By now, you should be able to: Find the domain and range of functions, graph basic functions and shifts of basic functions, determine if a function is even or odd, determine a function from a description, complete the square, know the unit circle and how to visualize some common trigonometric identities, know the other trig functions in terms of sin and cosine.

1. Three of the following points are collinear. How can you tell which ones they are? Find the equation of the line they are on. (0, -3), (4, -1/2), (5, 1), (-1, -8)

2. Solve the inequality \(x^2 + x - 12 \geq 0\).

3. What does it mean for a function to be even? What does this mean graphically? What does it mean for a function to be odd? What does this mean graphically? Think of a function that is neither even nor odd. Is there a function that is both even and odd?

4. Determine if each of the following functions are even, odd, or neither:
   
   (a) \(f(x) = \sin(x)\)  
   (b) \(f(x) = \cos(x)\)  
   (c) \(f(x) = x^3 + x^{-1}\)  
   (d) \(f(x) = x^2 + x\)  
   (e) \(f(x) = e^x\)  
   (f) \(f(x) = x^{-2}\)

5. Below there are four cases for \(f\) and \(g\). Decide if \(f + g\), \(fg\), and \(g \circ f\) are even, odd, or neither.
   
   (a) \(f\) is even, \(g\) is even  
   (b) \(f\) is odd, \(g\) is odd  
   (c) \(f\) is even, \(g\) is odd  
   (d) \(f\) is odd, \(g\) is even

6. Draw the unit circle, with the values corresponding to multiples of \(\frac{\pi}{4}\) and \(\frac{\pi}{6}\).

7. Sketch graphs of \(\sin(x)\) and \(\cos(x)\). Now sketch a graph of \(\cos(x - \frac{\pi}{2})\). What do you notice?

8. Below are a number of different trigonometric expressions involving or related to \(\sin x\). Identify which expressions are equal to each other. (Warning: Not everything is in a group and there are some groups of more than 2!)
   
   (a) \(\sin^2 x\)  
   (b) \(2\sin x\)  
   (c) \((\csc x)^{-1}\)  
   (d) \(\sin^2 x\)  
   (e) \((\sin x)^{-1}\)  
   (f) \(\frac{\sin 2x}{\cos x}\)  
   (g) \(\csc x\)  
   (h) \(\arcsin x\)  
   (i) \(1 - \cos^2 x\)  
   (j) \((\sin x)^2\)  
   (k) \(\frac{1}{\sin x}\)  
   (l) \(\sin^{-1} x\)  
   (m) \(\sin 2x\)  
   (n) \(\sin \frac{x}{2}\)  
   (o) \(\cos^2 x - \cos 2x\)  
   (p) \(\sin^2 x\)  
   (q) \(\cos^2 x\)  
   (r) \(\sin x\)  
   (s) \(\cos x\)  
   (t) \(\sin 2x\)  
   (u) \(\cos 2x\)  
   (v) \(\sin x\)  
   (w) \(\cos x\)  
   (x) \(\sin 2x\)  
   (y) \(\cos 2x\)  
   (z) \(\sin x\)  
   (aa) \(\cos x\)  
   (ab) \(\sin 2x\)  
   (ac) \(\cos 2x\)
9. Sketch the graphs of the following functions:

(a) \( y = \sin(x) \)
(b) \( y = \sin(2x) \)
(c) \( y = 4\sin(2x) \)
(d) \( y = 4\sin(2x - \frac{\pi}{2}) \)
(e) \( y = 4\sin(2x - \frac{\pi}{2}) - 5 \)

10. If \( \cos(\theta) = \frac{2}{7} \) and \( 0 < \theta < \frac{\pi}{2} \), find \( \sin(\theta) \) and \( \tan(\theta) \). What if \( \frac{\pi}{2} < \theta < \pi \)? Or \( \pi < \theta < 2\pi \)?

11. Solve the following:

(a) \( \sin^2 x + 2\sin x = -1 \)
(b) \( \cos^3 x - \cos x = 0 \)

Hint: It might be easier to make a substitution to simplify the equation first.

12. On the printed flashcards, match the graphs with their functions.

13. For \( c > 1 \), describe what each of the following does:

(a) \( f(x) + c \)  (c) \( f(x + c) \)  (e) \( cf(x) \)  (g) \( f(cx) \)  (i) \( -f(x) \)
(b) \( f(x) - c \)  (d) \( f(x - c) \)  (f) \( \frac{1}{c}f(x) \)  (h) \( f\left(\frac{x}{c}\right) \)  (j) \( f(-x) \)

An Ending Thought: You must do the things you think you cannot do.

– Eleanor Roosevelt