Fill in the blanks regarding the graph on the right. Simplify your answers.

NOTE: The x — coordinates of the two points highlighted are $-\frac{2\pi}{5}$ and $\frac{4\pi}{5}$.

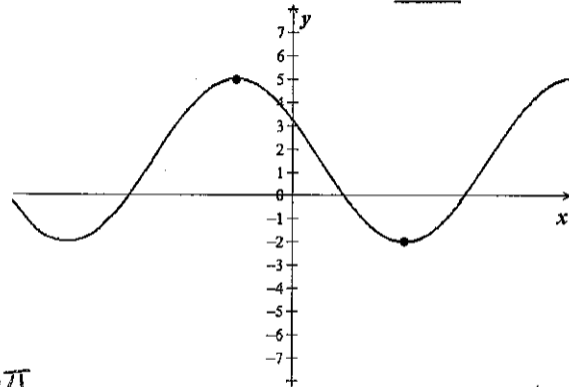[a] Middle y — value = $\dfrac{3}{2}$ $\dfrac{5+(-2)}{2}$

[b] Amplitude = $\dfrac{7}{2}$ $\dfrac{5-(-2)}{2}$

[c] Phase shift = $\dfrac{-2\pi}{5}$

[d] Period = $\dfrac{12\pi}{5}$ $\dfrac{1}{2}P = \dfrac{4\pi}{5} - \dfrac{-2\pi}{5} = \dfrac{6\pi}{5}$

$\dfrac{2\pi}{B} = \dfrac{12\pi}{5} \rightarrow B = 2\pi \cdot \dfrac{5}{12\pi}$

$\dfrac{6}$

[e] An equation of the graph is $y = \dfrac{7}{2}\cos\dfrac{5}{6}\left(x+\dfrac{2\pi}{5}\right)+\dfrac{3}{2}$.
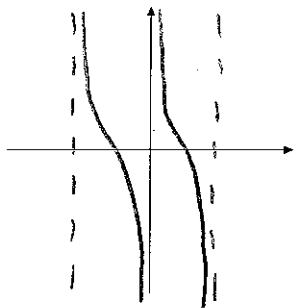
These questions are about the non-sinusoidal trigonometric functions.   SCORE: _____ / 8 PTS
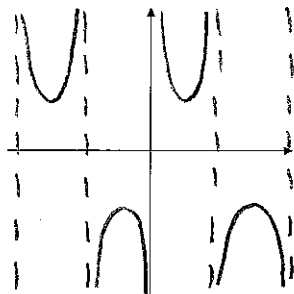
[a]   Sketch 2 periods of the graphs of the following functions.
        NOTE: You only need to get the general position and shape correct. Do NOT plot points.
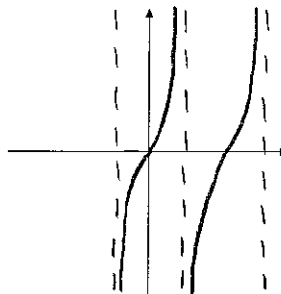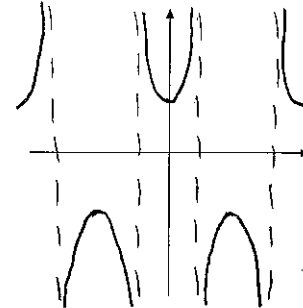
$y = \cot x$ $y = \csc x$ $y = \tan x$ $y = \sec x$

[b]   Fill in the blanks.

[1]   The equations of the vertical asymptotes of $y = \sec x$ are $\underline{x = \frac{\pi}{2} + n\pi}$, $n \in \mathbb{Z}$

[2]   The domain of $y = \cot x$ is $\underline{x \neq n\pi}$, $n \in \mathbb{Z}$

[3]   As $x \to \frac{\pi}{2}^{+}$, $\tan x \to \underline{-\infty}$.

[4]   As $x \to \pi^{-}$, $\csc x \to \underline{\infty}$.

Let $y = -3\sin(\frac{5\pi}{3}x + \frac{7\pi}{3}) - 4$.

[a] Fill in the blanks. Simplify your answers.

Middle y – value = $\underline{\quad -4 \quad}$

Maximum y – value = $\underline{\quad -1 \quad}$ $-4+3$

Minimum y – value = $\underline{\quad -7 \quad}$ $-4-3$

Amplitude = $\underline{\quad 3 \quad}$ $|-3|$

Period = $\underline{\quad \frac{6}{5} \quad}$ $\frac{2\pi}{\frac{5\pi}{3}} = 2\pi \cdot \frac{3}{5\pi}$

Phase shift = $\underline{\quad -\frac{7}{5} \quad}$ $\frac{5\pi}{3}x + \frac{7\pi}{3} = 0$

$\frac{5\pi}{3}x = -\frac{7\pi}{3}$

$x = -\frac{7\pi}{3} \cdot \frac{3}{5\pi}$

[b] Find the coordinates for all points corresponding to the middle, top and bottom of the graph of the function for 2 complete cycles, starting at the phase shift.

$\frac{1}{4}P = \frac{1}{4} \cdot \frac{6}{5} = \frac{3}{10}$

$-\frac{7}{5} = -\frac{14}{10}$

Point 1: ($\frac{-14}{10}$, -4)

Point 2: ($\frac{-11}{10}$, -7)

Point 3: ($\frac{-8}{10}$, -4)

Point 4: ($\frac{-5}{10}$, -1)

Point 5: ($\frac{-2}{10}$, -4)

Point 6: ($\frac{1}{10}$, -7)

Point 7: ($\frac{4}{10}$, -4)

Point 8: ($\frac{7}{10}$, -1)

Point 9: ($\frac{10}{10}$, -4)

[c] On the graph paper below, sketch a detailed graph of 2 complete cycles of the function using the information from [b]. You must label all $x-$ and $y-$ values from [b] on the appropriate axes below, and you must use a consistent scale for each axis. **You do NOT need to label each tick mark on each axis, only the ones you found in [b].**

[d] Also on the graph paper below, sketch the graph of $y = -3\csc(\frac{5\pi}{3}x + \frac{7\pi}{3}) - 4$. DOTTED GRAPH BELOW