विद्या ददाति विनयम्
Knowledge is Discipline

BJNP

Learning with the Speed of Mumbai and the Tradition of Kota

Max. Marks: 100 **Date: 06.11.2022**

ABHIMANYU BATCH

MATHEMATICS : REVISION TEST 1 (SET A)

Topics: Trigonometry, Circles and Straight Lines

1. If $\sec\theta + \tan\theta = 4$, then $\sin\theta =$

(a) $\frac{15}{17}$ (b) $\frac{7}{8}$ (c) $\frac{8}{15}$ (d) $\frac{7}{15}$

2. If $\cot 20° = p$, then $\frac{\tan 160° - \tan 110°}{1 + \tan 160° \tan 110°} =$

(a) $\frac{p^2+1}{2p}$ (b) $\frac{2p}{1+p^2}$ (c) $\frac{p^2-1}{2p}$ (d) $\frac{1-p^2}{2p}$

3. The value of $\tan 20° \cdot \tan 80° \cdot \tan 40°$ is

(a) $\frac{1}{\sqrt{3}}$ (b) $\sqrt{3}$ (c) $\frac{1}{2\sqrt{3}}$ (d) $2\sqrt{3}$

4. The value of $\frac{\tan 70° - \tan 20°}{\tan 50°} =$

(a) 4 (b) 1 (c) 2 (d) 3

5. The value of $\frac{\sin 70° + \cos 40°}{\cos 70° + \sin 40°} =$

(a) $-\sqrt{3}$ (b) $-\sqrt{2}$ (c) $\sqrt{2}$ (d) $\sqrt{3}$

Space for Rough Work

6. $\tan\frac{7\pi}{6} + \tan\frac{9\pi}{4} + \tan\frac{10\pi}{3} =$

(a) $1 - \frac{4}{\sqrt{3}}$ (b) $2 + \frac{1}{\sqrt{3}}$ (c) $1 + \frac{4}{\sqrt{3}}$ (d) $2 - \frac{1}{\sqrt{3}}$

7. Which of the following equation has no solution?

(a) $\sec\theta = 23$ (b) $\cos\theta = \sqrt{2}$ (c) $\tan\theta = 2019$ (d) $\sin\theta = -\frac{1}{5}$

8. The value of x in $\left(0, \frac{\pi}{2}\right)$ satisfying the equation $\sin x \,.\, \cos x = \frac{1}{4}$ are

(a) $\frac{\pi}{6}, \frac{\pi}{12}$ (b) $\frac{\pi}{12}, \frac{5\pi}{12}$ (c) $\frac{\pi}{8}, \frac{3\pi}{8}$ (d) $\frac{\pi}{8}, \frac{\pi}{4}$

9. The number of values of x in the interval $[0, 5\pi]$ satisfying the equation $3\sin^2 x - 7\sin x + 2 = 0$ is

(a) 6 (b) 0 (c) 2 (d) 4

10. If $A - B = \frac{\pi}{4}$, then $(1 + \tan A)(1 - \tan B) =$

(a) 1 (b) 3 (c) 2 (d) 4

11. The value of $\sin 10° \,.\, \sin 50° \,.\, \sin 70° =$

(a) $\frac{1}{6}$ (b) $\frac{1}{8}$ (c) $\frac{1}{2}$ (d) $\frac{1}{3}$

12. Which of the following function has period 2?

(a) $\cos(\pi x)$ (b) $\cos(2\pi x)$ (c) $\cos\left(\frac{\pi x}{2}\right)$ (d) $\cos\left(\frac{\pi x}{3}\right)$

13. In ΔABC, if $\tan A + \tan B + \tan C = 6$ and $\tan A \tan B = 2$, then $\tan C =$

(a) 3 (b) 4 (c) 1 (d) 2

Space for Rough Work

14. If $3\sin^2 x - 8\sin x + 4 = 0$, $x \in \left(\frac{\pi}{2}, \pi\right)$, then $\tan x =$

(a) $-\frac{\sqrt{5}}{2}$ (b) $-\frac{2}{\sqrt{5}}$ (c) $\frac{\sqrt{5}}{2}$ (d) $\frac{2}{\sqrt{5}}$

