

QUIZ #3 (SAMPLE QUESTIONS)

Show all work, simplify as appropriate, and use “good form and procedure” (as in class).

Box in your final answers; write units where appropriate!

No notes or books allowed.

USE A SCIENTIFIC CALCULATOR!

1) For parts a) and b), sketch the graph of f . You must:

- Find and label all critical points and inflection points (if any).
- Classify all critical points as relative maximum points, relative minimum points, or neither.
- Find the y -intercept.
- Have your graph correctly show where f is increasing / decreasing, and where f is concave up / concave down.
- Show all steps, as we have done in class.

(44 points total)

a) $f(x) = 2x^3 + 9x^2 - 24x + 20$. (26 points)

YOU MAY USE THE BACK OF THIS SHEET!

1) cont.)

YOU MAY USE THE NEXT SHEET!

b) $f(x) = \sqrt[5]{x^4}$. (18 points)

YOU MAY USE THE BACK OF THIS SHEET!

2) Find the absolute maximum and absolute minimum values of $f(x) = 2x^2 - 12x + 5$ on the interval $[1,4]$. (8 points)

3) Your company sells TVs. Fixed costs are \$2000. Each TV costs \$100 to make. The price function is $p(x) = 1100 - 20x$ in dollars, where x is the number of TVs produced and sold. (20 points total)

a) Find the profit function, $P(x)$.

b) How many TVs should be produced? Verify that this gives us the absolute maximum profit.

c) What is your maximum profit?

4) For the equation $x^3y + y^2 = 4$, use implicit differentiation to find $\frac{dy}{dx}$.
(10 points)

5) Darrell's company sells car alarms. Its revenue (R) is given by $R = 4x^2 + 300x$, where x is the population of Darrell's hometown. If the population of Darrell's hometown grows at the rate of 20 people per week, find how rapidly revenue is growing when the population of the town is 500. (12 points)

6) If 3 is a critical number of f , $f'(3) = 0$, and $f''(3)$ is positive, then what kind of a point does f have at $x = 3$? Circle one: (3 points)

Relative maximum point

Relative minimum point

Neither

7) True or False: If 7 is a critical number of f , $f'(7) = 0$, and $f''(7) = 0$, then f must have neither a relative maximum point, nor a relative minimum point at $x = 7$. Circle one: (3 points)

True

False