LECTURE: 1-3: TRANSFORMATIONS AND TRIGONOMETRY REVIEW

Transformation Review

1. Explain what each does to the *original* graph $y = f(x)$. (Assume $c > 0$.)

   (a) $f(x) + c$

   (b) $f(x) - c$

   (c) $f(x + c)$

   (d) $f(x - c)$

   (e) $cf(x)$

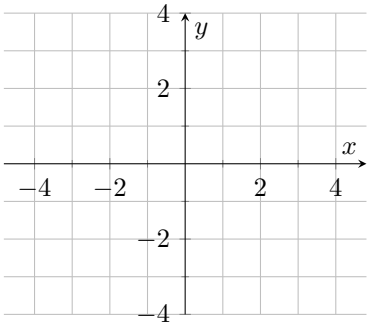
   (f) $f(cx)$

   (g) $-f(x)$

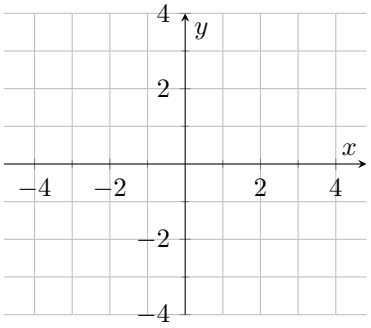
   (h) $f(-x)$

2. Let $f(x) = \begin{cases} 2 & x \leq 1 \\ 3 - x & x > 1 \end{cases}$. Graph each of the following *using the ideas from # 1 above.*

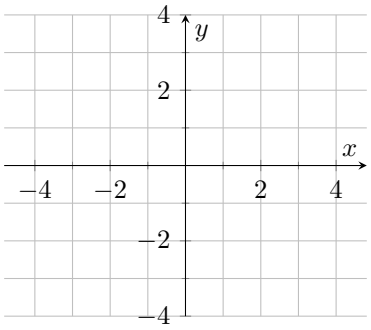
   (a) $f(x)$



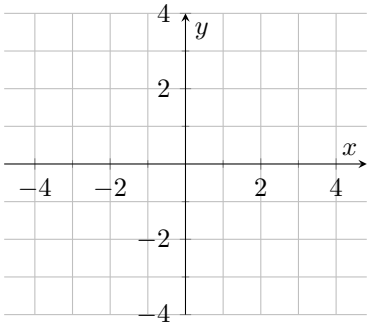
   (b) $f(x + 1)$



   (c) $f(2x)$



   (d) $-2f(x)$



Three Views of Trigonometric Functions

- sides of a right triangle
- points on the unit circle
- graphs in the xy-plane

The Triangle Defintion

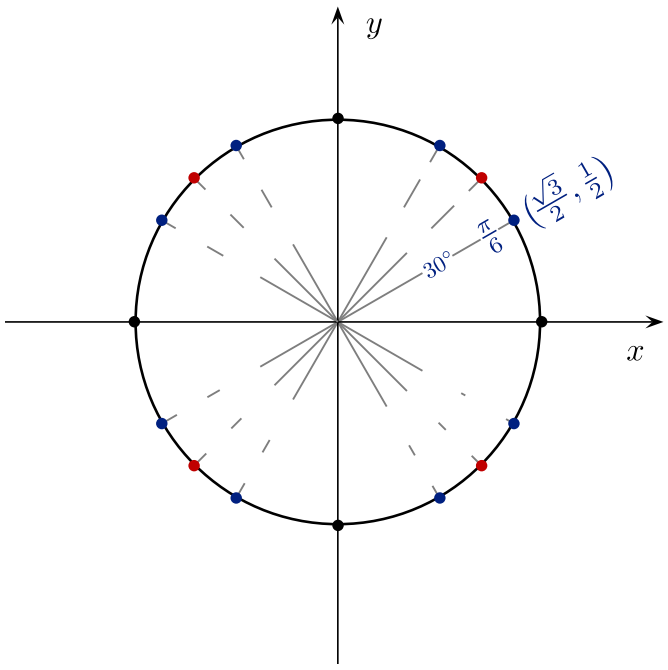
3. Sketch a right triangle with side a adjacent to an angle θ, o opposite of the angle θ and hypotenuse h. Define each of the six trigonometric functions in terms of that triangle.

a) $\sin\theta$ b) $\cos\theta$ c) $\tan\theta$ d) $\sec\theta$ e) $\csc\theta$ f) $\cot\theta$

4. An isosceles triangle has a height of 10 ft and its base is 8 feet long. Determine the sine, cosine and tangent of the base angle.

The Unit Circle Approach

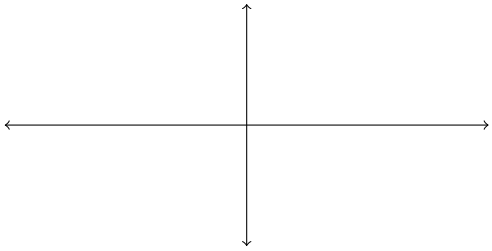
5. Using a 45-45-90 triangle and a 30-60-90 triangle find the coordinates of ALL of the points on the unit circle.

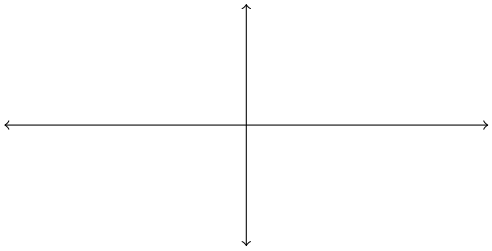


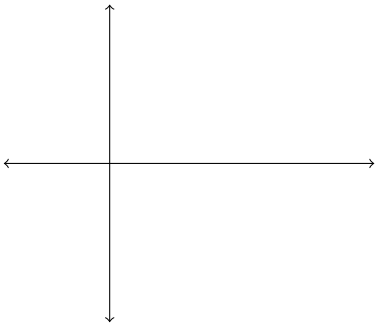
6. Without a calculator evaluate:

   (a) $\sin(\frac{2\pi}{3})$ (b) $\cos(\frac{5\pi}{4})$ (c) $\tan(\frac{-\pi}{4})$

7. On the axes below, graph *at least two cycles* of $f(x) = \sin x$, $f(x) = \cos x$, and $f(x) = \tan x$. Label all x- and y-intercepts.







8. Use the graphs above to solve the equations below.

   (a) $\cos x = 1$

   (b) $\sin x = 1$

   (c) $\tan x = 0$

   (d) $\sin x = 1/2$ (Find all solutions in $[0, 2\pi]$.)

9. For each problem below, sketch the graph and use it to help you solve the equation or answer the question.

   (a) Graph $y = \sin(x - 1)$ and use it to solve the equation $\sin(x - 1) = 1$.

   (b) Graph $y = \sin(x/2)$ and use it to find the domain of $f(x) = \csc(x/2)$.

   (c) Graph $y = -2\cos(x)$ and use it to solve the equation $-2\cos(x) = 0$.