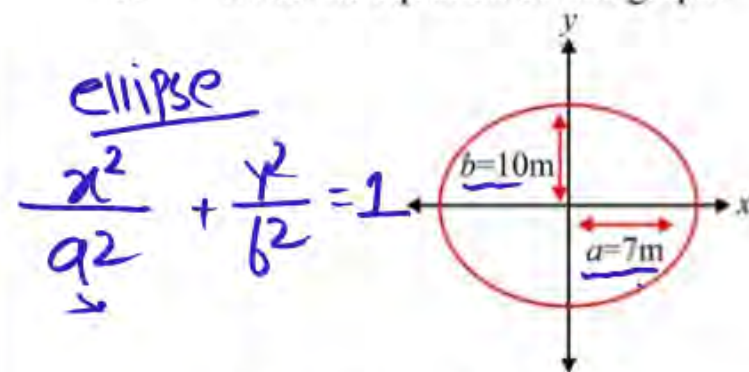Basic-Math.

Sangharsh. Assignment - 2.

M.R. Sir

1. Find the 15th term of the sequence 20, 15, 10, ...

(1) –45
(2) –50 ✓
(3) –55
(4) 0

2. If $\frac{a}{3} \neq \frac{b}{2}$, then value of $\boxed{\frac{2a+3b}{3a-2b}}$ is:

(1) $\frac{12}{5}$ ✓
(2) $\frac{5}{12}$
(3) 1
(4) $\frac{12}{7}$

3. Write the equation of this graph.

ellipse
$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$$

where a = semi minor axis and b = semi major axis

(1) $\frac{x^2}{10^2} + \frac{y^2}{7^2} = 1$
(2) $\frac{x^2}{7} + \frac{y^2}{10} = 1$
(3) $\frac{x^2}{7^2} + \frac{y^2}{10^2} = 1$ ✓
(4) $\frac{x^2}{7^2} + \frac{y^2}{10^2} = 4$

Handwritten working:

$d = -5 = 15-20$
$= 10-15$

value of 15th term $= a + (n-1)d$
$= 20 + (5-1) \times (-5)$
$= 20 + (14) \times (-5)$
$= 20 - 70 = -50$

$\left. \frac{a}{b} \to \frac{3}{2} \right\}$

$\frac{2a+3b}{3a-2b} = \frac{2\times3+3\times2}{9-4}$
$= \frac{12}{5}$

4. The line $4x + 7y = 12$ meets x-axis at the point:

(1) $(3, 1)$ $4x = 12 \times 3$ (2) $(0, 3)$ → x-Intercept

$x = 3$

(3) $(3, 0)$ (4) $(4, 0)$ $(Y=0)$

5. Find the solutions of given equation
$2x^2 + 3x - 2 = 0$:

(1) $x = -3, \dfrac{1}{2}$ (2) $x = 3, \dfrac{1}{2}$

(3) $x = -2, \dfrac{1}{2}$ (4) $x = 2, \dfrac{1}{2}$

$2x^2 + 3x - 2 = 0$

(3) $-2 \times \dfrac{1}{2} = -1$

$-2 + \dfrac{1}{2} = \dfrac{-4+1}{2} = \dfrac{-3}{2}$

$x_1 x_2 = \dfrac{c}{a} = \dfrac{-2}{2} = -1$

$x_1 + x_2 = \dfrac{-b}{a} = \dfrac{-3}{2}$

6. Find slope of tangent at $x = 1m$, if the curve equation $y = x^2 + 2x + 1$ is given
   (1) 3
   (2) 4
   (3) 6
   (4) None of these

7. Given $2x^2 + 5x - 12 = 0$, find the root of x
   (1) $x = \dfrac{3}{2}, -4$
   (2) $x = -\dfrac{3}{2}, -4$
   (3) $x = \dfrac{3}{2}, -2$
   (4) $x = -\dfrac{3}{2}, 4$

8. Given $x^2 + 7x + 12 = 0$, find the root of x
   (1) $x = \dfrac{3}{2}, -4$
   (2) $x = -3, -4$
   (3) $x = \dfrac{3}{2}, 4$
   (4) $x = \dfrac{3}{2}, -2$

Handwritten work:

wait it'll diff^n.

$$y = x^2 + 2x + 1$$

$$x_1 x_2 = \frac{c}{a} = \frac{-12}{2} = -6$$

$$\text{Slope} = \frac{dy}{dx} = 2x + 2 + 0$$

$$\frac{dy}{dx} = 2x + 2$$
$$= 2 \times 1 + 2$$
$$=$$

$$2x^2 + 5x - 12 = 0$$
$$2x^2 + 8x - 3x - 12 = 0$$
$$2x(x+4) - 3(x+4) = 0$$
$$(x+4)(2x-3) = 0$$

