

Calculus I

Name: \_\_\_\_\_

Study Guide 14

Class: \_\_\_\_\_

Due Date: \_\_\_\_\_

Score: \_\_\_\_\_

No Work  $\Leftrightarrow$  No Points

Use Pencil Only  $\Leftrightarrow$  Be Neat & Organized

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1. Given  $f(x) = x^2 - 2x - 3$ .

(a) (2 points) Find  $f'(x)$

(a) \_\_\_\_\_

(b) (2 points) Solve  $f'(x) = 0$

(b) \_\_\_\_\_

(c) (2 points) Find the points on the graph of  $f(x)$  where  $f'(x) = 0$

(c) \_\_\_\_\_

(d) (2 points) Find  $f''(x)$

(d) \_\_\_\_\_

(e) (2 points) Solve  $f''(x) = 0$

(e) \_\_\_\_\_

(f) (2 points) Find the points on the graph of  $f(x)$  where  $f''(x) = 0$

(f) \_\_\_\_\_

2. Given  $f(x) = x^3 - 6x^2 + 5$ .

(a) (2 points) Find  $f'(x)$

(a) \_\_\_\_\_

(b) (2 points) Solve  $f'(x) = 0$

(b) \_\_\_\_\_

(c) (2 points) Find the points on the graph of  $f(x)$  where  $f'(x) = 0$

(c) \_\_\_\_\_

(d) (2 points) Find  $f''(x)$

(d) \_\_\_\_\_

(e) (2 points) Solve  $f''(x) = 0$

(e) \_\_\_\_\_

(f) (2 points) Find the points on the graph of  $f(x)$  where  $f''(x) = 0$

(f) \_\_\_\_\_

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3. Suppose  $x = x(t)$  and  $y = y(t)$ , differentiate both sides with respect to  $t$ , then solve for  $\frac{dy}{dt}$ .

(a) (2 points)  $x^3 + y^2 = 75$

(a) \_\_\_\_\_

(b) (3 points)  $\frac{1}{x} + \frac{1}{y} = 1$

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(b) \_\_\_\_\_

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

(a) (2 points) Find  $f'(x)$

(a) \_\_\_\_\_

(b) (2 points) Solve  $f'(x) = 0$

(b) \_\_\_\_\_

(c) (2 points) Find the points on the graph of  $f(x)$  where  $f'(x) = 0$

(c) \_\_\_\_\_

(d) (2 points) Find  $f''(x)$

(d) \_\_\_\_\_

(e) (2 points) Solve  $f''(x) = 0$

(e) \_\_\_\_\_

(f) (2 points) Find the points on the graph of  $f(x)$  where  $f''(x) = 0$

(f) \_\_\_\_\_

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5. Suppose  $v = v(t)$ ,  $r = r(t)$ , and  $h = h(t)$ . Differentiate both sides with respect to  $t$ , then solve for  $\frac{dr}{dt}$ .

(a) (3 points)  $v = \pi r^2 h$

(a) \_\_\_\_\_

(b) (3 points)  $v = \frac{4\pi r^3}{3}$

(b) \_\_\_\_\_

(c) (3 points)  $v = \frac{\pi r^2 h}{3}$

(c) \_\_\_\_\_