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MATHS

BOOKS - CAREER POINT

MOCK TEST 4

Maths

1. ABCD is a convex quadrilateral and 3, 4, 5, and 6 points are marked on the sides AB, BC, CD, and DA, respectively. The number of

triangles with vertices on different sides is a. 270 b. 220 c. 282 d. 342

A. 270

B. 220

C. 282

D. 342

Answer: D

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2. Let a die is loaded in such a way that prime number faces are twice as likely to occur as a non prime number faces. The probability that an odd number will be show up when die is tossed is-

A. $\frac{1}{3}$

B. $\frac{2}{3}$

C. $\frac{4}{9}$

D. $\frac{5}{9}$

Answer: D

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3. $\Sigma_{r=1}^{n}(-1)^{r+1}.\frac{{}^{n}C_{r}}{r+1}$ is equal to $-$

A. $-\frac{1}{n}$

B. $\frac{1}{n+1}$

C. $\frac{-1}{n+1}$

D. $\frac{n}{n+1}$

Answer: D

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4. If p,q and r are three statements then negation of compound statement of $p \to (\sim r v \sim q)$ is -

A. $p \wedge (r \vee q)$

B. $p \wedge (r \wedge q)$

C. $p \vee (r \vee q)$

D. None

Answer: B

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5. The ratio of 11^{th} term from the beginning and 11^{th} term the end in the expansion of $\left(2x - \frac{1}{x^2}\right)^{25}$ is $-$

A. x^{15}

B. $-2^5 x^{15}$

C. $2^{15} x^5$

D. $2^5 x^{-15}$

Answer: B

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6. The equation $\sin^{-1} x - \cos^{-1} x = \cos^{-1}\left(\frac{\sqrt{3}}{2}\right)$ has

A. No solution

B. Unique solution

C. Infinite solution

D. None of these

Answer: B

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7. A vertical tower PQ subtends the same anlgle of 30° at each of two points A and B ,60 m apart on the ground .If AB subtends an angle of 120° at p the foot of the tower ,then find the height of the tower .

A. 10 m

B. 20 m

C. 30 m

D. 40 m

Answer: B

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8. If $|z_1 + z_2| = |z_1| + |z_2|$ is possible if :

A. $z_2 = 1$

B. $z_2 = \frac{1}{z_1}$

C. $\arg(z_1) = \arg(z_2)$

D. $|z_1| = |z_2|$

Answer: C

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9. Let the equation of a curve passing through the point (0,1) be given b $y = \int x^2 e^{x^3} dx$. If the equation of the curve is written in the form $x = f(y)$, then f(y) is

A. $\sqrt{\log_e(3y-2)}$

B. $(\log_e(3y-2))^{1/3}$

C. $(\log_e(2-3y))^{1/3}$

D. None of these

Answer: B

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10. If coses $0 = \frac{x^2 - Y^2}{x^2 + Y^2}$ is true iff-

A. $x = y \pm 0$

B. $x < y$

C. $x > y$

D. none of these

Answer: D

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11. The area bounded by the curves $y = \sin x$, y= cos x and y-axis in 1 quadrant is -

A. $\sqrt{2}$

B. $\sqrt{2} + 1$

C. $\sqrt{2} - 1$

D. $\sqrt{2} + 2$

Answer: C

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12. The solution of the DE $\frac{dy}{dx} + \sqrt{\frac{1-y^2}{1-x^2}} = 0$ is

A. $\sin^{-1}x . \sin^{-1}y = C$

B. $\sin^{-1}x = C\sin^{-1}y$

C. $\sin^{-1}x - \sin^{-1}y = C$

D. $\sin^{-1}x + \sin^{-1}y = C$

Answer: D

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13. A variable circle having fixed radius 'a' passes through origin and meets the co-ordinate axes in point A and B. Locus of centroid of triangle OAB where 'O' being the origin, is -

A. $9\left(x^2+y^2\right)=4a^2$

B. $9\left(x^2+y^2\right)=a^2$

C. $9\left(x^2+y^2\right)=2a^2$

D. $9\left(x^2+y^2\right)=8a^2$

Answer: A

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14. The chord AB of the parabola $y^2 = 4ax$ cuts the axis of the parabola at C. If $A \equiv (at12, 2at_1), B \equiv (at22, 2at_2)$, and $AC : AB1 : 3,$ then prove that $t_2 + 2t_1 = 0$.

