

Saturday, January 12, 2019  
8:56 PM

Precalculus  
Review 4.5-4.8 (day 1)

Name: \_\_\_\_\_  
Date: \_\_\_\_\_ Period: \_\_\_\_\_

**Classwork**

1.  $f(x) = -\frac{3}{2} \sin\left(2x - \frac{\pi}{2}\right)$

2.  $g(x) = -3 \cos \frac{\pi}{2} x + 1$

3.  $h(x) = 2 \cot\left(x - \frac{5\pi}{6}\right)$

4.  $k(x) = -2 \csc(4x + \pi) + 1$

5.  $r(x) = \sec\left(\frac{3}{2}x + \frac{\pi}{4}\right) - 1$

6.  $m(x) = -\tan\left(\frac{x}{2} + \frac{\pi}{6}\right)$

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KEY

1.  $f(x) = \frac{3}{2} \sin\left(2x - \frac{\pi}{4}\right)$

Reflect over x-axis

Shift  $\frac{\pi}{4}$  Right

$y = -\frac{3}{2} \sin\left(2\left(x - \frac{\pi}{4}\right)\right)$

\* FACTOR

period:  $\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$  amplitude:  $|a| = \frac{3}{2}$

Start:  $bx - c = 0$

END:  $bx - c = 2\pi$

Scale:  $\frac{b\pi}{a} = \frac{2\pi}{2} = \pi$

$2x - \frac{\pi}{4} = 0$

$2x - \frac{\pi}{4} = 2\pi$

$\frac{1}{2}(2x) = \left(\frac{\pi}{4}\right) \frac{1}{2}$

$2x = 2\pi + \frac{\pi}{4}$

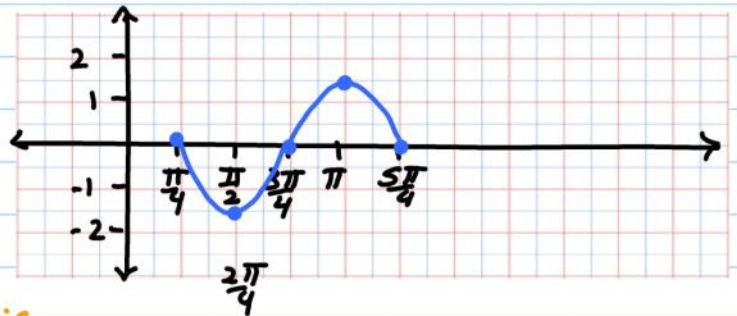
$x = \frac{\pi}{4}$

$\frac{1}{2}(2x) = \left(\frac{5\pi}{4}\right) \frac{1}{2}$

$x = \frac{5\pi}{4}$

KEY POINTS:

- $\left(\frac{\pi}{4}, 0\right)$ ,  $\left(\frac{\pi}{2}, -\frac{3}{2}\right)$ ,
- $\left(\frac{3\pi}{4}, 0\right)$ ,  $\left(\pi, \frac{3}{2}\right)$ ,
- $\left(\frac{5\pi}{4}, 0\right)$



Reflect over x-axis

Shift up 1

2.  $g(x) = -3 \cos\left(\frac{\pi}{2}x + 1\right)$

$a = -3$   $b = \frac{\pi}{2}$   $d = 1$

period:  $\frac{2\pi}{b} = \frac{2\pi}{\frac{\pi}{2}} = 2\pi \cdot \frac{2}{\pi} = 4$

Start:  $bx - c = 0$

END:  $bx - c = 2\pi$

Scale:  $\frac{b\pi}{a} = \frac{\pi}{2} = 2$

$\frac{2}{\pi} \left(\frac{\pi}{2}x\right) = (0) \frac{2}{\pi}$

$\frac{2}{\pi} \left(\frac{\pi}{2}x\right) = (2\pi) \frac{2}{\pi}$

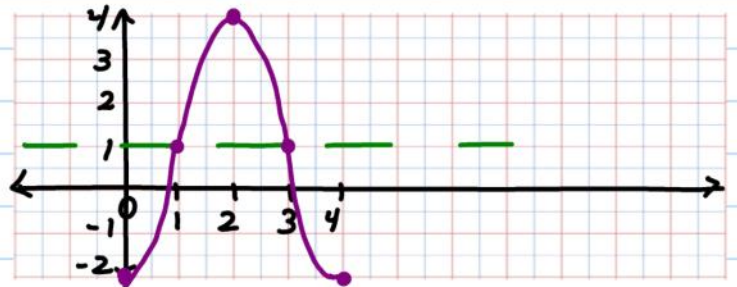
$= 1$

$x = 0$

$x = 4$

KEY POINTS:

