Directions: Find out when $f(x)$ is inc and when $f(x)$ is dec.

$f(x) = 3\cos(x) - \sqrt{3}\sin(x)$ on $[0, 2\pi]$

$f'(x) = -3\sin(x) - \sqrt{3}\cos(x) = 0$

$-3\sin(x) = \sqrt{3}\cos(x)$

$\frac{\sin(x)}{\cos(x)} = -\frac{\sqrt{3}}{3}$

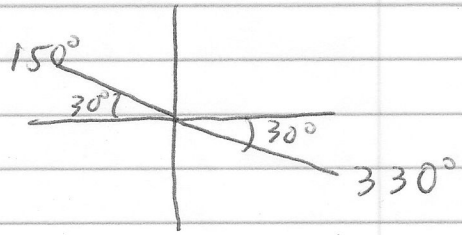
(try different angles till you get what you want)

reference angle: $x = \frac{\pi}{6} = 30°$ b/c

$\frac{\sin\left(\frac{\pi}{6}\right)}{\cos\left(\frac{\pi}{6}\right)} = \frac{\sin(30°)}{\cos(30°)} = \frac{\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{1\cdot\sqrt{3}}{\sqrt{3}\cdot\sqrt{3}} = \frac{\sqrt{3}}{3}$

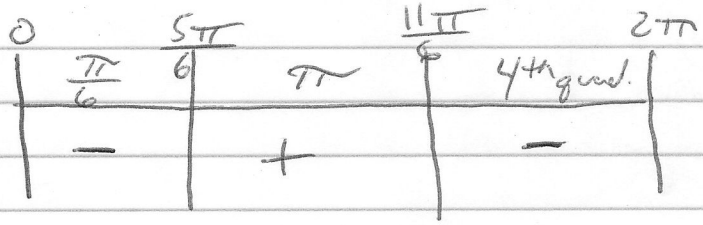
Now, find the quadrants where $\frac{\sin(x)}{\cos(x)}$ is neg

sin (+)	sin (+)
cos (−)	cos (+)
sin (−)	sin (−)
cos (−)	cos (+)



$x = 150°, 330°$

so, $x = \frac{5\pi}{6}, \frac{11\pi}{6}$



$f(x)$ is inc on $\left[\frac{5\pi}{6}, \frac{11\pi}{6}\right]$ b/c f' is +.

$f(x)$ is dec on $\left[0, \frac{5\pi}{6}\right], \left[\frac{11\pi}{6}, 2\pi\right]$ b/c f' is neg.