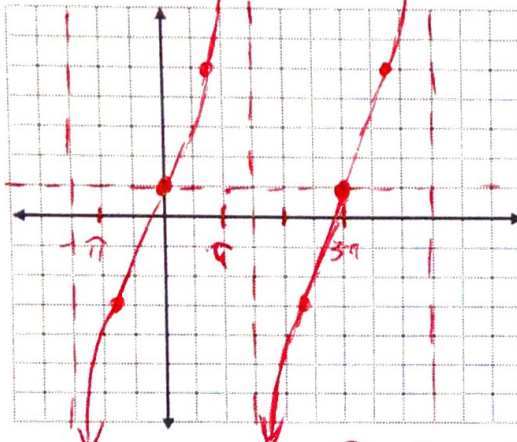


Graph at least one fundamental period. Show ALL critical points.  
Extend your graph to include at least one critical point left of the y-axis.

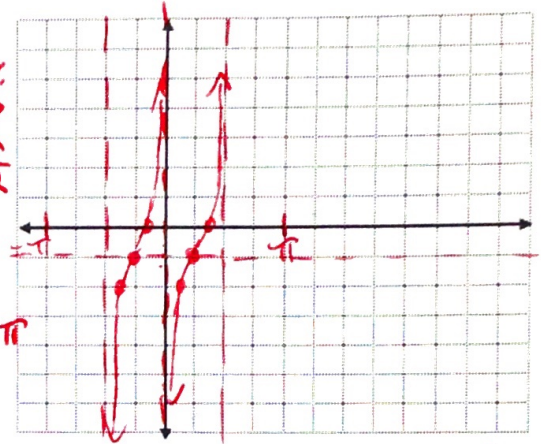
$A^-$   
 $P = \frac{\pi}{2}$

1.  $y = 4 \tan \frac{1}{3}x + 1$  Period  $3\pi$

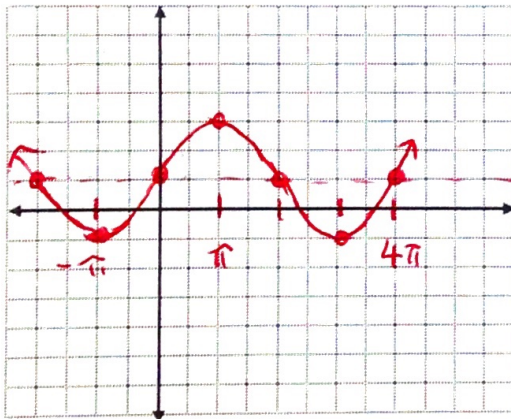


2.  $f(x) = -\cot(2x) - 1$

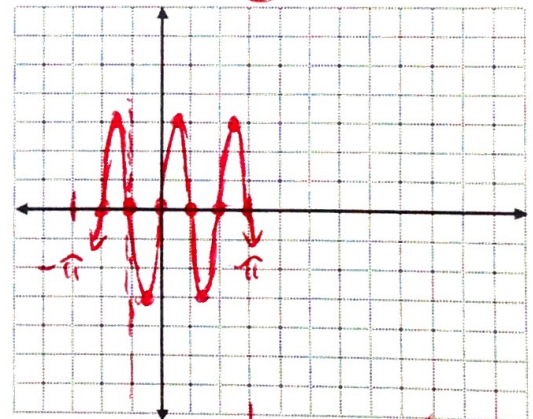
$A_{sym} \rightarrow$   
 $x = n\frac{\pi}{2}$   
 $A_{sym} =$   
 $x = \frac{3}{2}\pi + 3n\pi$



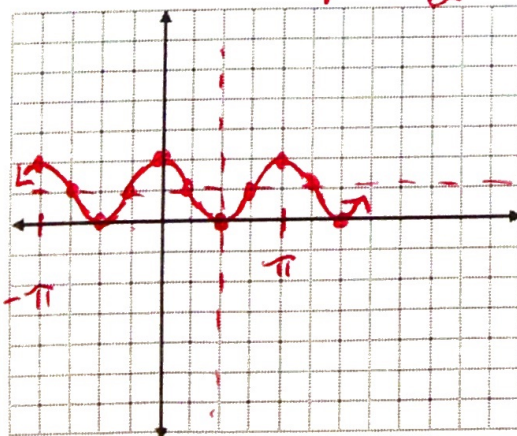
3.  $f(x) = 2\sin \frac{x}{2} + 1$   $P = 2\pi \cdot 2 = 4\pi$



