

ST. LAWRENCE HIGH SCHOOL A JESUIT CHRISTIAN MINORITY INSTITUTION



worksheet-17

<u>SUBJECT – MATHEMATICS</u>

Pre-test

Chapter: Applications of derivatives

Topic: Increasing-Decreasing functions and Tangent-Normal.

Choose the correct option

1. If $0 < x < \frac{\pi}{2}$ then,

- i. $\sin x$ is an increasing function ;
- ii. cos x is an increasing function ;
- iii. $\tan x$ is an increasing function.

Then – a) i. and ii. are true b) ii. and iii. Are true c) i. and iii. Are true

- d)only i. is true.
- 2. If the function f(x) is differentiable at x = a, then it is increasing at x = a when –

a) f'(a) > 0b) f'(a) < 0c) $f'(a) \ge 0$ d) $f'(a) \le 0$ Class: XII

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(1 X 15= 15)

3. Which of the statement(s) is/are true ?
i. f(x) = x³ is decreasing in (-∞,∞)
ii. f(x) = x⁴ is increasing in (-∞,0)
a) Only i. is true.
b) Only ii. is true.
c) Both i. and ii. are true.
d) Both are false.

4. A function f(x) is defined in $a \le x \le b$ and $a < x_1 < x_2 < b$ Then f(x) is strictly monotonic decreasing in $a \le x \le b$ when – a) $f(x_2) > f(x_1)$ when $x_2 > x_1$ b) $f(x_2) < f(x_1)$ when $x_2 > x_1$ c) $f(x_2) > f(x_1)$ when $x_2 < x_1$ d) $f(x_2) < f(x_1)$ when $x_2 < x_1$.

5. If the tangent to the continuous curve y = f(x)at P(a,b) is parallel to x-axis, then the equation of the tangent at P is – a) y = b
b) y = a
c) y = -b
d) y = -a

6. If the tangent to the continuous curve y = f(x)at P(a,b) is parallel to *y*-axis, then the equation of the normal to the curve at P is a) y = a
b) y = b

- c) x = a
- $(\mathbf{d})x = b$

- 7. If the slopes of the tangent and normal to the curve y = f(x) at (x,y) be dy/dx and m respectively, then m = ?
 a) dy/dx
 b) dx/dy
 c) dx/dy
 d) None of these.
- 8. The slope of the normal to the parabola $x^2 = 4ay$ at $(2at, at^2)$ is a) $\frac{1}{t}$ b) t c) – t d) $-\frac{1}{t}$
- 9. The slope of the normal to the rectangular hyperbola xy = 4 at $(2t, \frac{2}{t})$ is a) $-t^2$ b) t^2 c) 2td) -2t

10. The slope of the tangent to the parabola $y^2 = 4ax$ at $(at^2, 2at)$ is – a) $\frac{1}{t}$ b) t c) – t d) $-\frac{1}{t}$ 11. The slope of the normal to the circle $x^2 + y^2 = a^2$ at (x_1, y_1) is -

a)
$$\frac{x_1}{y_1}$$

b) $-\frac{x_1}{y_1}$
c) $-\frac{y_1}{x_1}$
d) $\frac{y_1}{x_1}$

12. The slope of the tangent to the rectangular hyperbola $xy = c^2$ at $(ct, \frac{c}{t})$ is – a) $-\frac{1}{t}$ b) $-\frac{1}{t^2}$ c) $\frac{1}{t}$ d) $\frac{1}{t^2}$

13. The slope of the normal to the circle $x^2 + y^2 = a^2 at$ (acos θ , $b \sin \theta$) is –

- a) $-\cot\theta$
- b) tan θ
- c) $\tan \theta$
- d) $\cot \theta$

14. The slope of the normal to the rectangular hyperbola $xy = c^2$ at (x_1, y_1) is – a) $-\frac{x_1}{y_1}$ b) $\frac{x_1}{y_1}$ c) $-\frac{y_1}{x_1}$ d) $\frac{y_1}{x_1}$

- 15. The length of the tangent drawn from the point (-4 , 5) to the circle $x^2 + y^2 = 16$ is
 - a) 3 unit
 - b) 4 unit
 - c) 5 unit
 - d) 6 unit

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