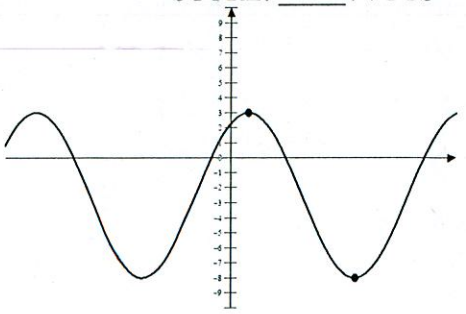
Fill in the blanks regarding the graph on the right. Simplify your answers. **SCORE: _____ / 7 PTS**

NOTE: The $x-$coordinates of the two points highlighted are $\frac{\pi}{8}$ and $\frac{7\pi}{8}$.



[a] Middle $y-$value = $\frac{-5}{2}$ $\frac{3+-8}{2}$

[b] Amplitude = $\frac{11}{2}$ $\frac{3--8}{2}$

[c] Phase shift = $\frac{\pi}{8}$

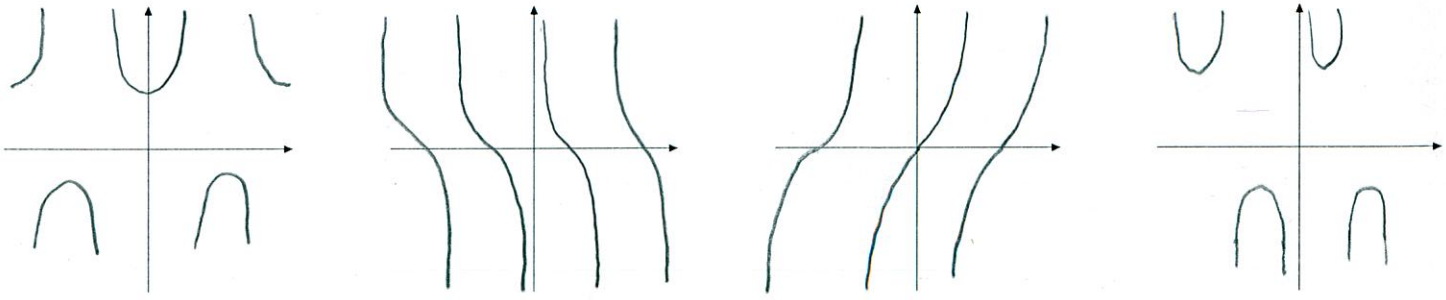
[d] Period = $\frac{3\pi}{2}$ $2\left(\frac{7\pi}{8}-\frac{\pi}{8}\right)=\frac{3\pi}{2}=\frac{2\pi}{B}\rightarrow 3\pi B=4\pi$ $B=\frac{4}{3}$

[e] An equation of the graph is $y=$ $\frac{11}{2}\cos\frac{4}{3}\left(x-\frac{\pi}{8}\right)-\frac{5}{2}$.

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.

$y=\sec x$ $y=\cot x$ $y=\tan x$ $y=\csc x$



[b] Fill in the blanks.

[1] As $x\rightarrow -\pi^{-}$, $\csc x\rightarrow$ ∞.

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

[3] The equations of the vertical asymptotes of $y=\sec x$ are $x=\frac{\pi}{2}+n\pi$.

[4] The domain of $y=\cot x$ is $x\neq n\pi$.

Let $y = -4\sin(\frac{4\pi}{3}x + \frac{5\pi}{3}) + 1$.

SCORE: ____ / 15 PTS

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

Middle $y-$value = 1

Amplitude = 4 $|-4|$

Maximum $y-$value = 5 $1+4$

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

Minimum $y-$value = -3 $1-4$

Phase shift = $-\frac{5}{4}$ $\frac{4\pi x}{3} + \frac{5\pi}{3} = 0$

$4x + 5 = 0$

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

[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.