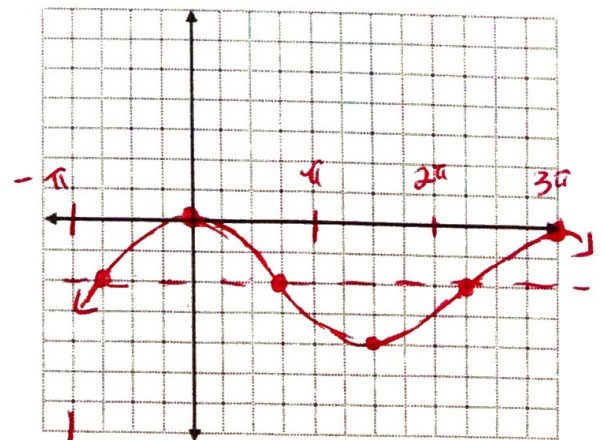
4.  $y = -3\sin(3x + \pi) = -3\sin 3(x + \frac{\pi}{3})$   
 $P = \frac{2\pi}{3}$



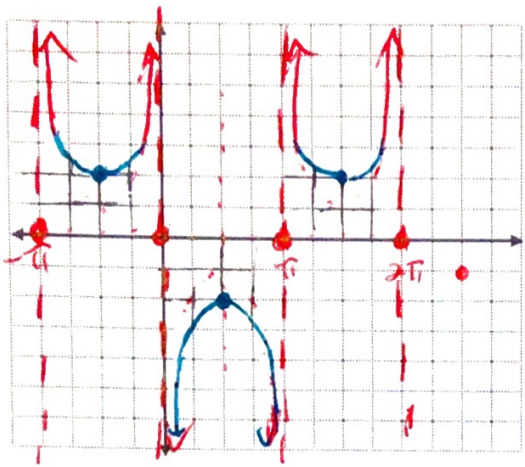
5.  $y = -\cos(2x - \pi) + 1 = -\cos 2(x - \frac{\pi}{2}) + 1$   
 $P = \frac{2\pi}{2} = \pi$



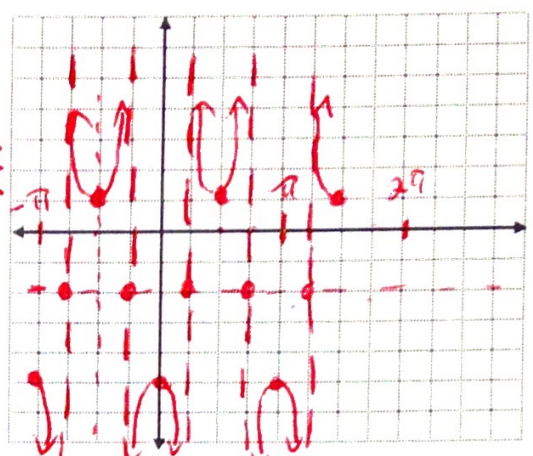
6.  $f(x) = 2\cos \frac{2}{3}x - 2$   $P = 2\pi \cdot \frac{3}{2} = 3\pi$



7.  $f(x) = -2\sec(x - \frac{\pi}{2})$   $\rho = 2\pi$



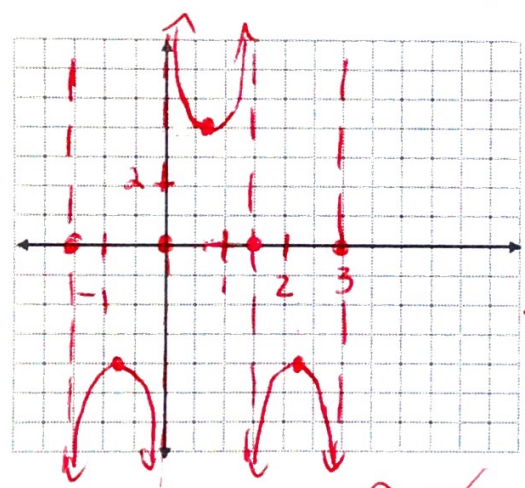
8.  $y = 3\sec(2x + \pi) - 2$   $\rho = \frac{\pi}{2}$