15. If $\tan\theta = \frac{1}{3}$, then $\cos 2\theta =$

(a) $\frac{1}{10}$ (b) $\frac{1}{4}$ (c) $\frac{1}{5}$ (d) $\frac{4}{5}$

16. $\cos x \cdot \cos 7x - \cos 5x \cdot \cos 13x =$

(a) $2\sin 6x \cdot \cos 12x$ (b) $2\cos^2 6x \cdot \cos 12x$ (c) $2\sin 6x \cdot \sin 12x$ (d) $2\sin^2 6x \cdot \cos 6x$

17. If $\operatorname{cosec}\theta + \cot\theta = 5$, then $\sin\theta =$

(a) $\frac{5}{13}$ (b) $\frac{5}{26}$ (c) $\frac{1}{5}$ (d) $\frac{1}{13}$

18. $\tan A + 2\tan 2A + 4\tan 4A + 8\cos 8A =$

(a) $\cot A$ (b) $\tan A$ (c) $\tan 2a$ (d) $\cot 2A$

19. If $a\sin\theta = b\cos\theta$, $a, b \neq 0$, then $a\cos 2\theta + b\sin 2\theta =$

(a) a (b) b (c) $\frac{a}{b}$ (d) ab

20. If $3\sin 2\theta = 2\sin 3\theta$ and $0 < \theta < \pi$, then $\sin\theta =$

(a) $\frac{\sqrt{15}}{4}$ (b) $\frac{\sqrt{2}}{\sqrt{5}}$ (c) $\frac{\sqrt{2}}{3}$ (d) $\frac{\sqrt{3}}{\sqrt{5}}$

21. If $\sec x = \frac{25}{24}$, x lies in first quadrant, then $\sin\frac{x}{2} + \cos\frac{x}{2} =$

(a) $\frac{8}{5\sqrt{2}}$ (b) $\frac{7}{5\sqrt{2}}$ (c) $\frac{1}{5\sqrt{2}}$ (d) $\frac{6}{5\sqrt{2}}$

Space for Rough Work

22. If $2\sin\left(\theta+\frac{\pi}{3}\right)=\cos\left(\theta-\frac{\pi}{6}\right)$, then $\tan\theta =$

(a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) $\frac{1}{\sqrt{3}}$ (d) $-\frac{1}{\sqrt{3}}$

23. If A(5, 8), B(–3, 4), C(7, k) are vertices of ΔABC. If $\angle B = 90°$, then k is

(a) 16 (b) 12 (c) –12 (d) –16

24. P(2, 2), Q(–2, 4), R(3, 4) are the vertices of ΔPQR, then the equation of the median through the vertex R is

(a) $x + 3y + 9 = 0$ (b) $x - 3y - 9 = 0$ (c) $x + 3y - 9 = 0$ (d) $x - 3y + 9 = 0$

25. The angle subtended by the line segment joining $A(1,\sqrt{3})$ and $B(\sqrt{3},1)$ at the origin is

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{2}$

26. A line cuts the X and Y-axis at the points A and B respectively. The point (5, 6) divides AB internally in the ratio 3 : 1, then the equation of the line is

(a) $2x + 5y = 40$ (b) $2x - 5y = -20$ (c) $2x + y = 16$ (d) $2x - y = 4$

27. If p_1 and p_2 are the length of perpendiculars from the origin to the lines

$x\cos\theta + y\sin\theta = 5\cos 2\theta$

and $x\,\text{cosec}\,\theta + y\sec\theta - 5 = 0$ respectively, then $p_1^2 + 4p_2^2 =$

(a) 25 (b) $\frac{1}{5}$ (c) $\frac{1}{25}$ (d) 5

28. The equation of the line passing through $(p\cos\alpha, p\sin\alpha)$ and making an angle of $(90+\alpha)°$ with the positive direction of the X-axis is

(a) $x\cos\alpha + y\sin\alpha = 3p$ (b) $x\cos\alpha + y\sin\alpha = p$

(c) $x\sin\alpha + y\cos\alpha = p$ (d) $x\cos\alpha - y\sin\alpha = 2p$

Space for Rough Work

29. p is the length of the perpendicular from the origin to the line whose intercepts on the axes are a and b, then $\frac{1}{a^2}+\frac{1}{b^2}=$

