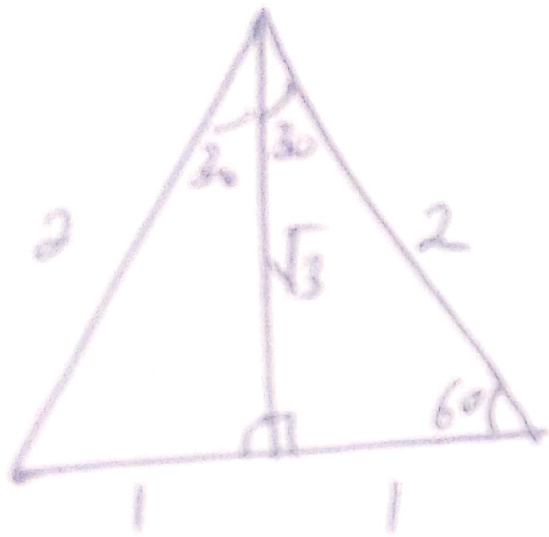


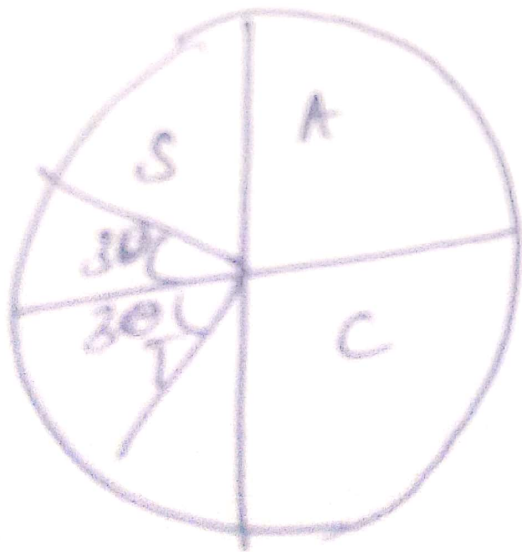
1. $\cos^{-1}(-\sqrt{3}/2)$



$$\cos 30 = \frac{\sqrt{3}}{2}$$

$$\cos^{-1} \frac{\sqrt{3}}{2} = 30^\circ$$

Cosine is negative
in quadrant 2
and 3.



$$\cos^{-1} \frac{\sqrt{3}}{2} = 180^\circ - 30^\circ$$

or
 $180^\circ + 30^\circ$

$$\cos^{-1} \left(-\frac{\sqrt{3}}{2} \right) = 150^\circ, 210^\circ$$

$$2. \quad f = \cot x, \quad a = \frac{\pi}{6}, \quad b = \frac{\pi}{2}.$$

$$\text{Average rate of change} = \frac{f(b) - f(a)}{b - a}.$$

$$= \frac{\cot\left(\frac{\pi}{2}\right) - \cot\left(\frac{\pi}{6}\right)}{\frac{\pi}{2} - \frac{\pi}{6}}.$$

$$= \frac{0 - \frac{3}{\sqrt{3}}}{\frac{\pi}{3}} = -\frac{3}{\sqrt{3}} \times \frac{3}{\pi} = -\frac{9}{\pi\sqrt{3}}$$

$$\frac{f(b) - f(a)}{b - a} = -\frac{9}{\pi\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}}$$

$$= -\frac{9\sqrt{3}}{3\pi} = -\frac{3\sqrt{3}}{\pi}.$$

3. a) $\lim_{x \rightarrow -1^-} f(x) = \infty$

b) $\lim_{x \rightarrow -1^+} f(x) = 3$

c) $\lim_{x \rightarrow -1} f(x) = 3$

d) $\lim_{x \rightarrow 2^-} f(x) = -1$

e) $\lim_{x \rightarrow 2^+} f(x) = \text{DNE}$

f) $\lim_{x \rightarrow 2} f(x) = \text{DNE}$