

1. (10 points). True or false, no explanation necessary.

a) T F

Let

$$f(x) = \begin{cases} \sin(3x - 1) & \text{if } x < 5, \\ 2x & \text{if } x \geq 5. \end{cases}$$

$f(x)$ is differentiable at $x = 5$.

b) T F

For $0 < x < 1$, the inequality $1 - \cos x < x$ is true.

c) T F

The following limit exists.

$$\lim_{x \rightarrow 2} \frac{x^2 - 9x + 14}{x^2 - 4}.$$

d) T F

If $\lim_{x \rightarrow 0} f(x) \cdot g(x) = 5$, then $\lim_{x \rightarrow 0} f(x)$ exists.

e) T F

If $\lim_{x \rightarrow c^-} f(x)$ and $\lim_{x \rightarrow c^+} f(x)$ both exist, then $f(x)$ is necessarily continuous at $x = c$.