$$x = -4$$
$$x = \frac{3}{2}$$

9. Solutions of equation $10x^2 - 27x + 5 = 0$ are:

(1) $\dfrac{5}{2}, \dfrac{1}{5}$ ✓

(2) $\dfrac{5}{2}, \dfrac{3}{2}$

(3) $\dfrac{1}{5}, \dfrac{5}{5}$

(4) $\dfrac{1}{2}, \dfrac{3}{5}$

10. What is the minimum value of $\dfrac{2}{4 + \sin\theta + \sqrt{3}\cos\theta}$?

(1) 0

(2) 1

(3) $\dfrac{1}{3}$ ✓

(4) $\dfrac{1}{2}$

11. Evaluate $4\tan^2 45° + 4\cos^2 30° - 8\sin^2 60°$.

(1) 1 $4 \times 1^2 + 4 \times \dfrac{3}{4} - 8 \times \dfrac{3}{4}$ (2) 3

(3) 2 (4) 4

$= 4 + 3 - 6$

12. The roots of equation $x^2 - 11x + 28 = 0$ is:

(1) 7 and 4 ✓

(2) 7 and 3

(3) 8 and 3

(4) 7 and 11

$x^2 - 7x - 4x + 28 = 0$

$x_1 x_2 = \dfrac{5}{10} = 0.5 = \dfrac{1}{2}$

$10x^2 - 27x + 5 = 0$

$10x^2 - 25x - 2x + 5 = 0$

$5x(2x - 5) - 1(2x - 5) = 0$

$Y_{min} = \dfrac{2}{(4 + \sin\theta + \sqrt{3}\cos\theta)_{max}} = \dfrac{2}{4 + \sqrt{1^2 + 3}}$

$= \dfrac{2}{4 + \sqrt{4}}$

$= \dfrac{2}{6} = \dfrac{1}{3}$

13. $\sin 20° \sin 70° - \cos 20° \cos 70° =$ $-[\cos 20° \cdot \cos 70° - \sin 20° \sin 70°]$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad A \qquad\qquad\quad B$

(1) 1   (2) 0

(3) 1/2   (4) $\sqrt{3}/2$

$= -[\cos(A+B)]$

$= -[\cos(20+70)]$

$= -[\cos 90°] =$

Weak **14.** If $y = 4x^2 + 2x$, then slope of y-x graph at $x = 1$ is:

(1) 10   (2) 8

(3) 6   (4) 12

$\dfrac{dy}{dx} = 4(2x) + 2 = 8x + 2$

15. The equation of straight line having slope $\sqrt{3}$ and y intercept of -2 will be:

(1) $y = \sqrt{3}x + 2$ (2) $y = \sqrt{3}x - 2$

(3) $y = -\sqrt{3}x - 2$ (4) $y = -\sqrt{3}x + 2$

16. The equation $\sqrt{x} = 2y$ represents that graph between x and y is a:

$x = 4y^2$

  ✗ (1) straight line   ✓ (2) parabola

  ✗ (3) hyperbola   ✗ (4) circle

17. Find sum of infinite term

G.P ser: $\dfrac{\frac{1}{4}}{-\frac{1}{2}} = \dfrac{b}{y} = -\dfrac{1}{2}$

$$1 - \frac{1}{2} + \frac{1}{4} - \frac{1}{8} + \frac{1}{16} - \frac{1}{32} \ldots \infty$$

(1) $\dfrac{1}{2}$ ✓ (2) $\dfrac{2}{3}$

(3) 2 (4) $\dfrac{3}{2}$

$Sum = \dfrac{a}{1 - c.r}$

$= \dfrac{1}{1 - \left(-\frac{1}{2}\right)} = \dfrac{1}{1 + \frac{1}{2}}$

18. Find sum of $1 + \dfrac{1}{3} + \dfrac{1}{9} + \dfrac{1}{27} \ldots$ up to $\propto$ term

  ✓ (1) $\dfrac{3}{2}$ (2) $\dfrac{2}{3}$

(3) $\dfrac{4}{3}$ (4) $\dfrac{3}{4}$

$\dfrac{1}{1 - \frac{1}{3}} = \dfrac{1}{\frac{3-1}{3}} = \dfrac{1}{\frac{2}{3}} = \dfrac{3}{2}$

19. If $\cos A = \dfrac{7}{25}$, then $\tan A + \cot A = \dfrac{24}{7} + \dfrac{7}{24}$

(1) $\dfrac{25}{168}$ (2) $\dfrac{168}{25}$

  ✓ (3) $\dfrac{625}{168}$ (4) None of these

$\cos A = \dfrac{7}{25}$

$B = 7$

$H = 25$

$P = \sqrt{H^2 - B^2}$

$= \sqrt{625 - 49}$

$P = 24$

20. Value of $\sin(37°)\cos(53°)$ is $\frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$

(1) $\frac{9}{25}$ ✓

(2) $\frac{12}{25}$

(3) $\frac{16}{25}$

(4) $\frac{3}{5}$

21. Find the value of $\sin(105°)$.

(1) $\frac{1}{4}\left(\sqrt{3} + \sqrt{7}\right)$

(2) $\frac{1}{4}\left(\sqrt{5} + \sqrt{2}\right)$

(3) $\frac{1}{4}\left(\sqrt{3} + \sqrt{2}\right)$

(4) $\frac{1}{4}\left(\sqrt{6} + \sqrt{2}\right)$ ✓

$\sin(105) = \sin(60 + 45)$

$= \sin 60 \cdot \cos 45 + \sin 45 \cdot \cos 60$

$= \frac{\sqrt{3}}{2} \times \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} \times \frac{1}{2}$

$= \left(\frac{\sqrt{3} + 1}{2\sqrt{2}}\right) \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{1}{4}\left(\sqrt{6} + \sqrt{2}\right)$

