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University (

1-12 0 x2 = L 10+1020 SUNTAL 22 | C 20+1020 200 2 300 5 - 4(E)+2020 100 2 300 5 - 4(E)+2020 1 7

RT-I: Give a Short Answer [20%]

Instruction: Write the most simplified answer on the space provided.

- Evaluate the following limits.

 - - 3. The value of a and b for which the function $f(x) = x^3 + ax^2 + b$ will have relative extreme value at (2,3) is _____ and ____ respectively.
 - 4. Let $f(x) = x \ln x$, then $(f)'(e^4) =$ ______
 - 5. The derivative of $g(x) = \int_1^{x^2} sint dt$ is ______
 - 6. Evaluate;
 - (a) $\frac{d}{dx} \tan^{-1}(\tan\sqrt{x}) =$ ______ (b) $\frac{d}{dx} \ln(\cosh x) =$ ______
 - 7. If $f(x) = \frac{x^3}{4} 3x$, then the absolute maximum value and absolute minimum value of f on the closed interval [0,3] is _____ and ____ respectively.
 - 8. Given $x^2 + 2xy + 2y^2 = 8$,
 - (a) $\frac{dy}{dx} =$
 - (b) The equation of the tangent line to the graph at (0,2) is_____
 - 9. If $f(x) = e^{-3x}$, then the third derivative of f is _

Top students

ART-II Workout[30%]

how all the necessary steps clearly and neatly to answer the following questions.

1. Use ϵ - δ definition to show that $\lim_{x\to 3} (x^2 - 4x + 5) = 2$ (3pts)

Top students

Natural Science

PART-II Workout[30%]

Show all the necessary steps clearly and neatly to answer the following questions.

1. Use
$$\epsilon$$
- δ definition to show that $\lim_{x\to 3} (x^2 - 4x + 5) = 2$ (3pts)

चिक्रिक्ट विवास

(e) the interval on which f is concave up and concave down, and the inflection point(s) of f if exist(s), (2 pts)

(f) Use the above information to sketch the graph of f. (1 pt)

चिक्रिकारिङ वृक्त

Science

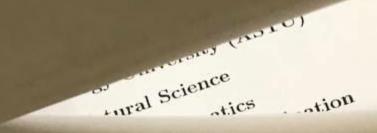
- 3. Given the function $f(x) = \frac{x^2}{x^2-1}$. Then find;
 - (a) the domain, intercepts and critical numbers of f, (1 pt)

(b) the vertical and horizontal asymptotes of f, (1 pt)

(c) the intervals on which f is increasing and decreasing, (2 pts)

(d) the relative extreme value(s) of f if exist(s), (1 pt)

जिन्ने अधिवारिक



A water pours into a fish tank at a rate of 5 ft³/min. How fast the water level rising if the base of the tank is a square of the dimension 5 ft? (3pts)