Asym:  $\rightarrow$   
 $x = \frac{\pi}{4} + n\frac{\pi}{2}$

Asym:  $\leftarrow$   
 $x = n\pi$

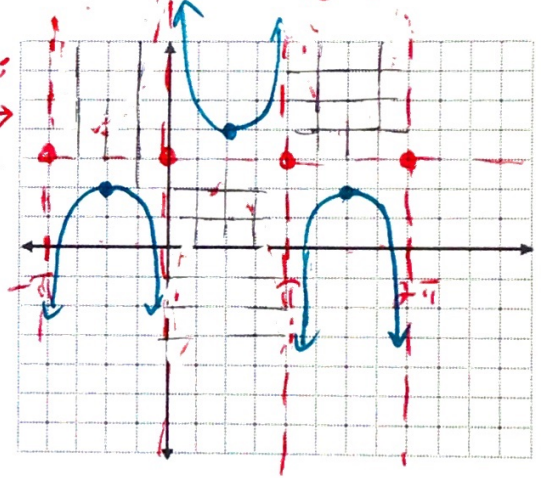
9.  $y = 4\csc(\frac{2}{3}\pi x)$   $\rho = 2\pi \cdot \frac{3}{2\pi} = 3$



Asym:  $\rightarrow$   
 $x = n\pi$

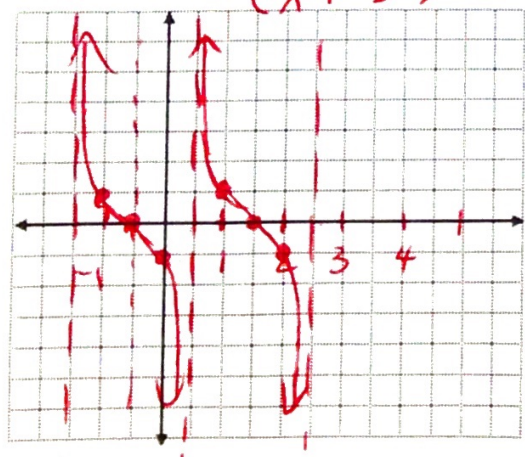
Asym:  $\leftarrow$   
 $x = 1.5n$

10.  $f(x) = -\csc(x + \pi) + 3$   $\rho = 2\pi$



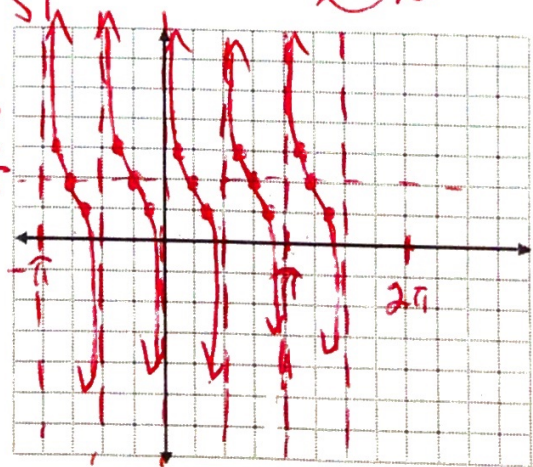
Asym:  $\rightarrow$   
 $x = n\pi$

11.  $y = -\tan(\frac{1}{2}\pi x + \frac{\pi}{4})$   $\rho = \pi \cdot \frac{2}{\pi} = 2$



Asym:  $\leftarrow$   
 $n = \frac{1}{2} + 2n$

12.  $f(x) = 2 + \cot(2x - \pi)$   $\rho = \frac{\pi}{2}$



Asym:  $\rightarrow$   
 $x = n\frac{\pi}{2}$