- $(0, -2)$ ,  $(1, 1)$ ,  $(2, 4)$
- $(3, 1)$ ,  $(4, -2)$



3.  $h(x) = 2\cot\left(x - \frac{5\pi}{6}\right)$  ← Shift  $\frac{5\pi}{6}$  Right

Period:  $\frac{\pi}{b} = \frac{\pi}{1} = \pi$     amplitude: none

Start:  $bx - c = 0$     END:  $bx - c = \pi$     Scale:  $\frac{\text{Per}}{4} = \frac{\pi}{4}$  min

$x - \frac{5\pi}{6} = 0$

$x - \frac{5\pi}{6} = \pi$

or  $\frac{3\pi}{12}$

or  $x = \frac{5\pi}{6} \cdot \frac{2}{2}$   
or  $\frac{10\pi}{12}$

$x = \pi \cdot \frac{6}{6} + \frac{5\pi}{6}$

or  $x = \frac{11\pi}{6} \cdot \frac{2}{2}$   
or  $\frac{22\pi}{12}$

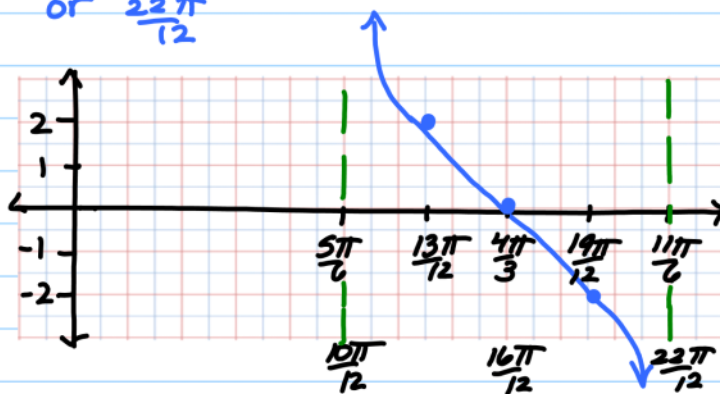
ASYMPTOTES:

$x = \frac{5\pi}{6}$      $x = \frac{11\pi}{6}$

POINTS:

$\left(\frac{13\pi}{12}, 2\right), \left(\frac{4\pi}{3}, 0\right)$

$\left(\frac{19\pi}{12}, -2\right)$



4.  $k(x) = -2\csc(4x + \pi) + 1$

\* graph Reciprocal 1st!

$y = -2\sin(4x + \pi) + 1$  ← Shift UP 1

$y = -2\sin\left[4\left(x + \frac{\pi}{4}\right)\right] + 1$

$\frac{2\pi}{b}$  period:  $\frac{2\pi}{4} = \frac{\pi}{2}$

Reflect \* FACTOR ← Shift  $\frac{\pi}{4}$  left

Start:  $bx - c = 0$

END:  $bx - c = 2\pi$

Scale:  $\frac{\text{Per}}{4} = \frac{\pi}{4}$

$4x + \pi = 0$

$4x + \pi = 2\pi$

$4x = -\pi$   
 $x = -\frac{\pi}{4} \cdot \frac{2}{2}$

$4x = \pi$   
 $x = \frac{\pi}{4} \cdot \frac{2}{2}$

$\frac{\pi}{2} \cdot \frac{1}{4} = \frac{\pi}{8}$

OR  $-\frac{2\pi}{8}$

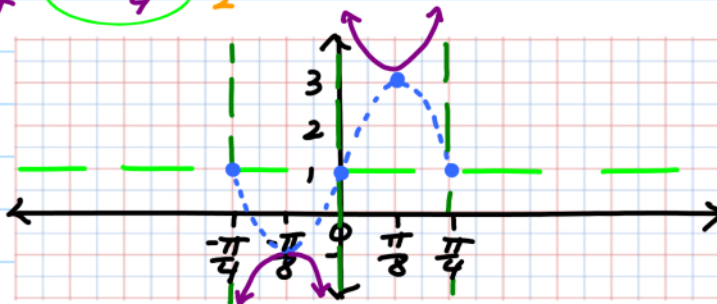
OR  $\frac{2\pi}{8}$

ASYMPTOTES:

$x = -\frac{\pi}{4}$      $x = 0$      $x = \frac{\pi}{4}$

POINTS:

$\left(-\frac{\pi}{8}, -1\right), \left(\frac{\pi}{8}, 3\right)$



5.  $r(x) = \sec\left(\frac{3}{2}x + \frac{\pi}{4}\right) - 1$

\* Graph reciprocal 1st!

