[-3, 3]$

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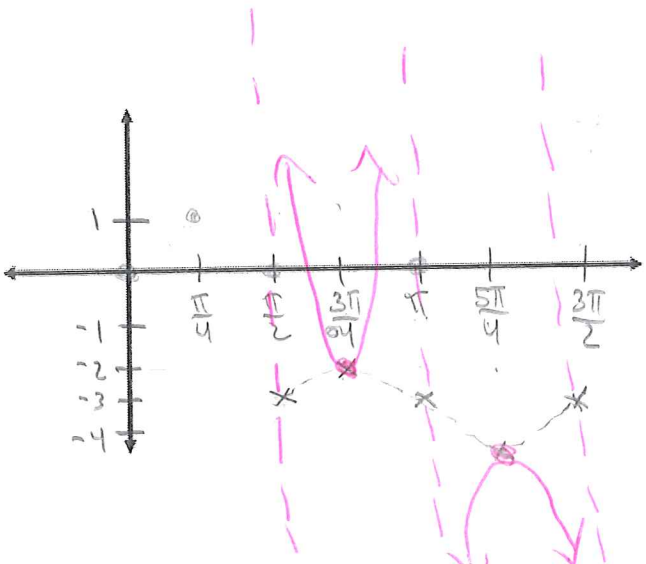
**13.)** $y = \csc(2x - \pi) - 3$ $2(x - \pi/2)$ sin

Amplitude: DNE (1) Period: $\frac{2\pi}{2} = \pi$

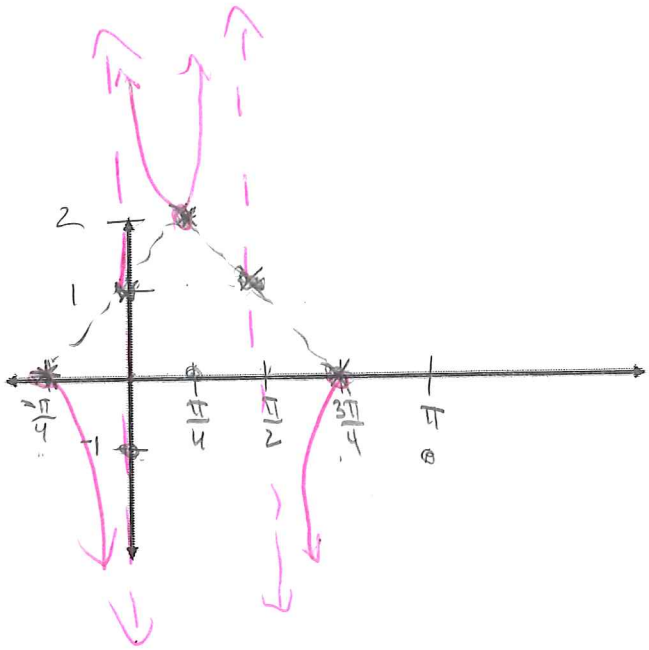
H.S: $\frac{\pi}{2}$ → V.S.: ↓ 3




**14.)** $y = -\sec 2\left(x + \frac{\pi}{4}\right) + 1$

Amplitude: DNE (1 flipped) Period: $\frac{2\pi}{2} = \pi$

H.S: ← $\frac{\pi}{4}$ V.S.: ↑ 1



**15.)** Write the equation of a cosine function that has a third of the period, an amplitude of 3, and a vertical shift of 5 units down. LS

$P = 2\pi$ (normal) $\quad \frac{2\pi}{3} = P$ (1/3 of period) $\quad A = 3$

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

$B = 3$

y = $3\cos 3x - 5$

**16.)** Name 5 x-values that contain the vertical asymptotes for the following graphs.

a.) $y = -3\tan\left(4x - \frac{\pi}{2}\right) + 1$

$P = \frac{\pi}{4} \rightarrow \pi/8$

$-\frac{\pi}{2}, -\frac{\pi}{4}, 0, \pi/4, \pi/2, \frac{3\pi}{4}$

b.) $y = \cot(2x + \pi) - 3$

$2(x + \frac{\pi}{2})$

$P = \pi/2$

$-\frac{3\pi}{2}, -\pi/2, 0, \pi/2, \pi, 3\pi/2$

**17.)** In comparison to $y = \cos x$, which of the following has half the amplitude and three times the period? $P = 2\pi$ normal $\quad P = 6\pi$ now $\quad A = 1/2$

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

$B = 1/3$

a.) $y = \frac{1}{2}\cos 3x$

b.) $y = 2\cos\frac{1}{3}x$

c.) $y = 2\cos 3x$

d.) $y = \frac{1}{2}\cos\frac{1}{3}x$

**18.)** The monthly average electric bill for a family of 2 is shown in the table below.

| Month | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $ | 61 | 65 | 70 | 75 | 79 | 80 | 79 | 75 | 70 | 65 | 61 | 60 |

H L

Which of the following functions models the data most closely?

$A = \frac{80 - 60}{2} \quad 10$

$P = \pi/6$ (12 months)

V.S. $\frac{80+60}{2} = 70$

H.S. look at table $\frac{3}{70}$

$\rightarrow 3$

a.) $f(x) = 10\sin\frac{\pi}{6}(x - 3) + 51$

b.) $f(x) = 61\sin\frac{\pi}{6}(x - 1) + 20$

c.) $f(x) = 10\sin\frac{\pi}{6}(x - 3) + 70$

d.) $f(x) = 80\sin\frac{\pi}{6}(x - 3) + 61$