22. Find angle subtended by a circular arc of radius 6 cm and length π cm at its centre

(1) 60°

(2) 15°

(3) 30° ✓

(4) 45°
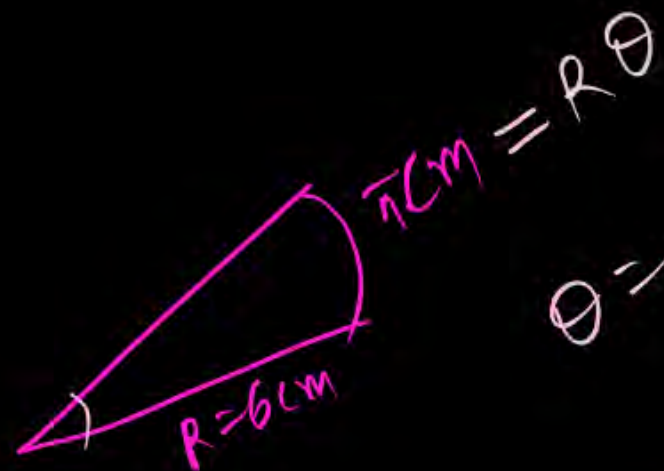
$\pi \text{ cm} = R\theta$

$\theta = \frac{\pi \text{ cm}}{6}$

$\theta = \frac{\pi}{6} \text{ rad} = \frac{180}{6} = 30°$

$R = 6 \text{ cm}$

23. Find the value of $\sin^{-1} 1$.

(1) $\dfrac{\pi}{4}$

(2) $\dfrac{\pi}{6}$

(3) $\dfrac{\pi}{2}$ ✓

(4) π

24. If $\tan \theta = \dfrac{5}{12}$; then what is the value of $3 \sin \theta + 2 \cos \theta$.

(1) 3

(2) 4

(3) −3

(4) 12

25. If $y = \dfrac{\tan \theta}{\theta}$, then find the value of y if $\theta = 10°$

(1) $10°$

(2) 0

(3) 1 ✓

(4) $\sqrt{3}$

$\sin^{-1}(1) = ??$

$\sin^{-1}(1) = y$

$1 = \sin(y)$

$y = \pi/2$

$\tan\theta = \dfrac{p}{B} = \dfrac{5}{12}$

$H = \sqrt{p^2 + B^2}$

$H = 13$

$y = \dfrac{\tan\theta}{\theta}$

$\left(\dfrac{\sin\theta}{\theta}\right)_{\theta-small} = \dfrac{\theta}{\theta} = 1$

at small angle $\quad y = \dfrac{\theta}{\theta} = 1$

26. A body is attached to a spring whose other end is fixed. If the spring is elongated by x, its potential energy is $U = 5x^2$, where x is in metre and U is in joule. U–x graph is

(1)

(2)

(3)

(4)
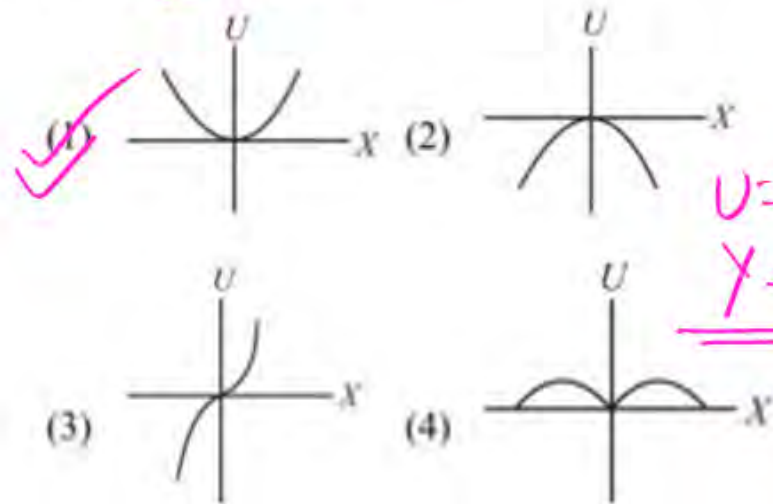
27. If $y = x^2 + 2x - 3$, y-x graph is

(1)

(2)

(3)

(4)
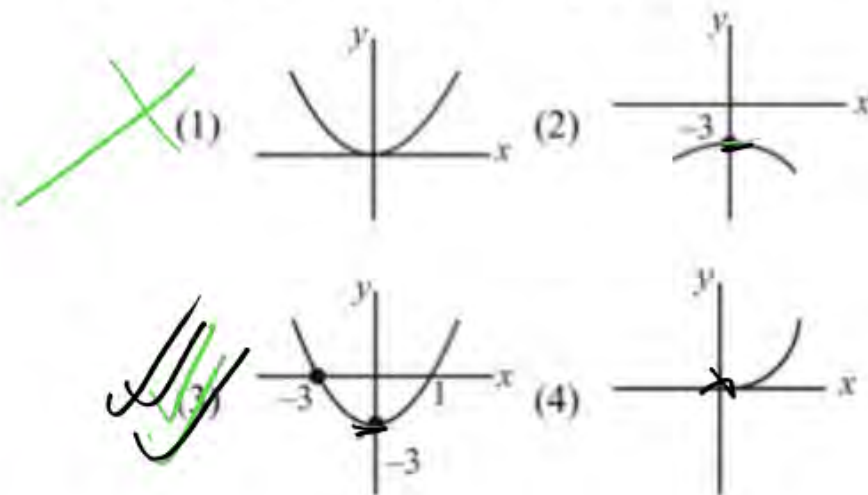
28. The velocity displacement graph of a particle moving along a straight line is shown in figure.

