Class 12 Mathematics · Chapter 6: Application of Derivatives

Worksheet · 20 marks · about 40 minutes · based on NCERT

Name _____ Class and section _____ Date _____

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1. Which of the following functions is increasing on R? [1]

(a) e^{-x} (b) $x^3 + 5x$

(c) x^2 (d) cos x

2. The function $f(x) = 5 - 2x^3$ on R is [1]

(a) strictly increasing (b) strictly decreasing

(c) constant (d) neither increasing nor decreasing

3. If f is continuous on the closed interval [a, b], then f [1]

(a) attains its absolute maximum and its absolute minimum value, each at least once, in [a, b] (b) attains its absolute maximum only at a or at b

(c) has a point c in (a, b) with $f'(c) = 0$ (d) has no local maxima in (a, b)

4. The side of a square sheet of ice is decreasing at 0.5 cm/s as it melts. When the side is 8 cm, the rate of change of its area is [1]

(a) $-16\ cm^2/s$ (b) $8\ cm^2/s$

(c) $-4\ cm^2/s$ (d) $-8\ cm^2/s$

5. A cylindrical can has a fixed height of 5 cm. The rate of change of its volume with respect to its radius r, when r = 2 cm, is [1]

(a) $40\pi\ cm^3/cm$ (b) $10\pi\ cm^3/cm$

(c) $20\pi\ cm^3/cm$ (d) $4\pi\ cm^3/cm$

6. Find all the critical points of $f(x) = |x^2 - 4|$ on the interval (−3, 3). [2]

7. Find the absolute maximum and absolute minimum values of $f(x) = x^3 - 6x^2 + 9x$ on [0, 4], and the points at which each is attained. [2]

8. Using the second derivative test, decide whether x = 2 is a point of local maxima or local minima of $f(x) = x^3 - 12x + 1$, and find the value of f there. [2]

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9. Using the first derivative test, find the points of local maxima and local minima of $f(x) = x^3 - 3x^2 - 24x + 5$, and the local maximum and local minimum values. [3]

10. Find the intervals in which $f(x) = x - 2 \sin x$, $0 \le x \le 2\pi$, is increasing and in which it is decreasing. [3]

11. A farmer has to fence a rectangular plot of area 800 m^2 that lies along a straight canal; the side along the canal needs no fence. Find the dimensions that use the least fencing, and that length. [3]

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