

- *PROBLEM 1* : Compute $\lim_{x \rightarrow \infty} \frac{\sin x}{x}$.

Click [HERE](#) to see a detailed solution to problem 1.

- *PROBLEM 2* : Compute $\lim_{x \rightarrow \infty} \frac{2 - \cos x}{x + 3}$.

Click [HERE](#) to see a detailed solution to problem 2.

- *PROBLEM 3* : Compute $\lim_{x \rightarrow \infty} \frac{\cos^2(2x)}{3 - 2x}$.

Click [HERE](#) to see a detailed solution to problem 3.

- *PROBLEM 4* : Compute $\lim_{x \rightarrow 0^-} x^3 \cos\left(\frac{2}{x}\right)$.

Click [HERE](#) to see a detailed solution to problem 4.

- *PROBLEM 5* : Compute $\lim_{x \rightarrow \infty} \frac{x^2(2 + \sin^2 x)}{x + 100}$.

Click [HERE](#) to see a detailed solution to problem 5.

- *PROBLEM 6* : Compute $\lim_{x \rightarrow -\infty} \frac{5x^2 - \sin(3x)}{x^2 + 10}$.

Click [HERE](#) to see a detailed solution to problem 6.

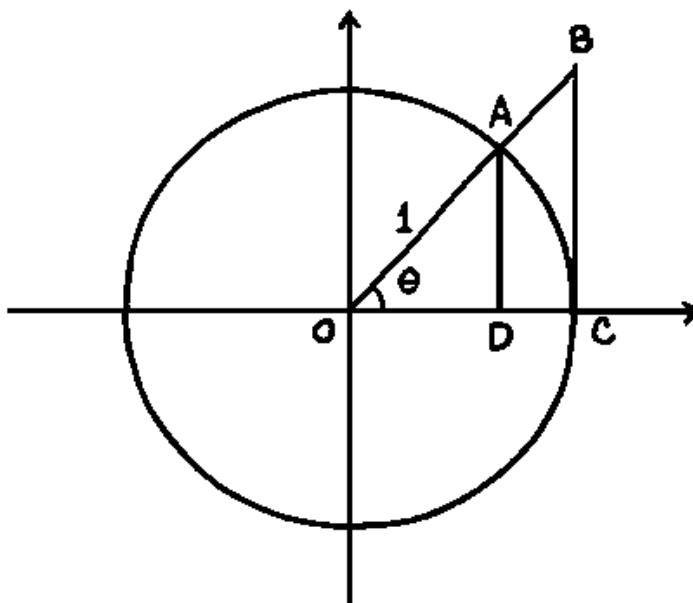
- *PROBLEM 7* : Compute $\lim_{x \rightarrow -\infty} \frac{x^2(\sin x + \cos^3 x)}{(x^2 + 1)(x - 3)}$.

Click [HERE](#) to see a detailed solution to problem 7.

- *PROBLEM 8* : Assume that $\lim_{\theta \rightarrow -1^-} f(\theta)$ exists and $\frac{\theta^2 + \theta - 2}{\theta + 3} \leq \frac{f(\theta)}{\theta^2} \leq \frac{\theta^2 + 2\theta - 1}{\theta + 3}$. Find $\lim_{\theta \rightarrow -1^-} f(\theta)$.

Click [HERE](#) to see a detailed solution to problem 8.

- *PROBLEM 9* : Consider a circle of radius 1 centered at the origin and an angle of θ radians, $0 < \theta < \frac{\pi}{2}$, in the given diagram.



- a.) By considering the areas of right triangle OAD, sector OAC, and right triangle OBC, conclude that

$$(\cos \theta)(\sin \theta) < \theta < \frac{\sin \theta}{\cos \theta}.$$

- b.) Use part a.) and the Squeeze Principle to show that

$$\lim_{\theta \rightarrow 0^+} \frac{\sin \theta}{\theta} = 1.$$

Click [HERE](#) to see a detailed solution to problem 9.

- *PROBLEM 10* : Assume that

$$f(x) = \begin{cases} x^2 \sin\left(\frac{1}{x}\right), & \text{if } x \neq 0 \\ 0, & \text{if } x = 0. \end{cases}$$

Show that f is continuous at $x=0$.

Click [HERE](#) to see a detailed solution to problem 10.