$C = 10$

$y = mx + C$

$V = mx + C$

$V = -10x + 10$

$m = -\tan\alpha$

$m = -\dfrac{10}{1}$
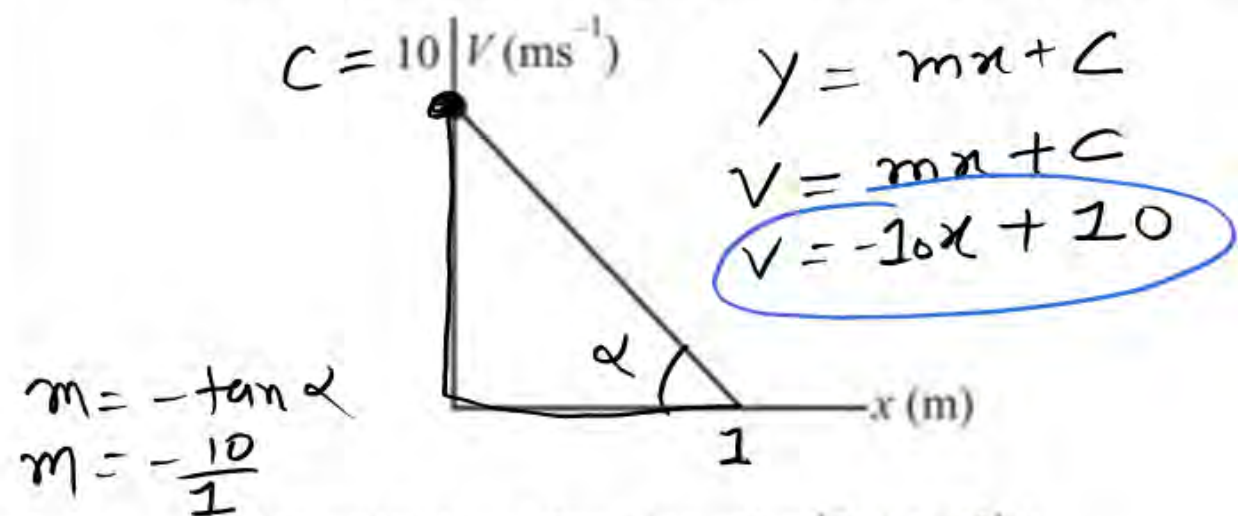
The velocity as function of $x\,(0 \le x \le 1)$ is

(1) $-10x$

(2) $-10x + 10$

(3) $10x - 10$

(4) $-10x^2 + 10x + 10$

29. A parallelogram $ABCD$ is shown in figure
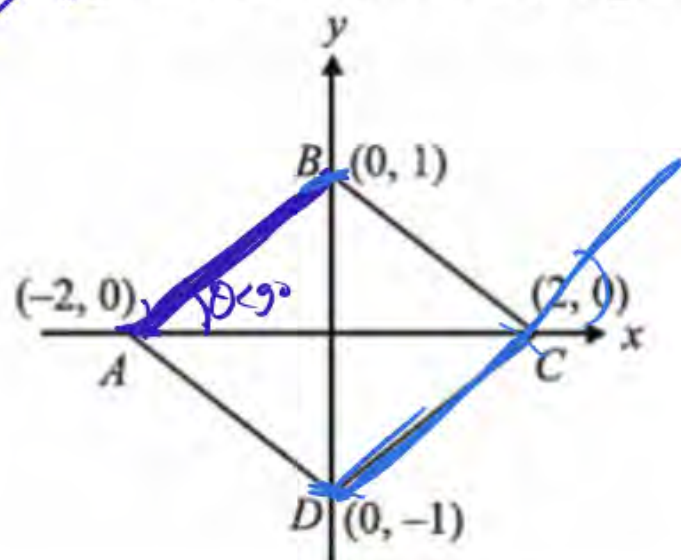
Column-I		Column-II
i. Equation of side AB	a.	$2y + x = 2$
ii. Equation of side BC	b.	$2y - x = 2$
iii. Equation of side CD	c.	$2y + x = -2$
iv. Equation of side DA	d.	$2y - x = -2$

