1.6 Periodic Functions Handout

Tips:

- A periodic function means the graph repeats by the *same amount* in *only* the horizontal direction.
- The property of periodicity is summarized by the equation

$$f(x+P) = f(x),$$

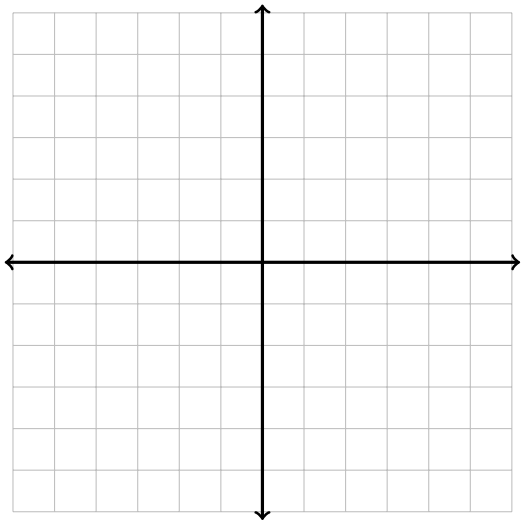
  where P is the period.
- Remember, a function is not *just* a formula!

1. Suppose a periodic function with period 10. If $f(2) = \pi$, $f(7) = -8$, and $f(-8) = 14$, find $f(82)$, $f(27)$, and $f(-38)$.

2. A function is periodic with period 2π. If $f(\frac{\pi}{2}) = 8$, $f(\pi) = -101$, $f(\frac{3\pi}{2}) = 6$, and $f(2\pi) = 0$, find $f(\frac{17\pi}{2})$.

3. The function $g(x)$ is periodic with period 1 and $g(x) = 3 - 2x$ whenever x is in the interval $[0, 1)$.

(a) Draw a graph of $g(x)$. (Be sure to include at least two periods.)



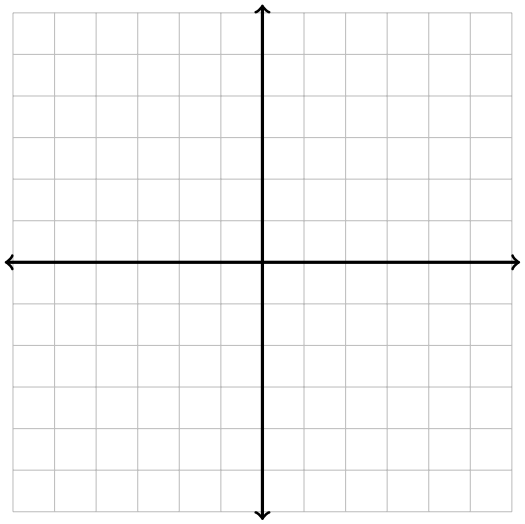
(b) Find $g(0), g(4.5)$, and $g(109)$.

(c) For what values of x does $g(x) = 2$?

(d) Find the amplitude and midline of $g(x)$.

4. The function $f(x)$ is periodic with period 2 and $f(x) = x^2$ whenever x is in the interval $(-1, 1]$.

   (a) Draw a graph of $f(x)$. (Be sure to include at least two periods.)



   (b) Compute $f(0)$ and $f(9)$.

   (c) For what values of x does $f(x) = 0.5$?