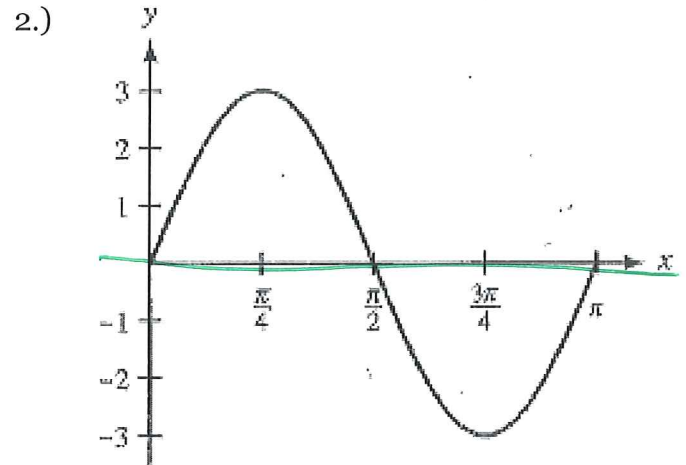
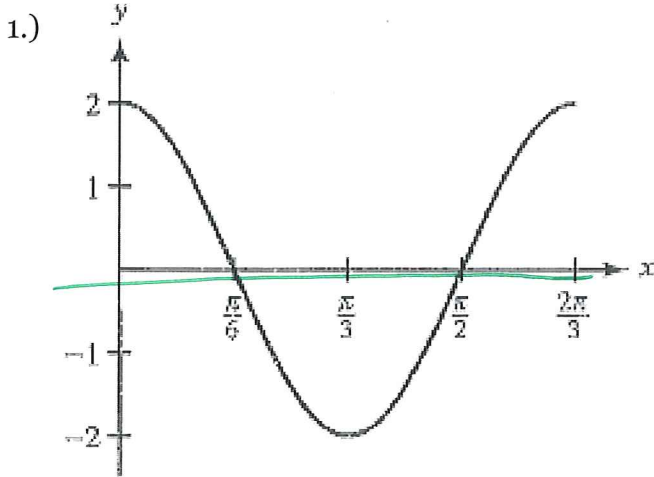
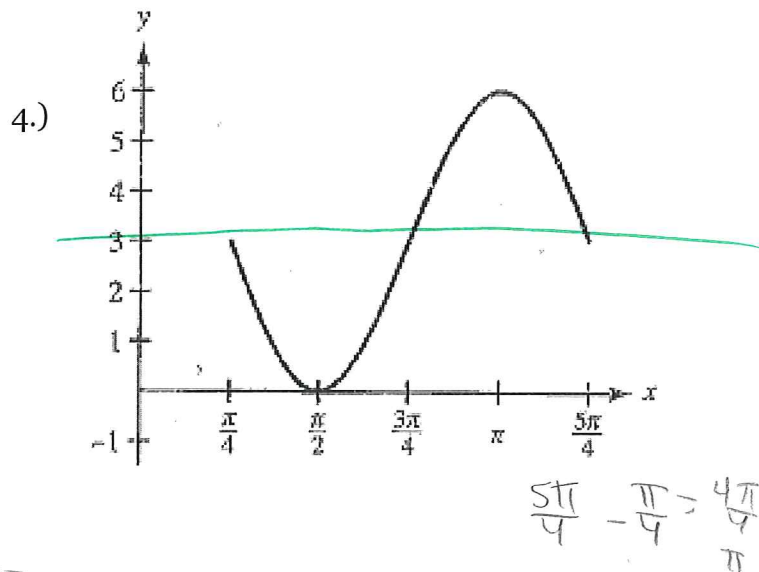
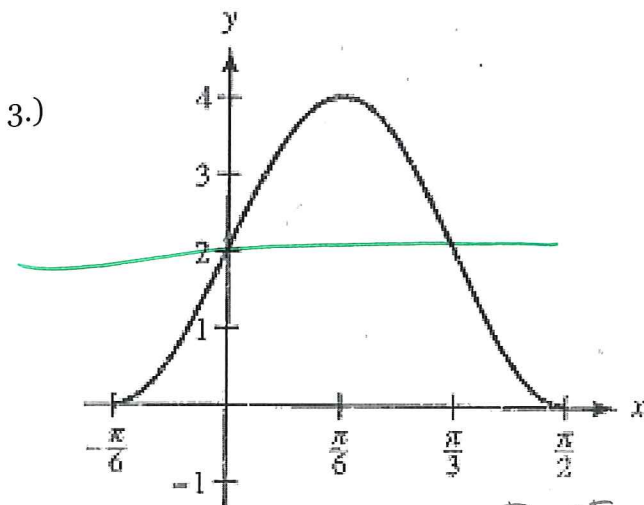


Identify the amplitude, period, and shifts of the following graphs. Then write the equation.