Correct matching is

(1) i → b; ii → a; iii → d; iv → c

(2) i → a; ii → b; iii → d; iv → c

(3) i → b; ii → d; iii → c; iv → a

(4) i → c; ii → a; iii → d; iv → b
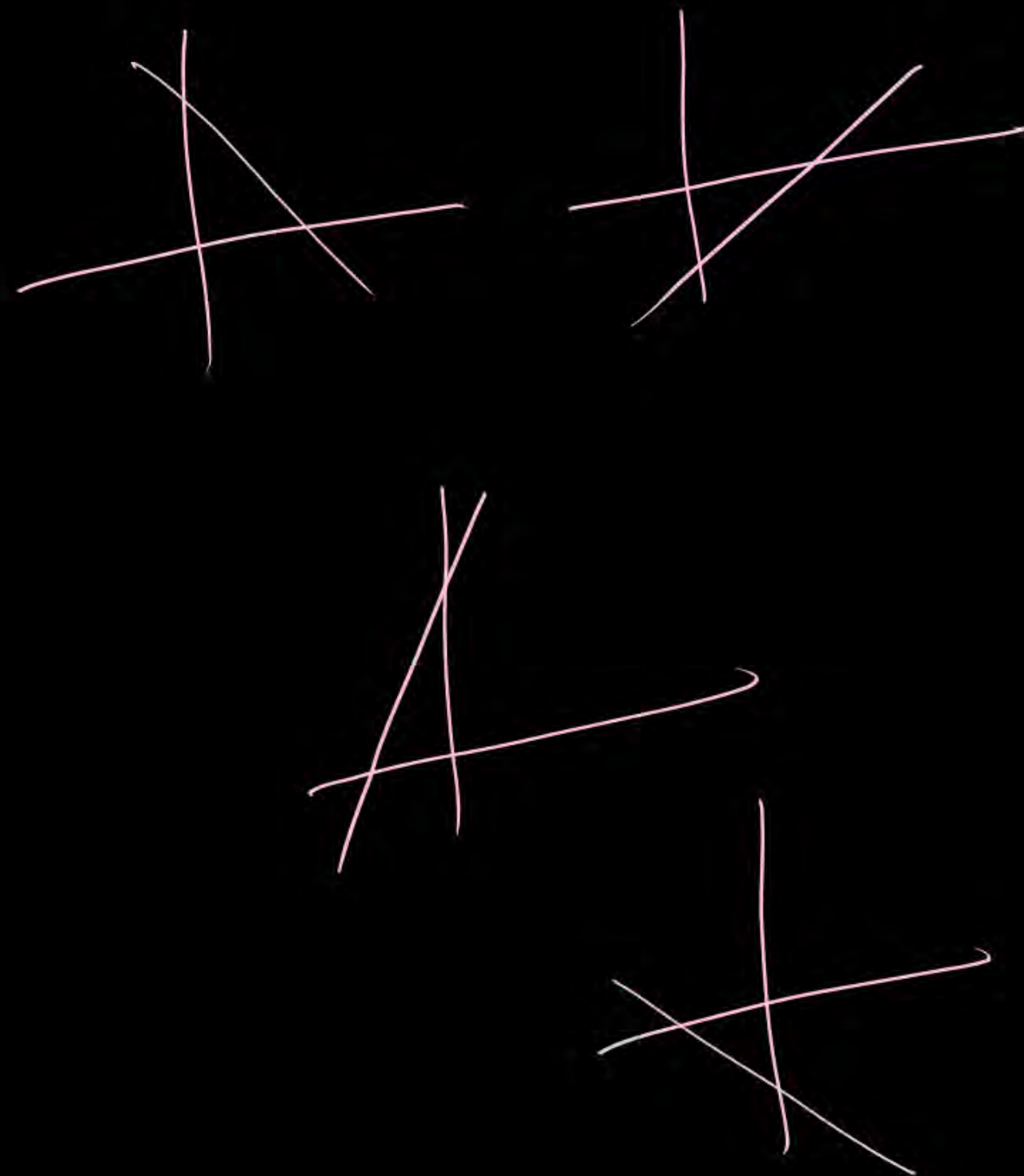
30. Which of the following statement is not correct for following straight line graph:
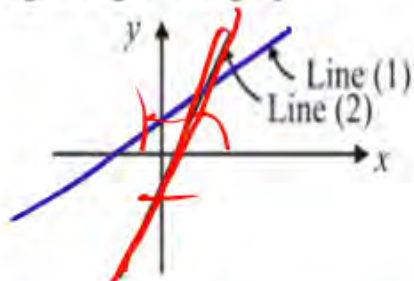
(1) Line (2) has negative y intercept ✓
(2) Line (1) has positive y intercept ✓
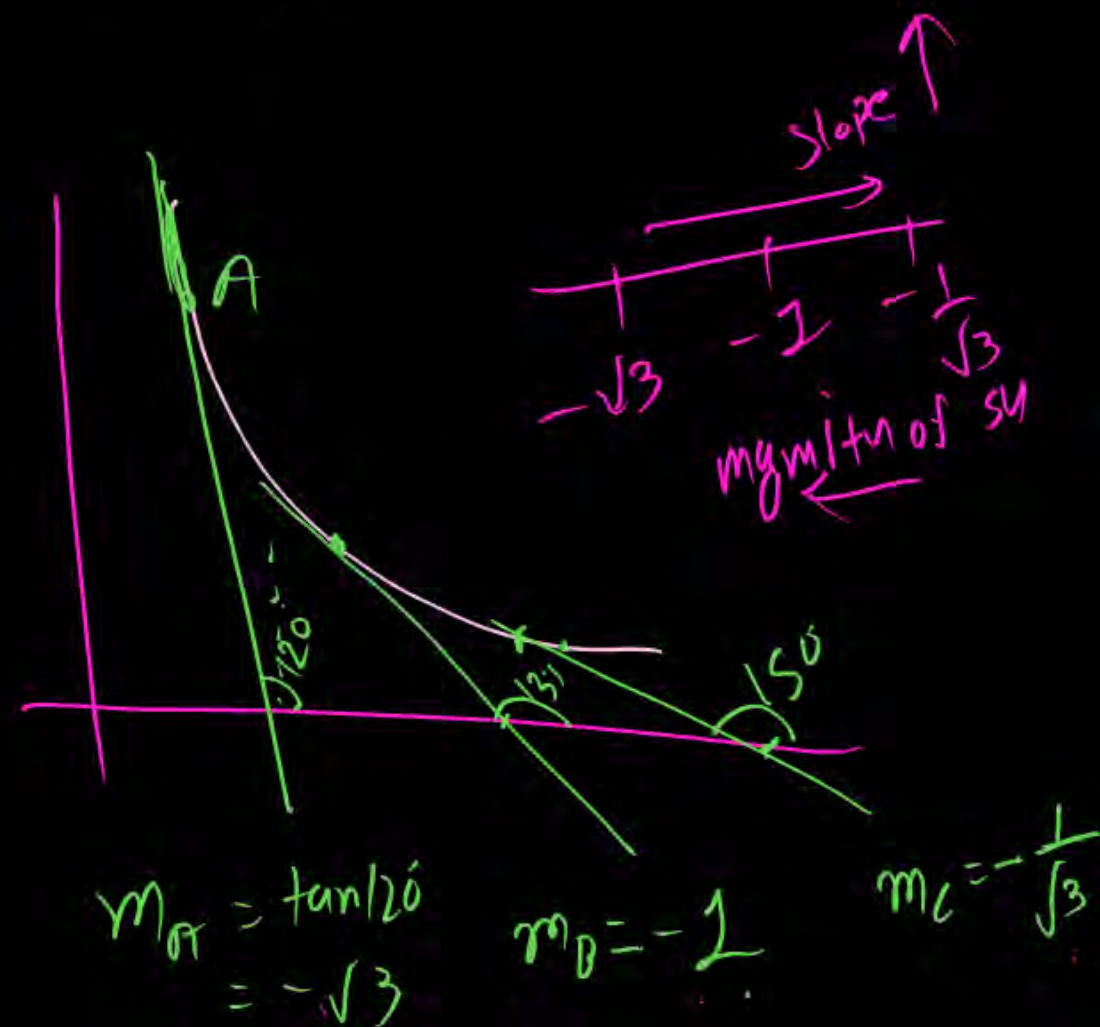(3) Line (2) has positive slope ✓
(4) Line (1) has negative slope ✗

