Mathematics **Class - XII MM-10** CHAPTER-APPLICATIONS OF DERIVTIVES SUBTOPIC- MAXIMA AND MINIMA **Multiple Choice Questions Assignment - 1** 1) The maximum value of $[x(x-1) + 1]^{\frac{1}{3}}, 0 \le x \le 1$ is a) $\frac{1^{1/3}}{3}$ b) $\frac{1}{2}$ c) 1 d) 0 2) For all real values of x, the minimum value of $\frac{1-x+x^2}{1+x+x^2}$ is d) $\frac{1}{2}$ c) 3 a) 0 b) 1 3) If x is real, the minimum value of $x^2-8x+17$ is a) -1 b) 0 c) 1 d) 2 **4**) The function $f(x)=2x^3-3x^2-12x+4$ has a) two points of local maxima b) two points of local minima c) one maxima or minima d) no maxima or minima 5) The maximum value of $\sin x \cdot \cos x$ is b) $\frac{1}{2}$ c) $\sqrt{2}$ a) $\frac{1}{4}$ d) $\sqrt[2]{2}$ 6) At $x = \frac{5\pi}{6}$ f(x) = 2sin 3x + 3cos 3x is a) maximum b) minimum d) neither maximum nor minimum c) zero 7) Maximum slope of the curve $y=-x^3+3x^2+9x-27$ is b) 12 c) 16 a) 0 d) 32 8) The maximum value of $\frac{1}{x}^{x}$ is b) e^{e} c) $e^{\frac{1}{e}}$ d) $\frac{1}{e}^{\frac{1}{e}}$ a) e **TRUE OR FALSE** 9) The maximum value of $f(x) = -x^2$, xeR is 4 10) Maximum value of the function $\sin x + \cos x$ is 2 **ANSWER KEY** 5) b 6) a 1) c 2) d 3) c 4) c 7) b 8) c 9) false 10) true Prepared by- Mrs Lakhwinder Kaur Lect. Math (GSSS Mehta Nangal Amritsar) Mrs Anterpreet Kaur Lect. Math (GSSS Mallian Amritsar)

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Mathematics Class - XII MM-10 CHAPTER-APPLICATIONS OF DERIVATIVES SUB TOPIC-INCREASING DECREASING Multiple Choice Questions Assignment - 2

1) The side of an equilateral triangle is increasing at the rate of 2 cm/s. The rate at which increases when the side 10 area is is b) $\sqrt{3}$ cm²/s c) $10\sqrt{3}$ cm²/s a) $10 \text{ cm}^2/\text{s}$ d) 10/3 cm²/s 2) The interval for which the function $f(x) = x^2 - 4x - 5$ is strictly increasing is b)(-2,2) $c)(-\infty, -2)$ d)(-2, ∞) a) $(2,\infty)$ 3) The interval in which $y=x^2e^{-x}$ is strictly increasing is b) (-2,0) a) $(-\infty,\infty)$ c) $(2,\infty)$ d(0,2)4) The interval for which the function $f(x) = x^2 - 6x + 3$ is strictly increasing is a) $(3,\infty)$ b) (-3,3) $c)(-\infty, -3)$ $d(-3,\infty)$ 5) The interval for which the function $f(x) = x^2 - 8x + 7$ is strictly increasing is b) (-4,4) $c)(-\infty, -4)$ a) $(4,\infty)$ $d(-4,\infty)$ 6) Which of the following functions is decreasing on [0, 11/2]b)tan xa) $\sin 2x$ c) $\cos x$ d)cos 3x7) The function $f(x) = \tan x - x$ a)always increases b)always decreases c)never increases d)sometimes increase and sometimes decreases 8) $y = x(x-3)^2$ decreases for the value of x given by d) $0 < x < \frac{3}{2}$ a)1 < x < 3b) x<0 c) x>0 **TRUE OR FALSE** 9) The function $f(x) = x^3 - 3x^2 + 3x - 100$ is increasing on R 10) The function f(x) = 7x-3 is a strictly deceasing function on R **ANSWER KEY** 1) a 2) d 3) a 4) a 5) c 6) c 7) a 8) a 9) true 10) false Prepared by- Mrs Lakhwinder Kaur Lect. Math (GSSS Mehta Nangal Amritsar) Mrs Anterpreet Kaur Lect. Math (GSSS Mallian Amritsar) Guided by- Mrs Mona Kaur Principal (GSSS Majitha, DM Amritsar)

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Mathematics Class - XII MM- 5

CHAPTER-APPICATIONS OF DERIVATIVES SUBTOPIC-APPROXIMATION

Multiple Choice Questions Assignment - 3

1) If $f(x)=3x^2-15x+5$, then approximate value of f(1.02) is a) 13.42 b) 43.42 c) 33.42 d)23.42 2) Find approximate value of $e^{3.001}$ where $e^3=20.09$ b) 21.31009 a) 19.3009 c) 21.21009 d) 20.11009 **3**) Find approximate value of $\sqrt[3]{997}$ a) 9.91 b) 10 c) 9.90 d) 9.99 4) Approximate value $\tan^{-1} 0.999$ a) $\frac{\pi}{2}$ - 0.006 b) $\frac{\pi}{4}$ + 0.005 c) $\frac{\pi}{4}$ - 0.0005 d) $\frac{\pi}{2}$ - 0.0016 5) If $f(x) = 3x^2 + 15x + 5$, then the approximate value of f (2.02) is a) 57.54 b) 27.24 c) 37.54 d) 47.54 **ANSWER KEY** 2) d 3) d 1) d 4) c 5)d

