

Calculus I Chapter 3

Name _____

_____ 1. Determine the absolute extreme of the function

$$f(x) = 3x^{\frac{2}{3}} - 2x \text{ on the interval } [-1,1].$$

_____ 2. Apply the mean value theorem for $f(x) = \sqrt{x-2}$ on the interval $[2,6]$

Given the function $y = \frac{x^2}{x^2 - 9}$ find

_____ 3. critical values

_____ 4. increasing intervals

_____ 5. decreasing intervals

Given the function $y = x^4 - 4x^3 + 16x$, find any

_____ 6. relative maxima

_____ 7. relative minima

_____ 8. points of inflection

Given the function $y = x\sqrt{4-x}$ find any

_____ 9. relative maxima

_____ 10. relative minima

_____ 11. points of inflection

_____ 12. A manufacturer has determined that the total cost of C of operating a factory is

$$C = 0.5x^2 + 15x + 5000$$

where x is the number of units produced. At what level of production will the average cost per unit be minimized? (The average cost per unit is C/x .)

_____ 13. The sum of the perimeters of an equilateral triangle and a square is 10. Find the dimensions of the triangle and the square that produces a minimum total area.

_____ 14. Use Newton's method to approximate the zero's of the function

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

Find the limit

_____ 15. $\lim_{n \rightarrow \infty} \frac{n^3 - 4n^2 + 6n + 2}{3n^3 - 2}$

_____ 16. $\lim_{n \rightarrow \infty} \frac{4n}{3n^2 + 6n + 8}$

_____ 17. $\lim_{n \rightarrow \infty} \frac{n^4 + 6n^2 + 8}{n^2 + 6n - 2}$