$\frac{1}{4}$ PERIOD $= \frac{3}{8}$

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

Point 2: ($-\frac{7}{8}$, -3) $-\frac{5}{4} + \frac{3}{8} = \frac{-10+3}{8} = -\frac{7}{8}$

Point 3: ($-\frac{4}{8}$, 1) $-\frac{7}{8} + \frac{3}{8} = -\frac{4}{8}$

Point 4: ($-\frac{1}{8}$, 5)

Point 5: ($\frac{2}{8}$, 1)

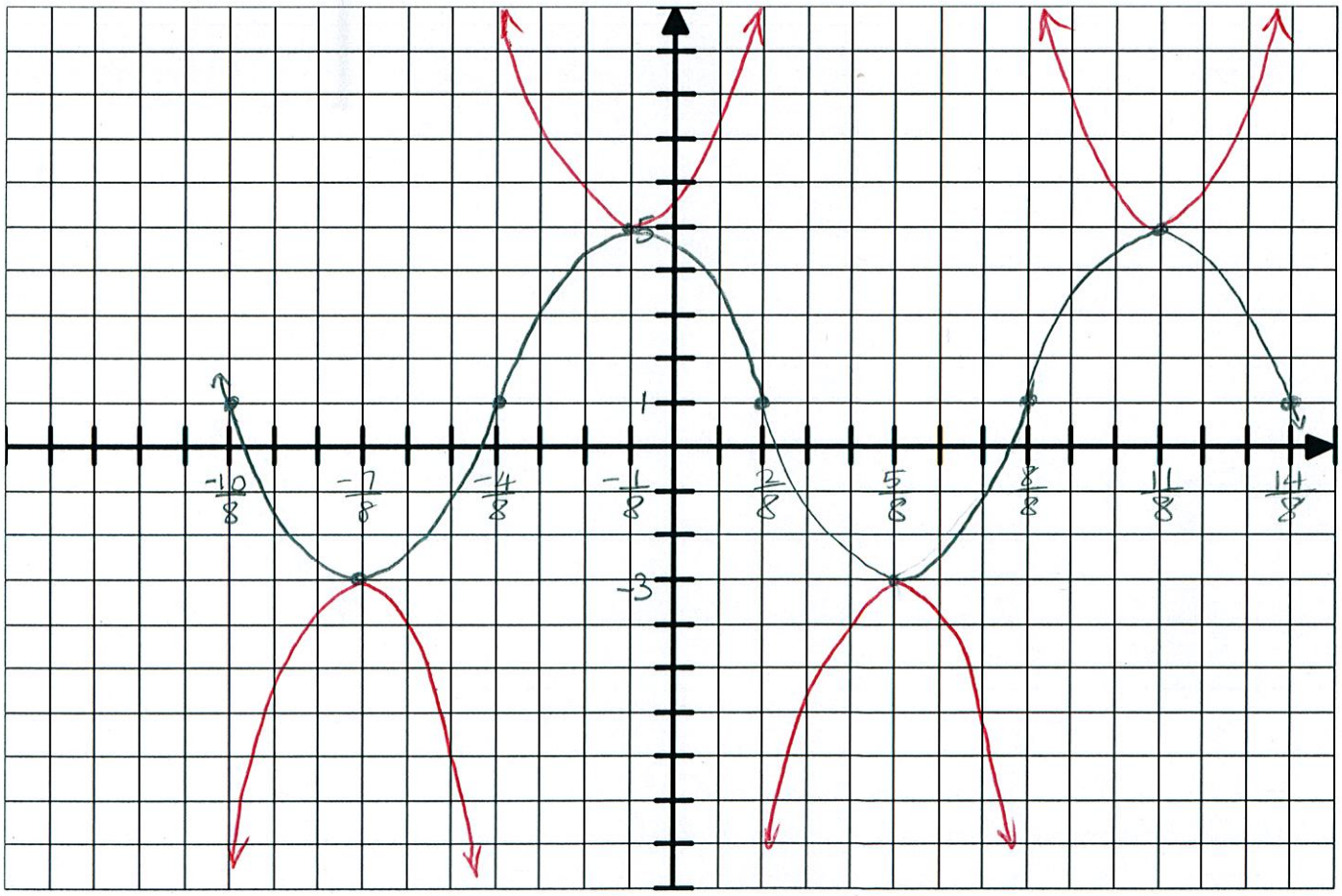
Point 6: ($\frac{5}{8}$, -3)

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

Point 8: ($\frac{11}{8}$, 5)

Point 9: ($\frac{14}{8}$, 1)

[c] 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] On the grid in [c], sketch the graph of $y = -4\csc(\frac{4\pi}{3}x + \frac{5\pi}{3}) + 1$.