

# Pre-Calculus Worksheet

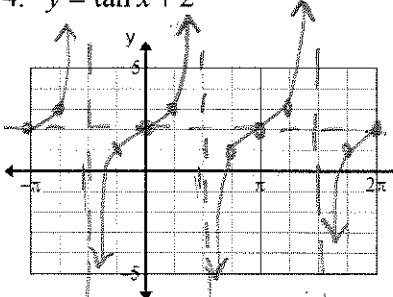
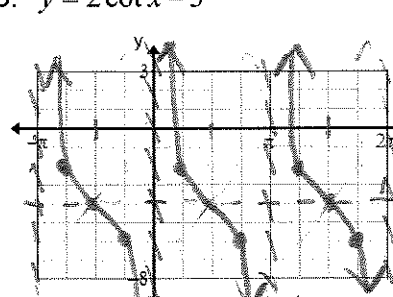
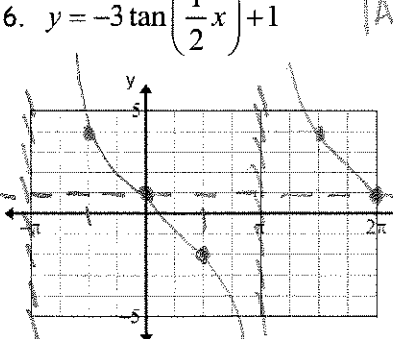
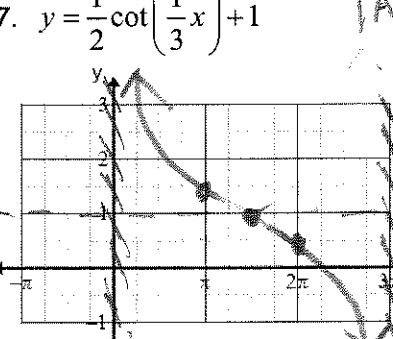
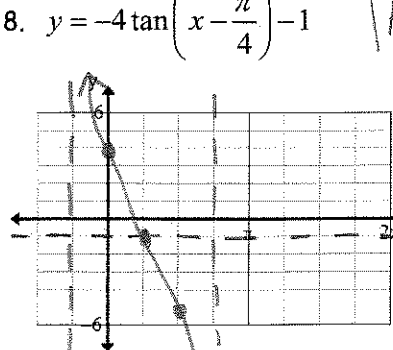
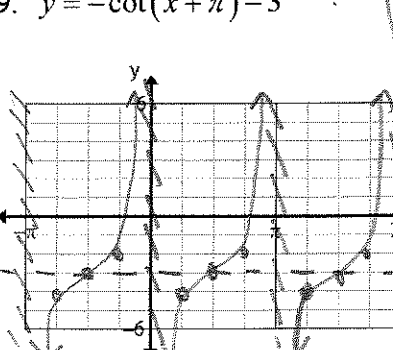
## Tangent and Cotangent

Name: Key  
Per: \_\_\_\_\_

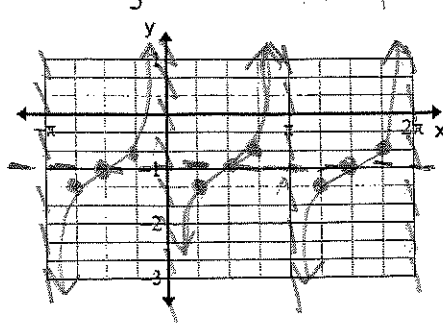
I. Fill in the chart for each function. DO NOT GRAPH. Remember to factor first when needed.

<p>1. <math>y = 2 \tan\left(\frac{1}{2}x\right) - 3</math></p> <p>Amplitude: <u>2</u></p> <p>Flip? <u>No</u></p> <p>Vertical Shift: <u>down 3</u></p> <p>Period: <math>\frac{\pi}{1/2} = 2\pi</math></p> <p>Phase Shift: <u>None</u></p>	<p>2. <math>y = \frac{4}{3} \cot\left(4\left(x - \frac{\pi}{2}\right)\right) + 1</math></p> <p>Amplitude: <u><math>\frac{4}{3}</math></u></p> <p>Flip? <u>No</u></p> <p>Vertical Shift: <u>up 1</u></p> <p>Period: <math>\frac{\pi}{4}</math></p> <p>Phase Shift: <u>right <math>\frac{\pi}{2}</math></u></p>	<p>3. <math>y = -5 \tan(3x + \pi)</math> <math>-5 \tan[3(x + \frac{\pi}{3})]</math></p> <p>Amplitude: <u>5</u></p> <p>Flip? <u>Yes across x-axis</u></p> <p>Vertical Shift: <u>None</u></p> <p>Period: <math>\frac{\pi}{3}</math></p> <p>Phase Shift: <u>left <math>\frac{\pi}{3}</math></u></p>
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II. Graph each function, over one period, showing the vertical asymptotes.