(a) $2p^2$ (b) p^2 (c) $\frac{1}{p^2}$ (d) $\frac{1}{2p^2}$

30. The equation of the perpendicular bisector of the line segment joining A(–2, 3) and B(6, –5) is

(a) $x + y = 3$ (b) $x - y = 3$ (c) $x - y = -1$ (d) $x + y = 1$

31. The line joining the two points A(2, 0) and B(3, 1) is rotated about A in anticlockwise direction through an angle of 15°. The equation of the line in the new position is

(a) $y = \frac{1}{\sqrt{3}}x - \frac{2}{\sqrt{3}}$ (b) $y = \sqrt{3}x - 2\sqrt{3}$ (c) $y = -\sqrt{3}x + 2\sqrt{3}$ (d) $y = 3x - 6$

32. The equation of line, where the length of the perpendicular segment from the origin to the line is 4 and inclination of this perpendicular segment with the positive direction of the X-axis is 30°, is

(a) $\sqrt{3}x + y = 8$ (b) $x - \sqrt{3}y = 8$ (c) $x + \sqrt{3}y = 8$ (d) $\sqrt{3}x - y = 8$

33. The equation of a line with slope $-\frac{1}{\sqrt{2}}$ and makes an intercept of $2\sqrt{2}$ units on negative direction of Y-axis is

(a) $\sqrt{2}y - x + 4 = 0$ (b) $x + \sqrt{2}y - 2\sqrt{2} = 0$

(c) $x + \sqrt{2}y + 2\sqrt{2} = 0$ (d) $\sqrt{2}y + x + 4 = 0$

34. If the angle between two lines is $\frac{\pi^c}{4}$ and the slope of one of the lines is $\frac{1}{2}$, then the slope of the other line is

(a) 3 or $-\frac{1}{3}$ (b) 3 or –3 (c) 4 or $-\frac{1}{4}$ (d) 2 or $-\frac{1}{2}$

Space for Rough Work

35. The x intercept of a line passing through the points $\left(-\frac{1}{2}, 1\right)$ and (1, 2) is

(a) 3 (b) –2 (c) –1 (d) 1

36. The sides of a rectangle are x = ± a, y = ± b, then the equation of the circle passing through the vertices of the rectangle is

(a) $x^2 + y^2 = a^2$ (b) $x^2 + y^2 = a^2 + b^2$

(c) $x^2 + y^2 = a^2 - b^2$ (d) $(x - a)^2 + (y - b)^2 = a^2 + b$

37. The radius of the circle concentric with $x^2 + y^2 - 6x - 4y - 1 = 0$ and touching the Y-axis is

(a) 5 (b) 2 (c) 4 (d) 3

38. The intercept on the line y = x by the circle $x^2 + y^2 - 2x = 0$ is AB. The equation of the circle with AB as a diameter is

(a) $x^2 + y^2 + x + y = 0$ (b) $x^2 + y^2 - x - y = 0$

(c) $x^2 + y^2 - 2x - 2y = 0$ (d) $x^2 + y^2 + 2x + 2y = 0$

39. If θ is the parameter, $0 \le \theta < 2\pi$, then the parametric equations of $x^2 + y^2 + 2x - 4y - 4 = 0$ are

(a) $x = -1 + 3\cos\theta,\ y = -2 + 3\sin\theta$ (b) $x = -1 + 3\cos\theta,\ y = 2 + 3\sin\theta$

(c) $x = 1 + 3\cos\theta,\ y = -2 + 3\sin\theta$ (d) $x = 1 + 3\cos\theta,\ y = 2 + 3\sin\theta$

40. The Cartesian equation of the curve represented by $x = 3 + 5\cos\theta,\ y = 2 + 5\sin\theta\ (0 \le \theta < 2\pi)$ is

(a) $x^2 + y^2 + 6x - 4y + 12 = 0$ (b) $x^2 + y^2 - 6x - 4y - 12 = 0$

(c) $x^2 + y^2 + 6x + 4y + 12 = 0$ (d) $x^2 + y^2 - 6x + 4y - 12 = 0$

41. The centre and radius of the circle $x = 4a\frac{1 - t^2}{1 + t^2}$, $y = \frac{8at}{1 + t^2}$ are

(a) (0, 0), 2a (b) (0, 0), 3a (c) (0, 0), 4a (d) (0, 0), a

Space for Rough Work

42. The number of tangents that can be drawn from the point (1, 2) to the circle $x^2 + y^2 = 5$ is

(a) 0 (b) 1 (c) 2 (d) more than 2

43. The equation of the circle whose centre lies on the line $x - 4y = 1$ and which passes through the points (3, 7) and (5, 5) is

