5. Graph $\frac{1}{2}\tan\left(\frac{1}{3}x-\frac{\pi}{4}\right)+\frac{3}{2}$

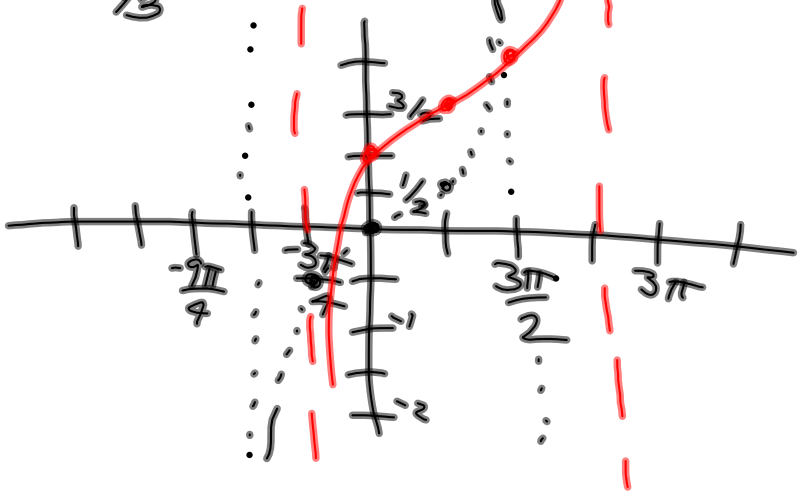
$=\frac{1}{2}\tan\frac{1}{3}\left(x-\frac{3\pi}{4}\right)+\frac{3}{2}$

"amp": $\frac{1}{2}$

period: $\frac{\pi}{1/3}=3\pi$

right $3\pi/4$

up $3/2$



9. Prove. $\frac{\sin x-\cos x}{\cos^2 x}=\frac{\tan^2 x-1}{\sin x+\cos x}$

$\sin^2x+\cos^2x=1$

$\tan^2x+1=\sec^2x$

$\tan^2x=\sec^2x-1$

$RHS=\frac{\sec^2x-1-1}{\sin x+\cos x}$

$=\frac{\sec^2x-2}{\sin x+\cos x}\cdot\frac{\sin x-\cos x}{\sin x-\cos x}$

$=\frac{\left(\frac{1}{\cos^2x}-\frac{2\cos^2x}{\cos^2x}\right)(\sin x-\cos x)}{(\sin x+\cos x)(\sin x-\cos x)}$

$=\frac{\left(\frac{1-2\cos^2x}{\cos^2x}\right)(\sin x-\cos x)}{(\sin^2x-\cos^2x)}$

$\cos 2x=2\cos^2x-1$

$=\cos^2x-\sin^2x$

$=\frac{\sin x-\cos x}{\cos^2x}\cdot\frac{1-2\cos^2x}{\sin^2x-\cos^2x}$

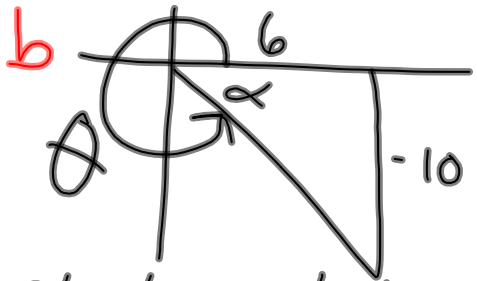
$=\frac{\sin x-\cos x}{\cos^2x}\cdot\frac{-\cos 2x}{-\cos 2x}=LHS$

19. $\vec{v} = \langle 6, -10 \rangle$

$68 = 2^2 \cdot 17$

a) $|\vec{v}| = \sqrt{a^2+b^2} = \sqrt{6^2+10^2} = \sqrt{136} = 2\sqrt{34}$

b

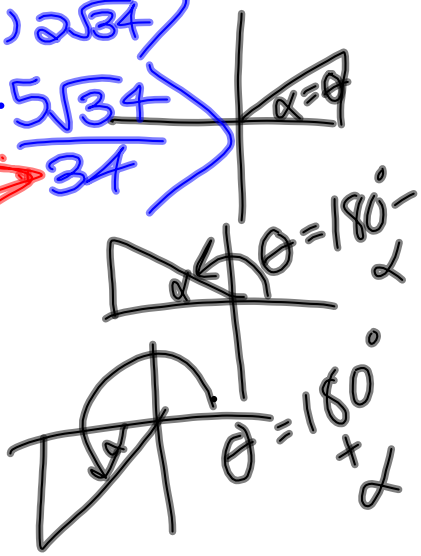


$\alpha = \left|\tan^{-1}\frac{b}{a}\right| = \tan^{-1}\left(\frac{10}{6}\right)$

