

2.1 Derivative Basics: Quiz C

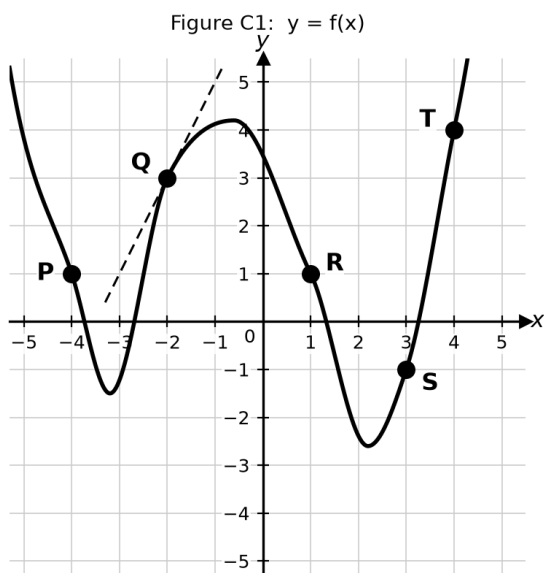
Name: _____

Time: 25 minutes No calculator 40 points

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Answer exactly the question asked. Show work on Questions 2, 4, and 5.
If a derivative does not exist, write DNE. If a function value does not exist, write *undefined*.

1. Questions 1(a)–1(e) refer to Figure C1, the graph of f . (2 each, 10 pts)
The labeled points are on the graph; the dashed line is tangent to the graph at Q .



- (a) $\lim_{x \rightarrow -2} \frac{f(-2) - f(x)}{x - (-2)}$ _____
- (b) $\lim_{x \rightarrow -2} f(x)$ _____
- (c) An equation of the tangent line at Q _____
- (d) The labeled point at which $f'(x)$ is least _____
- (e) Every labeled point at which $f'(x) > 0$ _____

2. Let $f(x) = x^3 - 5x$. Evaluate $\frac{f(1+h) - f(1)}{h}$ for $h = -2$. (4 pts)

3. Answer only. (3 each, 6 pts)

- (a) The limit $\lim_{h \rightarrow 0} \frac{\frac{1}{h-2} + \frac{1}{2}}{h}$ equals $f'(c)$ for the function $f(x) = \frac{1}{x}$.
Find c . _____

- (b) Evaluate $\lim_{h \rightarrow 0} \frac{(1+2h)^2 - 1}{h}$. _____

4. Let $f(x) = \frac{x}{x+2}$.

(a) Use the definition below to find $f'(x)$.

(8 pts)

An answer found without the definition earns at most 2 points.

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

(b) Find every point (x, y) on the graph of f at which the tangent line has slope 2.

(4 pts)

5. Let $g(x) = x^3 + 3x$. Use the definition below with $c = -2$ to find $g'(-2)$.

(8 pts)

An answer found without the definition earns at most 2 points.

$$g'(c) = \lim_{x \rightarrow c} \frac{g(x) - g(c)}{x - c}$$