

# Graphs & Inverses of Trig Functions

## 4A - Graphing Tangent & Cotangent

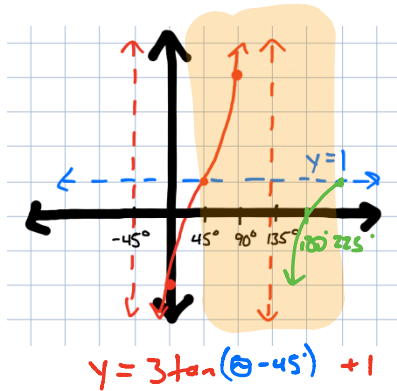
Write an equation of the **tangent** function with the given information

- #1)  $a = 5$ , period =  $360^\circ$ ,  
phase shift =  $60^\circ$ , VD = 2

$$y = 5 \tan \left[ \frac{1}{2} (\theta - 60^\circ) \right] + 2$$

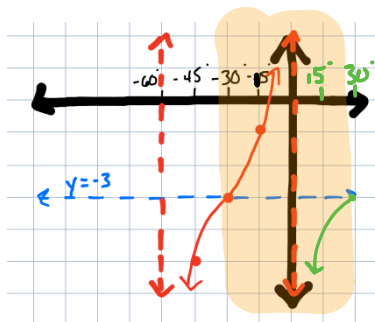
$$\boxed{\begin{aligned} 360^\circ k &= 180^\circ \\ k &= \frac{1}{2} \end{aligned}}$$

#2)



$$y = 3 \tan (\theta - 45^\circ) + 1$$

#3)



$$y = 2 \tan \left[ 3 (\theta + 30^\circ) \right] - 3$$

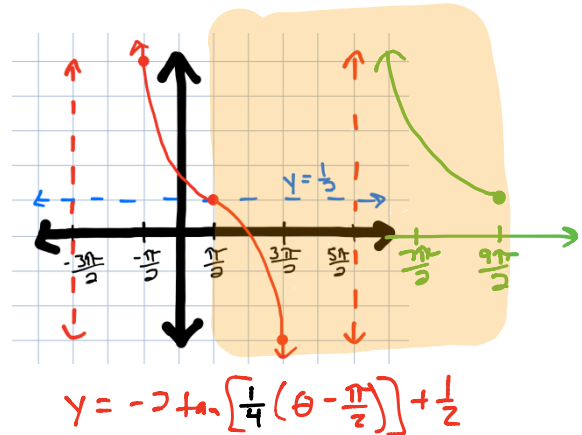
$$\boxed{\begin{aligned} 60^\circ k &= 180^\circ \\ k &= 3 \end{aligned}}$$

- #4)  $a = -17$ , period =  $\frac{\pi}{4}$ ,  
phase shift =  $-\frac{\pi}{3}$ , VD = -2

$$y = -17 \tan \left[ 4 \left( \theta + \frac{\pi}{3} \right) \right] - 2$$

$$\boxed{\begin{aligned} \frac{\pi}{4} k &= \pi \\ k &= 4 \end{aligned}}$$

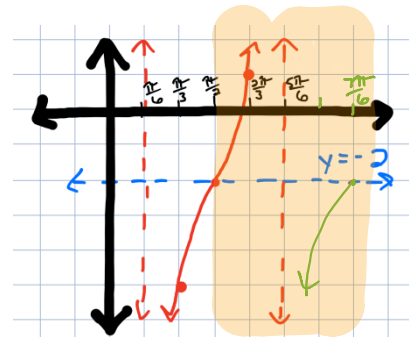
#5)



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

$$\boxed{\begin{aligned} 4\pi k &= \pi \\ k &= \frac{1}{4} \end{aligned}}$$

#6)



$$y = 3 \tan \left[ \frac{3}{2} \left( \theta - \frac{\pi}{2} \right) \right] - 2$$

$$\boxed{\begin{aligned} \frac{2\pi}{3} k &= \pi \\ k &= \frac{3}{2} \end{aligned}}$$