Ans (4)

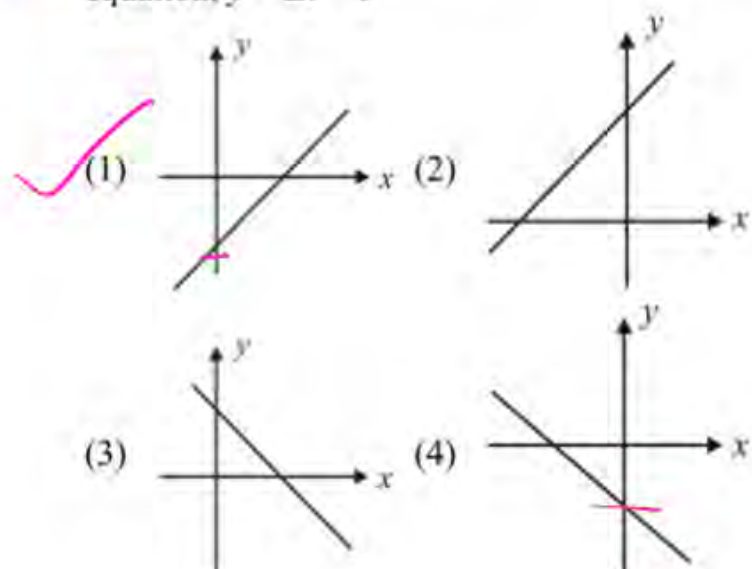**31.** The slope of graph in figure at point A, B and C is m_A, m_B and m_C respectively, then:

magnitude of curve
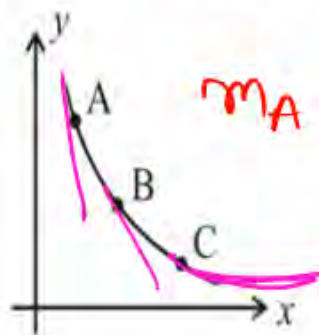
$m_A > m_B > m_C$

(1) $m_A > m_B > m_C$
(2) $m_A < m_B < m_C$
(3) $m_A = m_B = m_C$
(4) $m_A = m_B < m_C$