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

$y = \cos\left(\frac{3}{2}\left(x + \frac{\pi}{6}\right)\right) - 1$  ← Shift 1 down  
 ← Shift  $\frac{\pi}{6}$  left

Amplitude: none

Period:  $\frac{2\pi}{\frac{3}{2}} = \frac{2\pi}{1} = 2\pi \cdot \frac{2}{3} = \frac{4\pi}{3}$

START:  $bx - c = 0$

$\frac{3}{2}x + \frac{\pi}{4} = 0$

$\frac{2}{3}\left(\frac{3}{2}x\right) = \left(-\frac{\pi}{4}\right)\frac{2}{3}$

$x = -\frac{\pi}{6}$

END:  $bx - c = 2\pi$

$\frac{3}{2}x + \frac{\pi}{4} = 2\pi$

$\frac{3}{2}x = 2\pi \cdot \frac{4}{4} - \frac{\pi}{4}$

$\frac{2}{3}\left(\frac{3}{2}x\right) = \left(\frac{7\pi}{4}\right)\frac{2}{3}$

$x = \frac{7\pi}{6}$

Scale:  $\frac{\text{Per}}{4} = \frac{4\pi}{3} \cdot \frac{1}{4} = \frac{\pi}{3}$

$= \frac{4\pi}{3} \cdot \frac{1}{4} = \frac{\pi}{3} \cdot \frac{2}{2}$

OR  $\frac{2\pi}{6}$

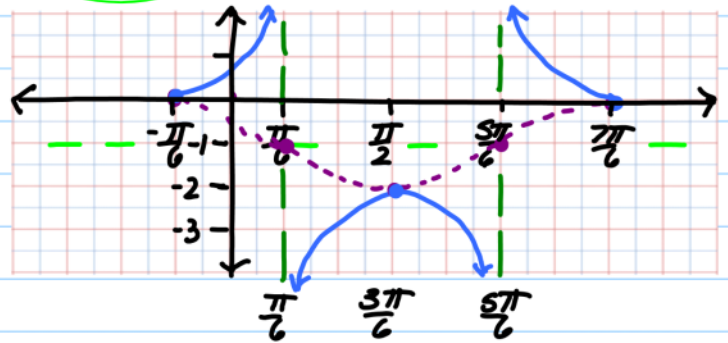
ASYMPTOTES!

$x = \frac{\pi}{6}$     $x = \frac{5\pi}{6}$

POINTS!

$\left(-\frac{\pi}{6}, 0\right), \left(\frac{\pi}{2}, -2\right),$

$\left(\frac{7\pi}{6}, 0\right)$



6.  $m(x) = -\tan\left(\frac{x}{2} + \frac{\pi}{6}\right)$

Reflect over x-axis  
 $y = -\tan\left(\frac{1}{2}\left(x + \frac{\pi}{3}\right)\right)$  \* FACTOR  
 \* Shift  $\frac{\pi}{3}$  left

amp: none

period:  $\frac{\pi}{b} = \frac{\pi}{\frac{1}{2}} = 2\pi$

START:  $bx - c = -\frac{\pi}{2}$

$\frac{x}{2} + \frac{\pi}{6} = -\frac{\pi}{2}$

$\frac{x}{2} = -\frac{\pi}{2} \cdot \frac{3}{3} - \frac{\pi}{6}$

$2\left(\frac{x}{2}\right) = \left(-\frac{4\pi}{6}\right) \cdot 2$

$x = -\frac{4\pi}{3} \cdot \frac{2}{2}$

or  $-\frac{8\pi}{6}$

END:  $bx - c = \frac{\pi}{2}$

$\frac{x}{2} + \frac{\pi}{6} = \frac{\pi}{2}$

$\frac{x}{2} = \frac{\pi}{2} \cdot \frac{3}{3} - \frac{\pi}{6}$

$2\left(\frac{x}{2}\right) = \left(\frac{2\pi}{6}\right) \cdot 2$

$x = \frac{2\pi}{3} \cdot \frac{2}{2}$

or  $\frac{4\pi}{6}$

Scale:  $\frac{\text{Per}}{4} = \frac{2\pi}{4}$

$= \frac{\pi}{2} \cdot \frac{3}{3}$   
 or  $\frac{3\pi}{6}$

ASYMPTOTES:

$x = -\frac{4\pi}{3}$     $x = \frac{2\pi}{3}$

points:

$\left(-\frac{5\pi}{6}, 1\right), \left(-\frac{\pi}{3}, 0\right)$

$\left(\frac{\pi}{6}, -1\right)$