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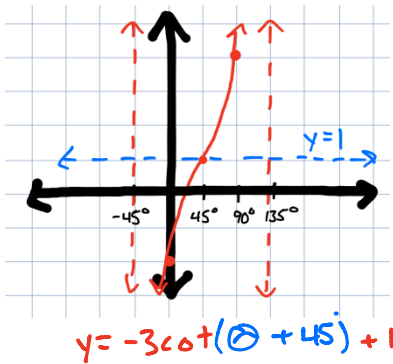
Write an equation of the cotangent function with the given information

- #7)  $a = -3$ , period =  $270^\circ$ ,  
phase shift =  $120^\circ$ , VD = 0

$$y = -3 \cot \left[ \frac{2}{3} (\theta - 120^\circ) \right]$$

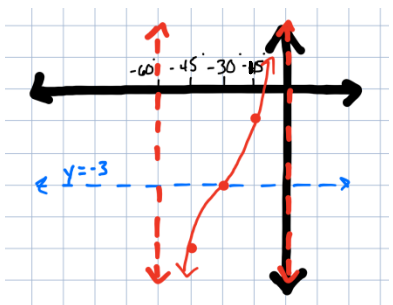
$$\begin{aligned} 270^\circ k &= 180^\circ \\ k &= \frac{18}{27} \\ k &= \frac{2}{3} \end{aligned}$$

#8)



$$y = -3 \cot (\theta + 45^\circ) + 1$$

#9)



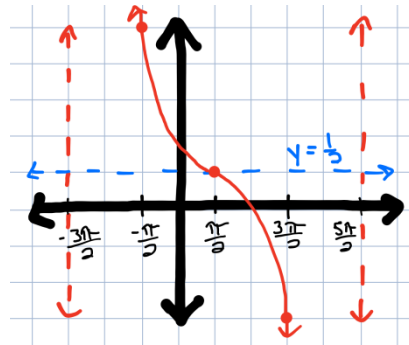
$$y = -2 \cot [3(\theta + 60^\circ)] - 3$$

$$\begin{aligned} 60^\circ k &= 180^\circ \\ k &= 3 \end{aligned}$$

- #10)  $a = \frac{1}{3}$ , period =  $\pi$ ,  
phase shift =  $\frac{\pi}{5}$ , VD = 7

$$y = \frac{1}{3} \cot \left( \theta - \frac{\pi}{5} \right) + 7$$

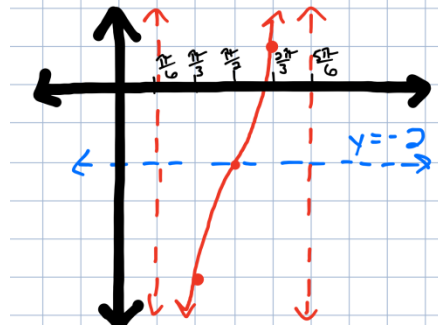
#11)



$$y = 2 \cot \left[ \frac{1}{4} \left( \theta + \frac{3\pi}{4} \right) \right] + \frac{1}{2}$$

$$\begin{aligned} 4\pi k &= \pi \\ k &= \frac{1}{4} \end{aligned}$$

#12)



$$y = -3 \cot \left[ \frac{3}{2} \left( \theta - \frac{\pi}{6} \right) \right] - 2$$

