GGSIPU mathmatics 2012

1. If the lines x-y-1=0, 4x+3y=k and 2x-3y+1=0 are concurrent, then k is

   a 1 b -1

   c 25 d 5

2. the number of common tangents to the circles $x^2+y^2 = 4$ and $x^2+y^2-8x+12 = 0$ is

   a 1 b 2 c 3 d 4

3. The centroid of a triangle formed by the points 0,0, cos θ,sin θ and sin θ, - cos θ lie on the line y = 2x; then θ is

   a $\tan^{-1} 2$ b $\tan^{-1}\frac{1}{3}$

   c $\tan^{-1}\frac{1}{2}$ d $\tan^{-1} -3$

4. The orthoocentre of the triangle formed by 8,0 and 4,6 with the origin, is

   a 4, $\frac{8}{3}$) b 3, -4

   b 4,3 d 3,4

5. If the angle between two lines represented by $2x^2+5xy+3y^2+7y+4 = 0$ is $\tan^{-1}$ m, then m is equal to

   a $\frac{1}{5}$ b 1

   c $\frac{7}{5}$ d 7

6. If xy-4x+3y-λ = 0 represents the asymptotes of xy-4x+3y = 0, then λ is

   a 3 b -6 c 8 d 12

7. The equation of the chord of the parabola $y^2 = 8x$ which is bisected at the point 2, -3, is

   a 4x+3y+1 = 0

   b 3x+4y -1 = 0

   c 4x -3y-1 = 0

   d 3x -4y+1 =0

8. If x+y+1 = 0 touches the parabola $y^2 = \lambda x$, then λ is equal to

a) 2 b 4 (c 6 d 8

9. The equations x = $\frac{e^t + e^{-t}}{2}$, y = $\frac{e^t - e^{-t}}{2}$ where t is real number, represents

a an ellipse b a parabola

c a hyperbola d a circle

10. if e_1 and e_2 are the eccentricities of two conics with $e_1^2 + e_2^2 = 3$, then the conics are

a ellipses b parabolas

c circles d hyperbolas

11. The sum of the distances of any point on the ellipse $3x^2+4y^2 = 24$ from its foci, is

a $8\sqrt{2}$ b 8

c $16\sqrt{2}$ d $4\sqrt{2}$

12. In $\triangle ABC$, if a tends to 2c and b tends to 3 c, then cos B tends to

a -1 b $\frac{1}{2}$ c $\frac{1}{3}$ d $\frac{2}{3}$

13. if sin π cos θ = cos π sin θ,, hen which of the following is correct

a cos $\theta = \frac{3}{2\sqrt{2}}$

b cos $\left(\theta - \frac{\pi}{2}\right) = \frac{1}{2\sqrt{2}}$

c cos $\left(\theta - \frac{\pi}{4}\right) = \frac{1}{2\sqrt{2}}$

d cos $\left(\theta + \frac{\pi}{4}\right) = -\frac{1}{2\sqrt{2}}$

14. The value of sin 12^0 sin 48^0 sin 54^0 is equal to

a $\frac{2}{3}$ b $\frac{1}{2}$

(c) $\frac{1}{8}$ (d) $\frac{1}{3}$

15. If $3\sin^{-1}\left(\frac{2x}{1+x^2}\right) - 4\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right) + 2\tan^{-1}\left(\frac{2x}{1-x^2}\right) = \frac{\pi}{3}$, then x is equal to