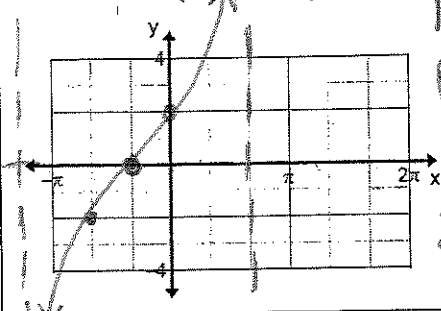
<p>4. <math>y = \tan x + 2</math></p>  <p><math> A  = 1</math> NP = <math>\pi</math> PS = none VS = <math>\uparrow 2</math></p>	<p>5. <math>y = 2 \cot x - 3</math></p>  <p><math> A  = 2</math> NP = <math>\pi</math> PS = none VS = <math>\downarrow 3</math></p>
<p>6. <math>y = -3 \tan\left(\frac{1}{2}x\right) + 1</math></p>  <p><math> A  = 3</math> Reflect x-axis NP = <math>\frac{\pi}{1/2} = 2\pi</math> PS = none VS = <math>\uparrow 1</math></p>	<p>7. <math>y = \frac{1}{2} \cot\left(\frac{1}{3}x\right) + 1</math></p>  <p><math> A  = \frac{1}{2}</math> NP = <math>\frac{\pi}{1/3} = 3\pi</math> PS = none VS = <math>\uparrow 1</math></p>
<p>8. <math>y = -4 \tan\left(x - \frac{\pi}{4}\right) - 1</math></p>  <p><math> A  = 4</math> Reflect x-axis NP = <math>\pi</math> PS = <math>\rightarrow \frac{\pi}{4}</math> VS = <math>\downarrow 1</math></p>	<p>9. <math>y = -\cot(x + \pi) - 3</math></p>  <p><math> A  = 1</math> Reflect x-axis NP = <math>\pi</math> PS = <math>\leftarrow \pi</math> VS = <math>\downarrow 3</math></p>

10.  $y = -\frac{1}{3} \cot x - 1$



$|A| = 1/3$  Reflect  
 $x$ -axis  
 NP =  $\pi$   
 PS = none  
 VS =  $\downarrow$

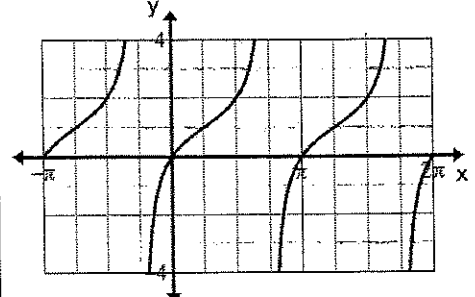
11.  $y = 2 \tan\left(\frac{1}{2}\left(x + \frac{\pi}{3}\right)\right)$



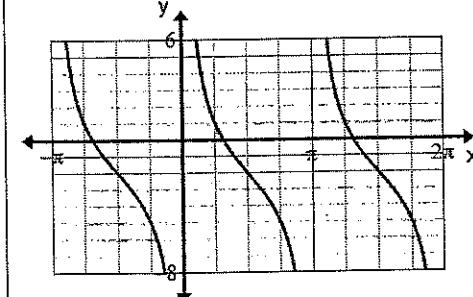
$|A| = 2$   
 NP =  $\frac{\pi}{1/2} = 2\pi$   
 PS =  $\leftarrow \frac{\pi}{3}$   
 VS = none  
 Intervals are  $60^\circ$

III. Write the equation for each trigonometric function. *See next pages*

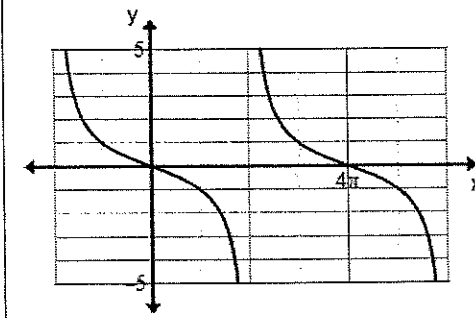
12.