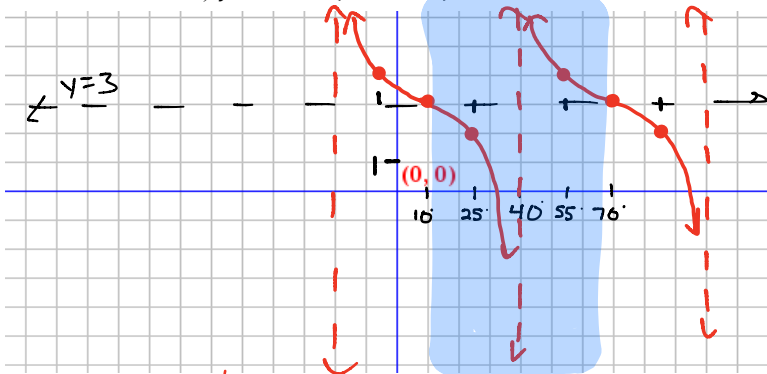
$$\begin{aligned} \frac{2\pi}{3} k &= \pi \\ k &= \frac{3}{2} \end{aligned}$$

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## 4A - Graphing Tangent & Cotangent

Graph at least two periods each function.

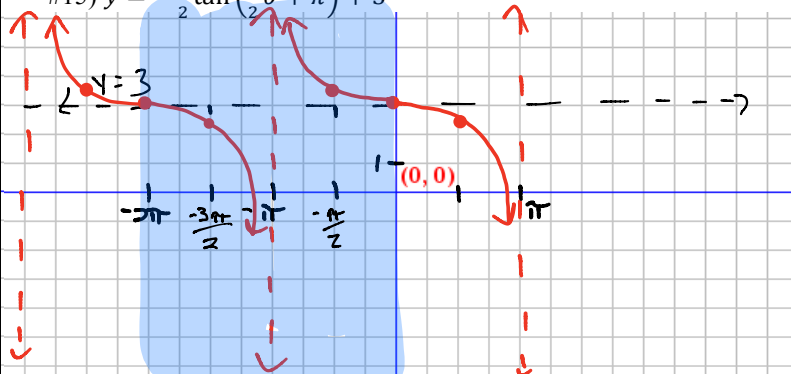
$y = -\tan[3(\theta - 10^\circ)] + 3$   
 #13)  $y = -\tan(3\theta - 30^\circ) + 3$



A: ~~-1~~  
~~Amplitude:~~  
 Reflected over midline? Yes  
 Vertical Displacement: 3  
 Midline:  $y=3$   
 Phase Shift:  $10^\circ$   
 Period:  $\frac{180^\circ}{3} = 60^\circ$

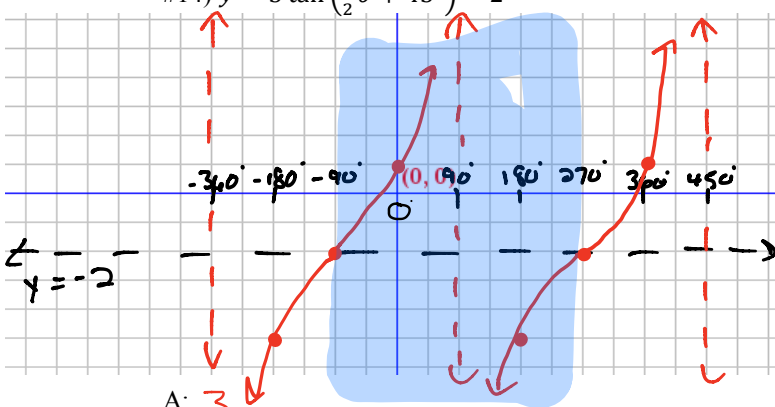
$y = -\frac{1}{2} \tan\left[\frac{1}{2}(\theta + 2\pi)\right] + 3$

#15)  $y = -\frac{1}{2} \tan\left(\frac{1}{2}\theta + \pi\right) + 3$



A: ~~-1/2~~  
~~Amplitude:~~  
 Reflected over midline? Yes  
 Vertical Displacement: 3  
 Midline:  $y=3$   
 Phase Shift:  $-2\pi$   
 Period:  $\frac{\pi}{1/2} = 2\pi$