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

c $\sqrt{3}$ ($-\frac{\sqrt{3}}{2}$

16. The shadow of a pole is $\sqrt{3}$ times longer. The angle of elevation is equal to

a 40^0 b $\frac{45^0}{2}$

c 60^0 d 30^0

17. The point of contact of the line x-y+2=0 with the parabola $y^2-8x = 0$ is

a 2,4 b -2,4

c 2, -4 d 2,2

18. If the sides of a triangle are x^2+x+1, x^2-1 and $2x+1$, then the greatest angle is

a 90^0 b 135^0 c 115^0 d 120^0

19. The value of $\cos 1^0 . \cos 2^0 . \cos 3^0 \ldots \cos 179^0$ is equal to

a $\frac{1}{\sqrt{2}}$ b 0

c 1 d -1

20. If $\cot \alpha+\beta = 0$, then $\sin \alpha+2\beta$ is equal to

a $\sin \alpha$ b $\cos \alpha$

c $\sin \beta$ d $\cos 2 \beta$

21. The value of $4 \sin A \cos^3 A - 4 \cos A \sin^3 A$ is equal to

a cos 2A b sin 3A

c sin 2A d sin 4A

22. If the solutions for θ of cos of $\cos p\theta+\cos q\theta = 0$, $0>q>0$ arer in AP, then the numerically smallest common difference of AP is

a $\frac{\pi}{p+q}$ b $\frac{2\pi}{p+q}$

c $\frac{\pi}{2\ p+q)}$ d $\frac{1}{p+q}$

23. The value of k for which $\cos x + \sin x\ ^2 + k \sin x \cos x -1 = 0$ is that identity, is

a -1 b -2 c 0 d 1

24. If $4\cos^{-1}x + \sin^{-1}x = \pi$, then the value of x is

a $\frac{1}{2}$ b $\frac{1}{\sqrt{2}}$

c $\frac{\sqrt{3}}{2}$ d $\frac{2}{\sqrt{3}}$

25. a problem in mathematics is given to 3 students whose chances of solving individually are $\frac{1}{2},\frac{1}{3}$ and $\frac{1}{4}$. The probability that the problem will be solved at least by one, is

a $\frac{1}{4}$ b $\frac{1}{24}$

c $\frac{23}{24}$ d $\frac{3}{4}$

26. In a non-leap year the probability of getting 53 Sundays or 53 Tuesdays or 53 Thursdays is

a $\frac{1}{7}$ b $\frac{2}{7}$

c $\frac{3}{7}$ d $\frac{4}{7}$

27. The probability for a randomly chosen month to have its 10th day as Sunday, is

a $\frac{1}{84}$ b $\frac{10}{12}$

c $\frac{10}{84}$ d $\frac{1}{7}$

28. If the mean of numbers 27+x, 31+x, 89+x,107+x,156+x is 82, then the mean of 130+x,126+x,68+x,50+x,1+x is

a 79 b 157

c 82 d 75

29. if μ is the mean distributionof $\{Y_i , f_i\}$, then $\sum fi(\,'_i - \mu$ is equal to

a MD b SD

c 0 d relative frequency

30. Two cards are drawn successively with replacement from a well-shuffled pack of 52 cards. The probability of drawing two aces is

a $\frac{1}{13}$ b $\frac{1}{13} \times \frac{1}{17}$

c $\frac{1}{52} \times \frac{1}{51}$ d $\frac{1}{13} \times \frac{1}{13}$

31. If $\sec\left(\frac{x+y}{x-y}\right) = a$, then $\frac{dy}{dx}$ is

a $\frac{x}{y}$ b $\frac{y}{x}$

(c) y d x

32. If $x^y = e^{x-y}$, then $\frac{dy}{dx}$ is equal to

a $\frac{\log x}{1+\log x}$ (b) $\frac{\log x}{1-\log x}$

c $\frac{\log x}{1+\log x)^2}$ (d) $\frac{y\log x}{x\ 1+\log x)}$

33. For y = cosm sin $^{-1}$ x which of the following is true?

a 1 $-x^2\ y_2 + xy_1 - m^2y = 0$

b 1 $-x^2\ y_2 - xy_1 + m^2y = 0$

c 1+x $^2\ y_2 + xy_1 - m^2y = 0$

(c, ($-x^2)\ y_2 + xy_1 + m^2y = 0$

34. If f(x = $\begin{cases} x+1 & x \le 1 \\ 3 - ax^2 & x > 1 \end{cases}$ is continuous at x =1, then the value of a is

a -1 b 2

(c) -3 (d)1

35. $\lim_{x\to\frac{\pi}{2}} \frac{a^{\cot x} - a^{\cos x}}{\cot x - \cos x}$ is equal to

a log a b log 2

c a a (d) log x

36. If f ’ ‘0 = k, then $\lim_{x\to 0} \frac{2f(x)-3f(2x\ +f(4x}{x^2}$ is equal to

a k b 2k c 3k d 4k)

