

Name: _____ ID #: _____ Section: _____

Q1(2 Points) **Express** the slope of the tangent line to the curve $f(x) = 2 - 3x^2$ at $x = 1$ in terms of limit and then **find** the limit.

Q2(5 Points) Find the limit, if it exists. If it does not exist, explain why.

a)
$$\lim_{x \rightarrow 2} \frac{x^2 - 2x}{x^2 - 3x + 2}$$

b)
$$\lim_{t \rightarrow 0} \left(\frac{1}{2t} - \frac{1}{t^2 + 2t} \right)$$

c)
$$\lim_{x \rightarrow -1} \left(x - \frac{x}{|x|} \right)$$

d)
$$\lim_{x \rightarrow 1} ([x - 1] - [2x])$$

Q3 (3 Points) Consider the function

$$\begin{cases} 1 + x, & \text{if } x < -2 \\ 0, & \text{if } x = -2 \\ \frac{1}{x^2}, & \text{if } -2 < x < 0 \\ \sin x, & \text{if } x \geq 0. \end{cases}$$

Find the limit:

a) $\lim_{x \rightarrow -2^-} f(x)$

b) $\lim_{x \rightarrow -2} f(x)$

c) $\lim_{x \rightarrow 0} f(x)$

d) $\lim_{x \rightarrow -\pi} f(x)$