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Mathematics Class - XII MM-10 CHAPTER-APPLICATIONS OF DERIVATIVES

SUBTOPIC-TANGENTS AND NORMAL Multiple Choice Questions Assignment - 4

(a)

1. The tangent to the curve $y=e^2x$ at the point (0,1) meets the X axis at (0,1) (b) (2,0) (c) (-1/2,0) (d) (-2,0)

2. If the curve $ay+x^2=7$ and $x^3=y$ cut orthogonally at (1, 1) then the value of a is (a) 1 (b) 0 (c) -6 (d) 6

3. The curves $y=a e^{-x}$ and $y=b e^{x}$ are orthogonally, if

(a) a=b (b) a=-b (c) ab=1 (d) ab=-1

4. The line y=x+1 is a tangent to the curve $y^2=4x$ at the point

(a) (-1, 2) (b) (1, 2) (c) (1, -2) (d) (2, 1)

5. The point on the curve where tangent with curve $y^2=x$ makes an angle of 45° clockwise with X-axis is

(a) (-1/2, 1/4) (b) (1/4, -1/2) (c) (-2, 4) (d) (4, -2)

6. The equation of normal to the curve Y=Sin x at (0, 0) is

(a) x = 0 (b) y = 0 (c) x + y = 0 (d)x - y = 0

7. The angle between the curve $y^2=x$ and $x^2=y$ at (1, 1) is

(a) 60° (b) $\tan^{-1}(4/3)$ (c) $\cot^{-1}(4/3)$ (d) 90°

8. The slope of the normal to the curve $y=2x^2+3$ Sin x at x=0 is

(a) 3 (b) 1/3 (c) -3 (d) -1/3

9. The points on the curve $9y^2 = x^3$ where the normal to the curve makes equal intercepts with axes are

(a) $(4, \pm 8/3)$ (b) (4, -8/3) (c) $(4, \pm 3/8)$ (d) $(\pm 4, 3/8)$

10. The normal at the point (1, 1) on the curve $2y+x^2=3$

(a)
$$x + y=07$$
 (b) $x - y=0$ (c) $x+y+1=0$ (d) $x-y=2$
ANSWER KEY-

1. c 2. d 3. c 4. b 5. b 6. c 7. c 8. d 9. a 10. b

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Mathematics Class - XII MM-10 CHAPTER-APPLICATIONS OF DERIVATIVES SUB TOPIC-RATE OF CHANGE OF QUANTITIES Multiple Choice Questions Assignment - 5

1. The rate of change of the area of a circle with respect to its radius r when r=5cm is (a) $10 \pi \text{ cm}^2/\text{cm}$ (b) $25 \pi \text{ cm}^2/\text{cm}$ (c) $5 \pi^2 \text{ cm}^2/\text{cm}$ (d) $25 \pi^2 \text{ cm}^2/\text{cm}$

2. x and y are the sides of two squares such that $y=x-x^2$. The rate of change of the area of 2nd square with respect to the area of the 1st square is

(a) $2x^2+3x+1$ (b) $1-3x+2x^2$ (c) $3x^2-2x+1$ (d) $2x^2-x+3$

3. The rate of change of volume of a bar with respect to its radius r is

(a) πr^2 (b) $4\pi r^2$ (c) $2\pi r$ (d) $2\pi r^2$

4. The radius of a circle is increasing at 0.7 cm/sec. What is the rate of increase of its circumference when r = 4.9cm?

(a) 0.7 cm/sec (b) 14π cm/sec (c) 1.4π cm/sec (d) 2.1π cm/sec

5. An edge of a variable cube is increasing at the rate of 3 cm/sec. How fast is the volume of the cube increasing when edge is 10 cm long?

(a) $30 \text{ cm}^3/\text{sec}$ (b) $300 \text{ cm}^3/\text{sec}$ (c) $90 \text{ cm}^3/\text{sec}$ (d) $900 \text{ cm}^3/\text{sec}$

6. The radius of a spherical soap bubble is increasing at the rate of 0.2 cm/sec. Find the rate of change of its surface area when radius is 4 cm

(a) 0.4 π sq. cm/sec (b) 1.6 π sq. cm/sec (c) 6.4 π sq. cm/sec

(d) 8.0 π sq. cm/sec

7. The length x of a triangle is decreasing at the rate of 2 cm/sec and width y is increasing at the rate of 2 cm/sec. When x=12 cm, y=5 cm. Find the rate of change of the perimeter

(a) 0 cm/sec (b) 14 cm/sec (c) 34 cm/sec (d) 60 cm/sec

8. A cylindrical tank of radius 10m is being filled with wheat at the rate of 314 cubic meters per hour. Then the depth of the wheat is increasing at the rate

(a) $1m^{3}/h$ (b) $1.1 m^{3}/h$ (c) $0.1 m^{3}/h$ (d) $0.5 m^{3}/h$

9. The total revenue in rupees received from the sale of x units of a product is given by R (x) = $3x^2+36x+5$. The marginal revenue when x= 15 cm is (a) 116 (b) 96 (c) 90 (d) 126

10. A balloon which always remains spherical is being inflated by pumping in 900 cubic centimetre of gas per second. The rate of which the radius of the balloon is increasing when the radius is 15 cm is

(a) π cm/sec (b) π^2 cm/sec (c) $1/\pi$ cm/sec (d) None of these

ANSWER KEY

1) a 2) b 3) b 4) c 5) d 6) c 7) a 8) a 9) d 10) c

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