37. If g is the inversefunction of f and f’ x = $\frac{1}{1+x^n}$, then g’x is equal to

a 1+gx ^{n} b 1 -gx

c 1+gx d 1 -gx ^{n}

38. The curves $4x^2+9y^2 = 72$ and $x^2-y^2 = 5$ at 3,2

a touch each other b cut orthogonally

c interest at 45 ^{0} d interest at 60 ^{0}

39. The velocity v m/s of a particle is proportional to the cube of the time. If the velocity after 2 s is 4m/s, then v is equal to

a t t^3 b $\frac{t^3}{2}$

c $\frac{t^3}{3}$ d $\frac{t^3}{4}$

40. The minimum value of x log x is equal to

a e b $\frac{1}{e}$

c $-\frac{1}{e}$ d $\frac{2}{e}$

41. A particle moves along the x-axis so that its position is given $x = 2t^3 - 3t^2$ at a time t second. What is the time interval during which particle will be on the negative half of the axis?

a $0<t<\frac{2}{3}$ b $0<t<1$

c $0<t<\frac{3}{2}$ d $\frac{1}{2}<t<1$

42. A stone thrown vertically upwards satisfies the equations $s = 80t - 16t^2$. The time required to reach the maximum height is

a 2 s b 4 s

c 3 s d 2.5 s

43. If f(x+y = f(x, f(y, f(3 = 3, f'0 = 11. Then f'3 is equal to

a $11.e^{33}$ b 33

c 11 . d lo g 33

44. If y = x tan y, then $\frac{dy}{dx}$ is equal to

a $\frac{\tan y}{x-x^2-y^2}$ (b $\frac{y}{x-x^2-y^2}$

c $\frac{\tan y}{y-x}$ d $\frac{\tan x}{x-y^2}$

45. The product of the lengths of subtangent and subnormal at any point x,y of a curve is

a x^2 b y^2

c a constant d x

46. The equation of tangent to the curve

$\left(\frac{x}{a}\right)^n + \left(\frac{y}{b}\right)^n = 2$ at (a, b) is s

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

c $\frac{x}{b}-\frac{y}{a} = 2$ d ax + by = 2

47. If $\int_0^\infty \frac{x^2 dx}{(x^2+a^2)(x^2+b^2)(x^2+c^2)} = \frac{\pi}{2(a+b)(b+c)(c+a)}$, then the value of $\int_0^\infty \frac{1}{(x^2+4)(x^2+9)}$ dx is

(a) $\frac{\pi}{60}$ (b) $\frac{\pi}{20}$ c $\frac{\pi}{40}$ d $\frac{\pi}{80}$

48. $\int (e^{a\log x} + e^{x\log a})$ dx is equal to

a $\frac{x^{a+1}}{a+1}$ + c b $\frac{x^{a+1}}{a+1} + \frac{a^x}{\log a}$ + c

c x^{a+1} + a^x +c d $\frac{x^{a+1}}{a-1} + \frac{\log a}{a^x}$ + c

49. $\int_0^a \frac{dx}{x+\sqrt{a^2-x^2}}$ is

(a) $\frac{a^2}{4}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{4}$ (c π

50. If $\int_{-1}^{4} f(x)\,dx = 4$ and $\int_{2}^{4} [3 - f(x)]\,dx = 7$, then the value of $\int_{-1}^{2} f(x)\,dx$ is

a -2 b 3 c 5 d 8