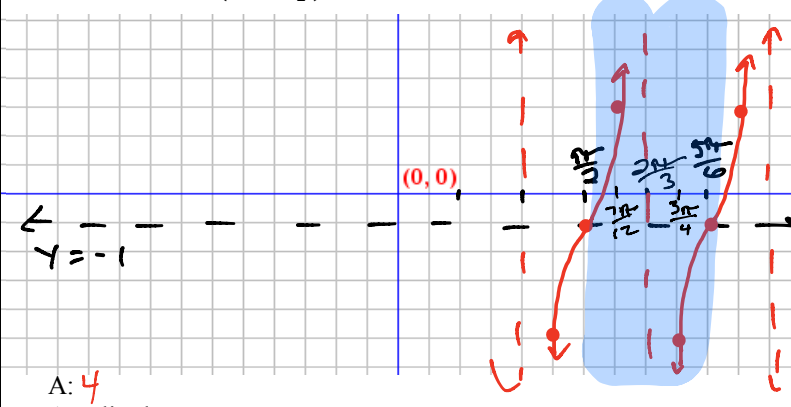
$y = 3 + \tan\left[\frac{1}{2}(\theta + 90^\circ)\right]$   
 #14)  $y = 3 \tan\left(\frac{1}{2}\theta + 45^\circ\right) - 2$



A: 3  
~~Amplitude:~~  
 Reflected over midline? No  
 Vertical Displacement: -2  
 Midline:  $y=-2$   
 Phase Shift:  $-90^\circ$   
 Period:  $360^\circ = \frac{180^\circ}{1/2}$

$y = 4 + \tan\left[3\left(\theta - \frac{\pi}{2}\right)\right] - 1$

#16)  $y = 4 \tan\left(3\theta - \frac{3\pi}{2}\right) - 1$



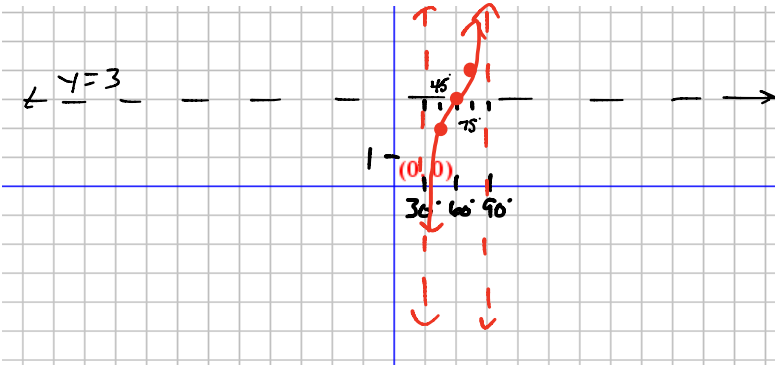
A: 4  
~~Amplitude:~~  
 Reflected over midline? No  
 Vertical Displacement:  $y=-1$   
 Midline:  $y=-1$   
 Phase Shift:  $\frac{\pi}{2}$   
 Period:  $\frac{\pi}{3}$

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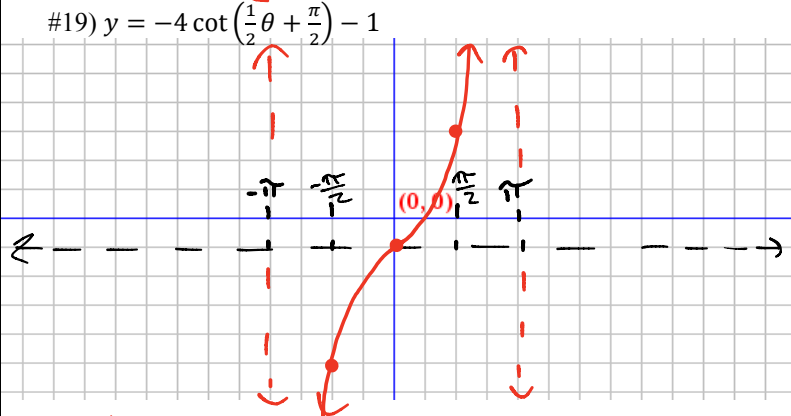
Graph at least one period each function.