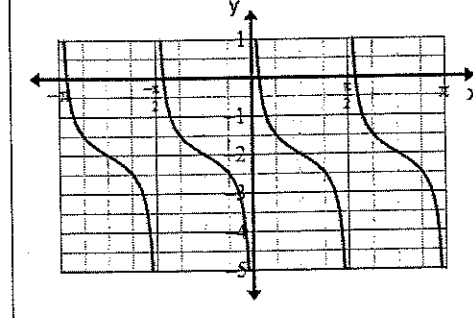
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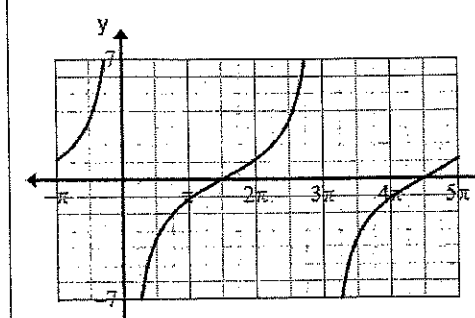
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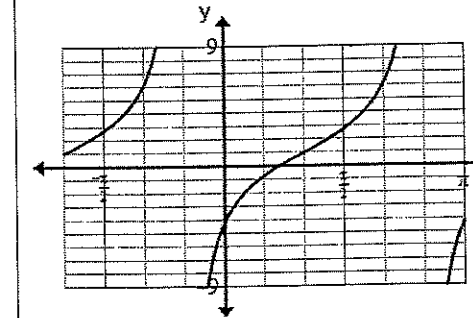
15.



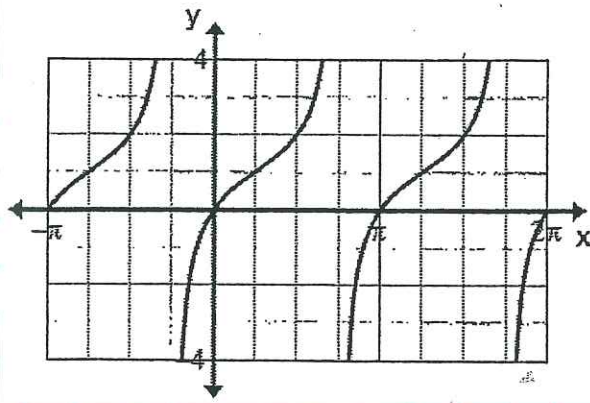
16.



17.



12.



(b) • Intervals on  $x$ -axis =  $\pi/4$  Asymptotes =  $\pi/4, 3\pi/4, \dots$

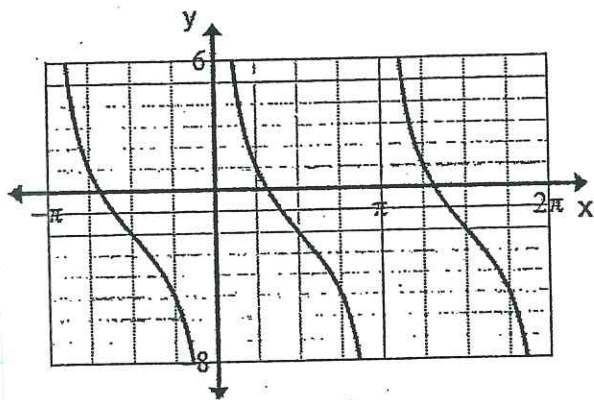
•  $VS = \uparrow 1$        $NP = \pi$        $B = \frac{\pi}{\pi} = 1$        $|A| = 1$

For tan:  $PS = \rightarrow \pi/4$        $y = \tan(x - \pi/4) + 1$

For cot:  $PS = \leftarrow \pi/4$        $y = -\cot(x + \pi/4) + 1$

and reflect  
 $y$ -axis

13.



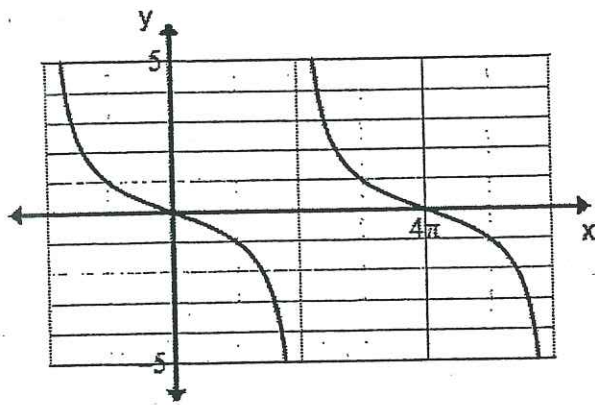
⑬ • Intervals on x-axis =  $\pi/4$  Asymptotes =  $0, \pi, etc$

• VS =  $\downarrow 2$  NP =  $\pi$  B = 1  $|A| = 3$

• For tan: PS =  $\rightarrow \pi/2$   $y = -3 \tan(x - \pi/2) - 2$   
and reflect x-axis

• For cot: PS = none  $y = 3 \cot x - 2$

14.