(a) $x^2 + y^2 + 6x - 2y + 90 = 0$ (b) $x^2 + y^2 - 6x + 2y - 30 = 0$

(c) $x^2 + y^2 - 6x - 2y - 25 = 0$ (d) $x^2 + y^2 + 6x + 2y - 90 = 0$

44. The equation of the circle with centre (2, –3) and circumference 10π units is

(a) $x^2 + y^2 - 4x - 6y - 12 = 0$ (b) $x^2 + y^2 + 4x + 6y + 12 = 0$

(c) $x^2 + y^2 - 4x + 6y + 12 = 0$ (d) $x^2 + y^2 - 4x + 6y - 12 = 0$

45. Two circles centred at (2, 3) and (4, 5) intersect each other. If their radii are equal, then the quation of the common chord is

(a) $x + y - 7 = 0$ (b) $x + y + 7 = 0$ (c) $x + y + 1 = 0$ (d) $x + y - 1 = 0$

46. If a circle passes through the points (0, 0), (x, 0) and (0, y), then the co-ordinates of its centre are

(a) $\left(\frac{x}{2}, \frac{y}{2}\right)$ (b) $\left(\frac{x}{2}, -\frac{y}{2}\right)$ (c) $\left(-\frac{x}{2}, -\frac{y}{2}\right)$ (d) $\left(-\frac{x}{2}, \frac{y}{2}\right)$

47. If $y = 2x$ is a chord of the circle $x^2 + y^2 - 10x = 0$, then the equation of circle with this chord as diameter is

(a) $x^2 + y^2 + 2x - 4y = 0$ (b) $x^2 + y^2 - 2x - 4y = 0$

(c) $x^2 + y^2 + 2x + 4y = 0$ (d) $x^2 + y^2 - 2x + 4y = 0$

48. Equation of the chord of the circle $x^2 + y^2 - 4x - 10y + 25 = 0$, having midpoint (1, 2) is

(a) $3x + y = 5$ (b) $x + 3y = 7$ (c) $5x + y = 7$ (d) $-x + 3y = 5$

Space for Rough Work

49. The equation of tangent to the circle $x^2 + y^2 = 64$ at the point $P\left(\frac{2\pi}{3}\right)$ is

(a) $\sqrt{3}x + y - 16 = 0$
(b) $x - \sqrt{3}y - 16 = 0$
(c) $x + \sqrt{3}y + 16 = 0$
(d) $x - \sqrt{3}y + 16 = 0$

50. If $2\cos\theta = x + \frac{1}{x}$, then $2\cos 3\theta =$

(a) $x^3 + \frac{1}{x^3}$
(b) $\left(x + \frac{1}{x}\right)^3$
(c) $x^3 - \frac{1}{x^3}$
(d) $x + \frac{1}{x}$

Space for Rough Work

विद्या ददाति विनयम्
Knowledge is Discipline

BJNP

Learning with the Speed of Mumbai and the Tradition of Kota

Max. Marks: 100 **Date: 06.11.2022**

ABHIMANYU BATCH

MATHEMATICS : REVISION TEST 1 (SET A)

Topics: Trigonometry, Circles and Straight Lines

Answer Key

1.	(a)	2.	(c)	3.	(b)	4.	(c)	5.	(d)
6.	(c)	7.	(b)	8.	(b)	9.	(a)	10.	(c)
11.	(b)	12.	(a)	13.	(a)	14.	(b)	15.	(d)
16.	(d)	17.	(a)	18.	(a)	15.	(a)	20.	(a)
21.	(a)	22.	(b)	23.	(d)	24.	(d)	25.	(b)
26.	(a)	27.	(a)	28.	(b)	29.	(c)	30.	(b)
31.	(b)	32.	(a)	33.	(d)	34.	(a)	35.	(b)
36.	(b)	37.	(d)	38.	(b)	39.	(b)	40.	(b)
41.	(c)	42.	(c)	43.	(d)	44.	(d)	45.	(a)
46.	(a)	47.	(b)	48.	(b)	49.	(d)	50.	(a)