Amplitude: 2 Vertical Shift: none  
 Period:  $\frac{2\pi}{3}$   $B=3$  Horizontal Shift: none  
 Equation:  $y = 2\cos 3x$

Amplitude: 3 Vertical Shift: none  
 Period:  $\pi$   $B=2$  Horizontal Shift: none  
 Equation:  $y = 3\sin 2x$



Amplitude: 2<sup>\*</sup>(-) Vertical Shift:  $\uparrow 2$   
 Period:  $\frac{2\pi}{3}$   $B=3$  Horizontal Shift:  $\leftarrow \frac{\pi}{6}$   
 Equation:  $y = -2\cos 3(x + \frac{\pi}{6}) + 2$

*Handwritten notes:*  
 $\frac{\pi}{6} - \frac{\pi}{6} = 0$   
 $\frac{3\pi}{6} + \frac{\pi}{6} = \frac{4\pi}{6} = \frac{2\pi}{3}$

Amplitude: 3<sup>\*</sup>(-) Vertical Shift:  $\uparrow 3$   
 Period:  $\pi$   $B=2$  Horizontal Shift:  $\frac{\pi}{4} \rightarrow$   
 Equation:  $y = -3\sin 2(x - \frac{\pi}{4}) + 3$

*Handwritten notes:*  
 $\frac{5\pi}{4} - \frac{\pi}{4} = \frac{4\pi}{4} = \pi$

Write equations for sine/cosine given the following changes to the parent graph.

5.) Cosine

Amplitude: 8

Period:  $3\pi$

$$\begin{aligned} \frac{3\pi}{1} &= \frac{2\pi}{B} \\ 2\pi &= 3\pi B \\ \frac{2}{3} &= B \end{aligned}$$

Equation:  $y = 8 \cos \frac{2}{3}x$

6.) Sine

Period:  $\frac{\pi}{5}$

Vertical shift: down 5

$$\begin{aligned} \frac{2\pi}{B} &= \frac{\pi}{5} \\ 10\pi &= \pi B \\ 10 &= B \end{aligned}$$

Equation:  $y = \sin 10x - 5$

7.) Cosine

Period: 3 times the parent graph  $6\pi$

Horizontal shift: right  $\frac{\pi}{4}$

Vertical shift: up 2

$$\begin{aligned} \frac{2\pi}{B} &= \frac{6\pi}{1} \\ 6\pi B &= 2\pi \\ B &= \frac{1}{3} \end{aligned}$$

Equation:  $y = \cos \frac{1}{3}(x - \frac{\pi}{4}) + 2$

8.) Sine

Amplitude: 6

Period:  $\frac{\pi}{7}$

Horizontal shift: right  $\frac{\pi}{2}$

$$\begin{aligned} \frac{2\pi}{B} &= \frac{\pi}{7} \\ 14\pi &= \pi B \\ 14 &= B \end{aligned}$$

Equation:  $y = 6 \sin 14(x - \frac{\pi}{2})$

9.) Cosine

Amplitude: 2

Horizontal shift: left  $\frac{\pi}{18}$

Vertical shift: down 5

Equation:  $y = 2 \cos(x + \frac{\pi}{18}) - 5$

10.) Sine

Amplitude:  $\frac{1}{3}$

Period:  $12\pi$

Horizontal shift: left  $\frac{5\pi}{12}$

Vertical shift: up 4

$$\begin{aligned} \frac{2\pi}{B} &= \frac{12\pi}{1} \\ 12\pi B &= 2\pi \\ B &= \frac{1}{6} \end{aligned}$$

Equation:  $y = \frac{1}{3} \sin \frac{1}{6}(x + \frac{5\pi}{12}) + 4$