

Name _____

To receive full credit you must show all work.

1. Evaluate the following limits without the use of a table.

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

b. $\lim_{s \rightarrow 16} \left(\frac{1}{2}s - \sqrt{s} \right)$

2. Use the definition of derivative to find $f'(x)$ for $f(x) = 2x^2 + 3x - 2$

3. Find $f'(x)$ for each of the following. Do not simplify your answers.

a. $f(x) = 3\sqrt[3]{x} - \frac{5}{x^2} - 4x^3 + 5$

b. $f(x) = (4x^3 - 6x + 2)(3x^4 - 2x^2 + 1)$

c. $f(x) = \frac{3x^2 - 1}{5x + 2}$

d. $f(x) = x^4 \sqrt[3]{x^2 + 1}$

4. Evaluate the following expression.

$$\frac{d^2}{dx^2} \sqrt{x^7} \quad x=16$$

5. Use the given graph to answer the following questions.

a. At what x-values is the function discontinuous?

b. At what x-values is the function nondifferentiable?

6. After t hours a passenger train is $s(t) = 24t^2 - 2t^3$ miles due west of its starting point (for $0 \leq T \leq 12$).

a. Find its velocity at time $t=4$ hours.

b. Find its acceleration at time $t=1$ hour

7. A steel mill finds that its cost function is $C(x) = 8000\sqrt{x} - 6000 \sqrt[3]{x}$ dollars, where x is the daily Production of steel (in tons).

a. Find the marginal cost function

b. Find the marginal cost when 64 tons of steel are produced.

