Solutions to Trig Homework problems

*Give a sinusoidal equation for each graph.*

\[ Y = 3 \cos 2(x - 0) - 1 \]  
note: period appears to be \( \pi \)

\[ Y = 1 \cos \frac{1}{2} (x + 2) + 0 \]  
note: period appears to be \( 4\pi \)

\[ Y = \frac{1}{2} \cos \frac{4\pi}{3} (x - 0) + 2 \]  
note: if period appears to be 1.5

\[ Y = \frac{1}{2} \cos 4x + 2 \]  
note: if period appears to be \( \pi/2 \)
Write the equation of the graph described.

4. The graph of $y = \sin 2\pi x$ translated down 5 units and right 2 units.
   \[ Y = \sin 2\pi (x - 2) - 5 \]

5. The graph of $y = 3 \cos x$ translated up 3 units and left $\pi$ units.
   \[ Y = 3 \cos (x + \pi) + 3 \]

6. Explain how $y = \sin x$ can be translated to become the graph of $y = \cos x$.
   Phase shift of $\pi/2$, so $y = \sin x = \cos (x + \pi/2)$

7. Biologists use sine and cosine functions to model oscillations in predator and prey populations. The population $R$ of rabbits and the population $C$ of coyotes in a particular region can be modeled by
   \[
   R = 25000 + 15000 \cos \frac{\pi}{12} t \\
   C = 5000 + 2000 \sin \frac{\pi}{12} t
   \]
   where $t$ is time in months. Graph both functions on the same coordinate plane and describe how the characteristics of the graphs relate to the diagram shown.
State the amplitude and period of the function.

8. \( y = \frac{5}{2} \sin 7x \)  \( \text{amp} = \frac{5}{2} \)  \( \text{period} = \frac{2\pi}{7} \)

9. \( y = 3 \cos \pi x \)  \( \text{amp} = 3 \)  \( \text{period} = 2 \)

10. \( y = 4 \cos \frac{3\pi}{2} x \)  \( \text{amp} = 4 \)  \( \text{period} = \frac{4}{3} \)

Graph the function.

11. \( y = 2 \sin \pi x \)

12. \( y = \frac{3}{2} \cos \frac{1}{3} \pi x \)

13. \( y = -3 \cos (x + \pi) \)