(14) • Intervals on x-axis =  $2\pi$  Asymptotes =  $2\pi, 6\pi, \text{etc}$

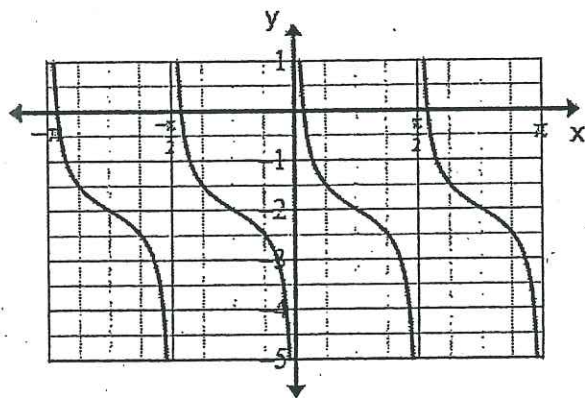
• VS = none NP =  $2\pi$   $\beta = \frac{\pi}{2\pi} = \frac{1}{2}$   $|A| = 1$

For tan: PS = none  $y = -\tan\left(\frac{1}{2}x\right)$

Reflect x-axis

For cot: PS =  $\rightarrow 2\pi$   $y = \cot\left[\frac{1}{2}(x - 2\pi)\right]$

15.

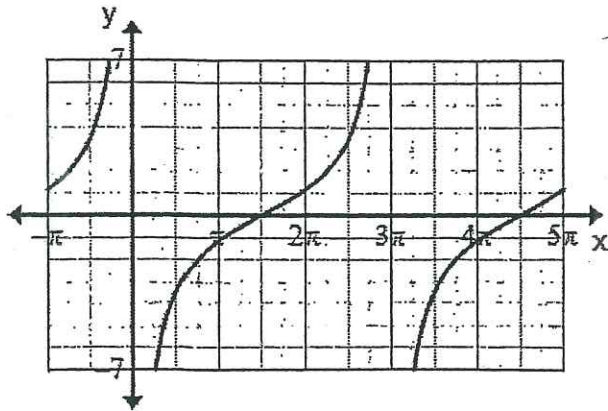


(15) • Intervals on x-axis =  $\pi/8$  Asymptotes =  $0, \pi/2, \pi, \dots$   
 • VS =  $\downarrow 2$  NP =  $\pi/2$   $B = \frac{\pi}{\pi/2} = 2$   $|A| = 1$

For tan: PS =  $\rightarrow \pi/4$   $y = -\tan[2(x - \pi/4)] - 2$   
 and reflected x-axis

For cot: PS = none  $y = \cot(2x) - 4$

16.



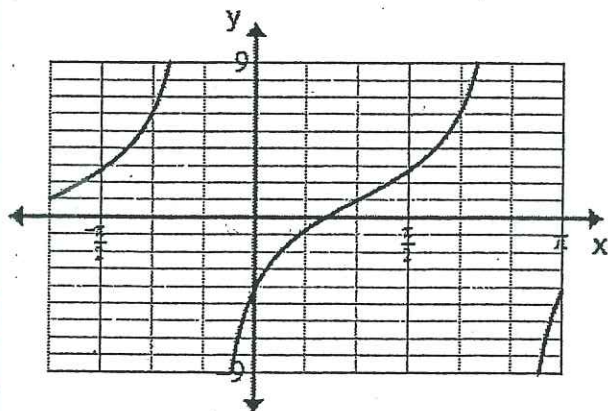
(16) • Interval on x-axis =  $\frac{\pi}{2}$  Asymptotes =  $0, 3\pi, \text{etc}$

• VS = none NP =  $3\pi$   $B = \frac{\pi}{3\pi} = \frac{1}{3}$   $|A| = 1$

For tan: PS  $\Rightarrow 3\pi/2$   $y = \tan\left[\frac{1}{3}\left(x - \frac{3\pi}{2}\right)\right]$

For cot: PS  $\Rightarrow \pi$   $y = -\cot\left[\frac{1}{3}\left(x - \frac{3\pi}{2}\right)\right]$   
reflect x-axis

17.



(17) • Interval on x-axis =  $\pi/6$  Asymptotes =  $-\pi/2, 5\pi/2, \dots$

• VS =  $\uparrow 1$  NP =  $\pi$  B = 1  $|A| = 2$

For tan: PS =  $\rightarrow \frac{2\pi}{6}$  ( $\pi/3$ )  $y = 2 \tan(x - \pi/3) + 1$

For cot: PS =  $\leftarrow \pi/6$   $y = -2 \cot(x + \pi/6) + 1$

reflect over  
x-axis