$\theta = 360° - \alpha$

c) $\vec{u} = \left\langle \frac{6}{2\sqrt{34}}, \frac{-10}{2\sqrt{34}} \right\rangle$

$= \left\langle \frac{3\sqrt{34}}{34}, \frac{-5\sqrt{34}}{34} \right\rangle$



7.6

#67 $\vec{a} = \vec{i} + \vec{j}$; $\vec{b} = 2\vec{i} - 3\vec{j}$

angle between $\vec{a}$ & $\vec{b}$

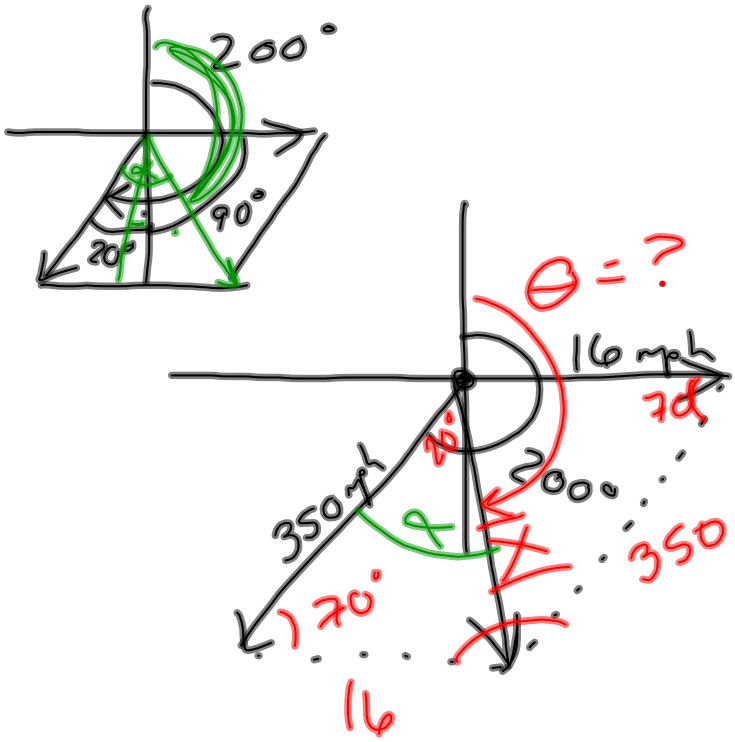
$\theta = \cos^{-1}\left(\frac{\vec{a}\cdot\vec{b}}{|\vec{a}||\vec{b}|}\right) = \cos^{-1}\left(\frac{-1}{\sqrt{26}}\right)$

$\vec{a}\cdot\vec{b} = 1(2) + 1(-3) = -1$

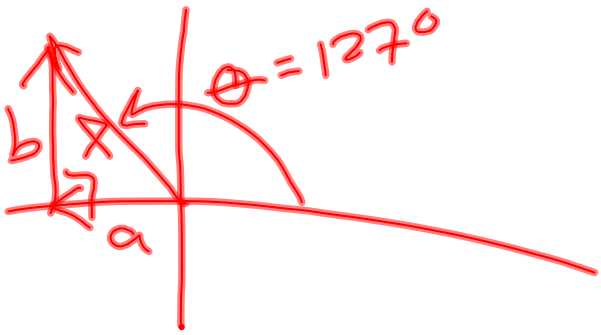
$|\vec{a}| = \sqrt{1^2+1^2} = \sqrt{2}$

$|\vec{b}| = \sqrt{2^2+(-3)^2} = \sqrt{13}$

$= 101.3°$



$$X = \sqrt{16^2 + 350^2 - 2(16)(350)\cos 70^\circ}$$



$$\cos 127^\circ = \frac{a}{4}$$

$$a = 4\cos 127^\circ \approx$$

$$\sin 127^\circ = \frac{b}{4}$$

$$b = 4\sin 127^\circ \approx$$

$$a\vec{i} + b\vec{j}$$