

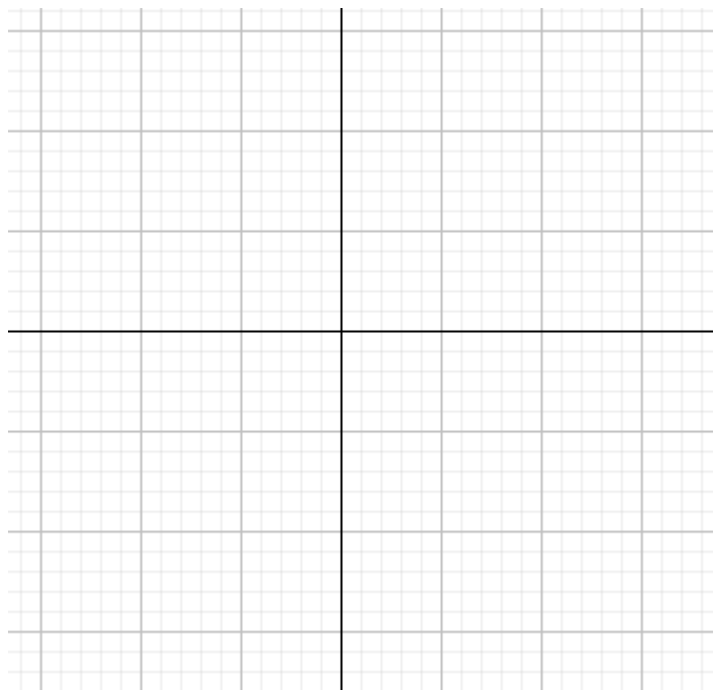
1. In a device, a drum is used to retract a 5 ft string in 0.25 second. If the diameter of the drum is 1 ft, what is the average spinning speed of the drum so that the device can retract the given length of the string within the required time? (Write your answer in RPM)

2. Verify  $\frac{\cos x}{1 - \tan x} + \frac{\sin x}{1 - \cot x} = \sin x + \cos x$

3. Given  $f(x) = 4 \sin\left(\frac{\pi}{2}x + \frac{\pi}{3}\right) - 2$ ,

(a) Graph the function for at least 2 whole periods.

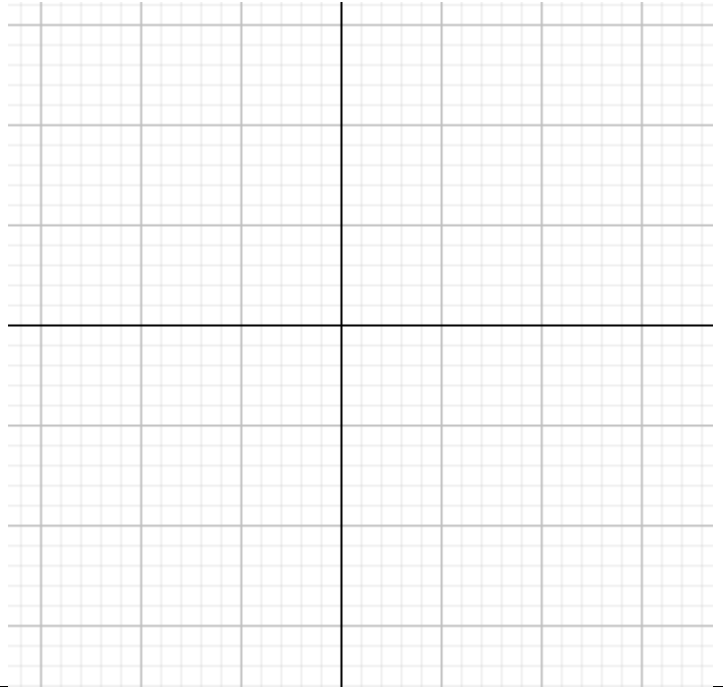
(b) Identify and write the range of  $f(x)$  using interval notation.



4. Given  $f(x) = -\tan(3x - \pi) + \sqrt{3}$

(a) Graph at least 2 whole periods for  $x > 0$

(c) Find vertical asymptotes.



5. Let  $-2\pi \leq \theta < -\pi$ ,  $20\sec^2 \theta + 23\sec \theta - 21 = 0$ ,  
find  $1 - \sin \theta \cos \theta$

6 If the terminal side of  $\theta$  is in the 2<sup>nd</sup> quadrant and

$\tan \theta = -4$ , find  $\cos(\frac{3\pi}{2} - \theta)$