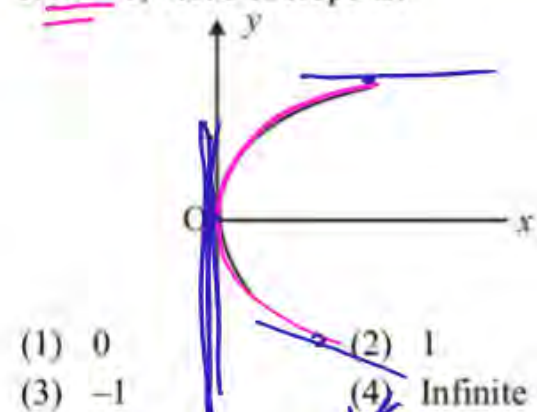for slope (2)

magnitude of slope (1) A2 } H/w next class m_B^*

slope ↑

$-\sqrt{3}$ -1 $-\frac{1}{\sqrt{3}}$

mgnltd of su

$m_A = \tan 120° = -\sqrt{3}$ $m_B = -1$ $m_C = -\frac{1}{\sqrt{3}}$

32. Which graph is the best representation for the given equation, $y = 2x - 1$
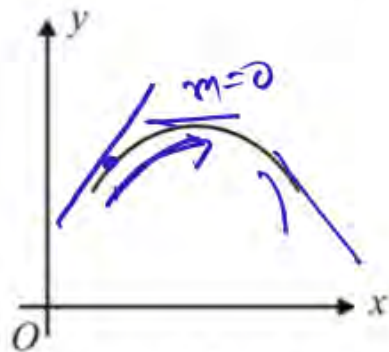

(1)

(2)

(3)

(4)

33. The equation $\sqrt{x} = 2y$, represents that graph between x and y is a:
(1) Straight line   (2) Parabola
(3) Hyperbola   (4) Circle

34. At $x = 0$, value of slope is:

(1) 0   (2) 1
(3) −1   (4) Infinite

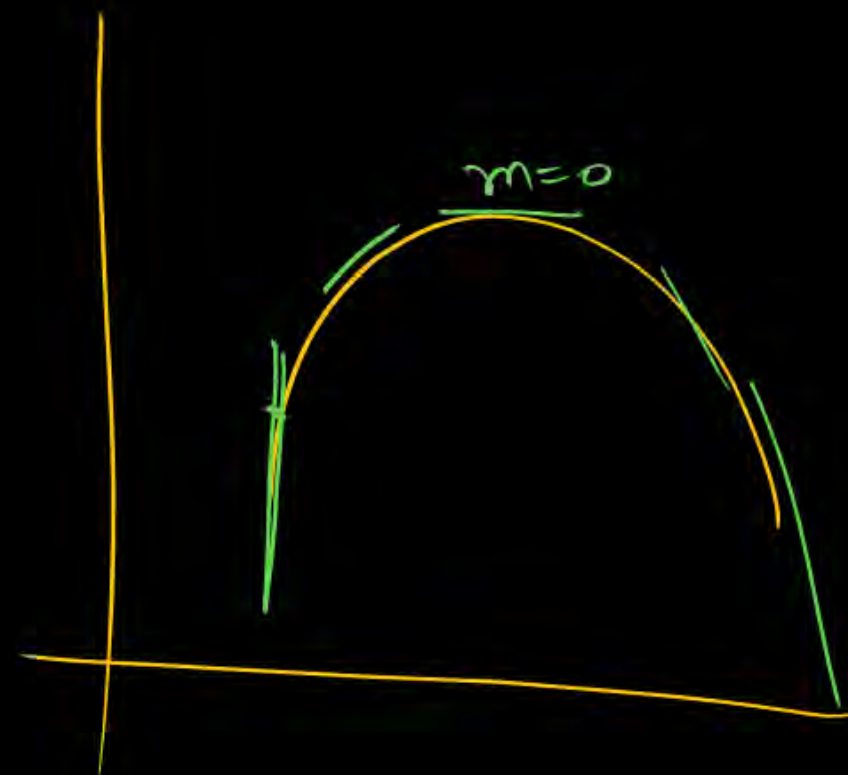**35.** Magnitude of slope *i.e.*, steepness of graph shown in figure.

(1) First increase and then decreases
(2) First decreases and then increases
(3) Decreases continuously
(4) Increases continuously

MP* line jitana vertical
slope utna jayde.

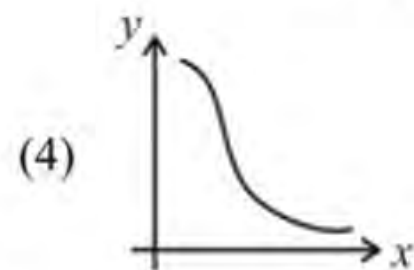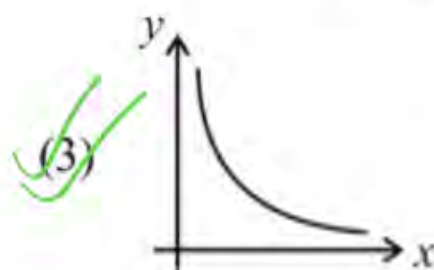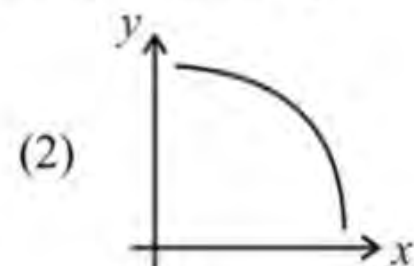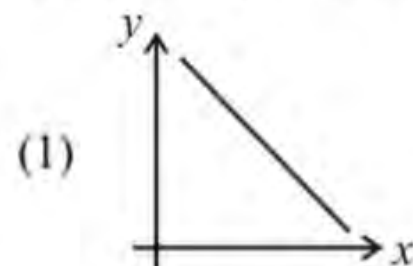**36.** Distance between points $(2, 3, -7)$ and $(-2, 0, 5)$ is