#17)  $y = -\cot(3\theta - 90^\circ) + 3$



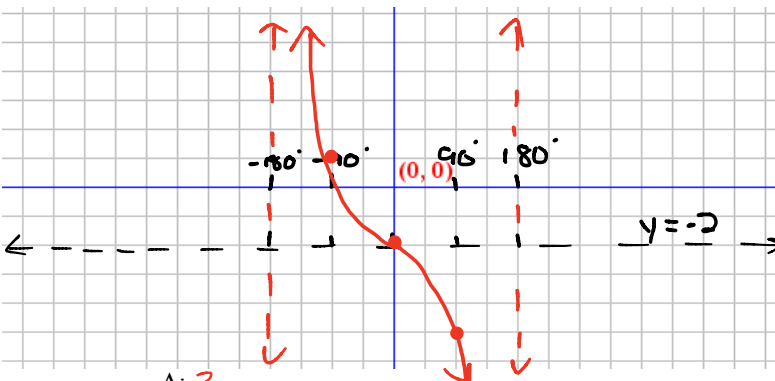
A:  $-1$   
~~Amplitude:~~  
 Reflected over midline?  $Yes$   
 Vertical Displacement:  $3$   
 Midline:  $y=3$   
 Phase Shift:  $30^\circ$   
 Period:  $\frac{180^\circ}{3} = 60^\circ$

#19)  $y = -4\cot\left[\frac{1}{2}(\theta + \pi)\right] - 1$



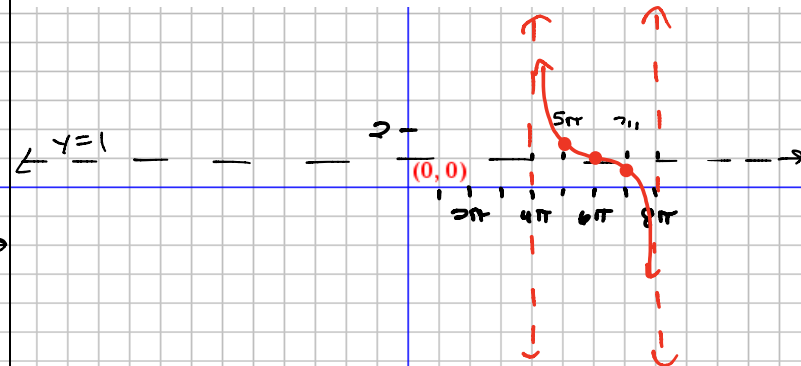
A:  $-4$   
~~Amplitude:~~  
 Reflected over midline?  $Yes$   
 Vertical Displacement:  $-1$   
 Midline:  $y=-1$   
 Phase Shift:  $-\pi$   
 Period:  $\frac{\pi}{\frac{1}{2}} = 2\pi$

#18)  $y = 3\cot\left[\frac{1}{2}(\theta + 180^\circ)\right] - 2$



A:  $3$   
~~Amplitude:~~  
 Reflected over midline?  $No$   
 Vertical Displacement:  $-2$   
 Midline:  $y=-2$   
 Phase Shift:  $-180^\circ$   
 Period:  $\frac{180^\circ}{\frac{1}{2}} = 360^\circ$

#20)  $y = \frac{1}{3}\cot\left[\frac{1}{4}(\theta - 4\pi)\right] + 1$



A:  $\frac{1}{3}$   
~~Amplitude:~~  
 Reflected over midline?  $No$   
 Vertical Displacement:  $1$   
 Midline:  $y=1$   
 Phase Shift:  $4\pi$   
 Period:  $\frac{\pi}{\frac{1}{4}} = 4\pi$