(1) 5   (2) 13

(3) $\sqrt{145}$ (4) $\sqrt{119}$

$$= \sqrt{(-2-2)^2 + (0-3)^2 (5-(-7))^2}$$

37. Graph of $x^2y = 2$ is best represented by:

(1)   (2)

(3)   (4)

$$x^2y = 2$$

$$y = \frac{2}{x^2}$$

38. If two straight line is perpendicular to each other them product of Their slope is
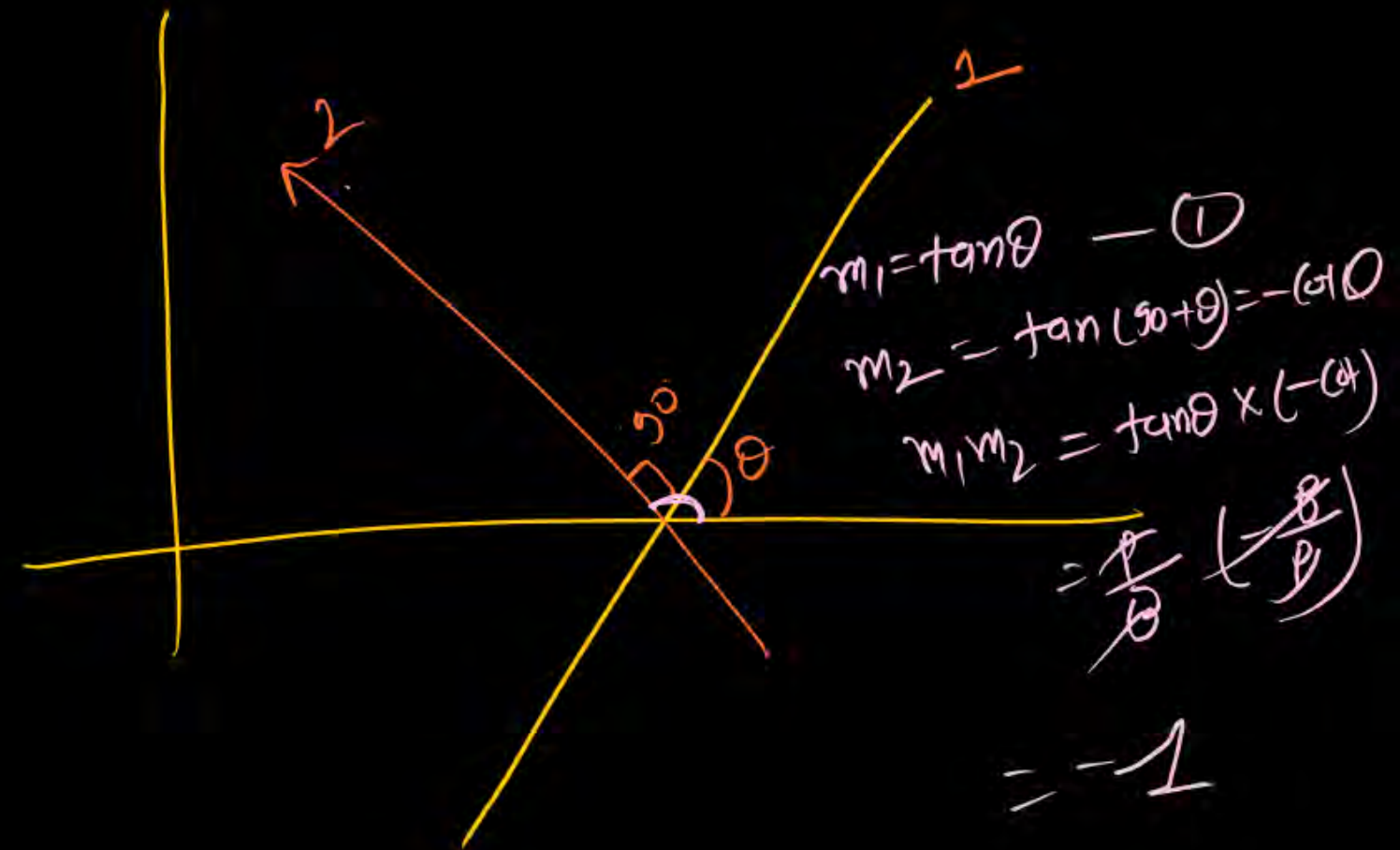
(1) 2   (2) 1

(3) −1 ✓   (4) zero

39. Object is moving on the straight line of equation $4y + 3x = 5$ and force acting on it is $F = 3i + 4j$, then work done will be:

$\tan\theta = 4/3$

(1) 2   (2) 1

(3) −1   (4) zero ✓

$m = -\dfrac{3}{4}$

$\dfrac{clage \to g}{study \, me}$

done gcc

$F \perp r \, S$

$W = 0$

Thanks

$m_1 = \tan\theta$ — ①

$m_2 = \tan(50+\theta) = -\cot\theta$

$m_1 m_2 = \tan\theta \times (-\cot\theta)$

$= \dfrac{8}{8}\left(-\dfrac{8}{8}\right)$

$= -1$

Thank-you