A. $t_2 = 2t_1$

B. $t_2 + 2t_1 = 0$

C. $t_1 + 2t_2 = 0$

D. None of these

Answer: B

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15. If tangents are drawn to the ellipse $x^2 + 2y^2 = 2$, then the locus of the midpoint of the intercept made by the tangents between the coordinate axes is

$\frac{1}{2x^2} + \frac{1}{4y^2} = 1$ (b) $\frac{1}{4x^2} + \frac{1}{2y^2} = 1$

$\frac{x^2}{2} + y^2 = 1$ (d) $\frac{x^2}{4} + \frac{y^2}{2} = 1$

A. $\frac{1}{x^2}+\frac{1}{2y^2}=1$

B. $\frac{1}{4x^2}+\frac{1}{2y^2}=1$

C. $\frac{1}{2x^2}+\frac{1}{4y^2}=1$

D. $\frac{1}{2x^2}+\frac{1}{y^2}=1$

Answer: C

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16. $f(x)=\left(\tan x^5\right)e^{x^3\operatorname{sgn}x^7}$ is $-$

A. An even function

B. An odd fundtion

C. Neither even nor odd function

D. None of these

Answer: B

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17. if $y = \cos^{-1}\left(\frac{5\cos x - 12\sin x}{13}\right)$, where $x \in \left(0, \frac{\pi}{2}\right)$, then $\frac{dy}{dx}$ is $-$

A. 1

B. -1

C. 0

D. None of these

Answer: A

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18. $\lim_{x \to 0} \frac{\left(1 + a^3\right) + 8e^{1/x}}{1 + (1 - b^3)e^{1/x}} = 2 \quad \text{then} \quad -$

A. $a = 1, b = 2$

B. $a = 1, b = (-3)^{1/3}$

C. $a = 2, b = 3\frac{1}{3}$

D. None of these

Answer: B

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19. If $\vec{a}, \vec{b}, \vec{c}$ are three mutually perpendicular vectors, then the vector which is equally inclined to these vectors is (A) $\vec{a} + \vec{b} + \vec{c}$ (B) $\frac{\vec{a}}{|\vec{a}|} + \frac{\vec{b}}{|\vec{b}|} + \frac{\vec{c}}{|\vec{c}|}$ (C)

$$\frac{\vec{a}}{\left|\vec{a}\right|^2}+\frac{\vec{b}}{\left|\vec{b}\right|^2}+\frac{\vec{c}}{\left|\vec{c}\right|^2}$$

(D)

$$\left|\vec{a}\right|\vec{a}-\left|\vec{b}\right|\vec{b}+\left|\vec{c}\right|\vec{c}$$

A. $\vec{a}+\vec{b}+\vec{c}$

B. $\frac{\vec{a}}{\left|\vec{a}\right|}+\frac{\vec{b}}{\left|\vec{b}\right|}+\frac{\vec{c}}{\left|\vec{c}\right|}$

C. $\frac{\vec{a}}{\left|\vec{a}\right|^2}+\frac{\vec{b}}{\left|\vec{b}\right|^2}+\frac{\vec{c}}{\left|\vec{c}\right|^2}$

D. |veca|veca-|vecb|vecb+|vecc|vecc|`

Answer: B

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20. A straight line moves so that the sum of the reciprocals of its intercepts on two perpendicular lines is constant then the line passes through-

A. A fixed piont

B. A variable point

C. Origin

D. None of these

Answer: A

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21. The points $(1, 1), (0, \sec^2 0), (\operatorname{cosec}^2 0, 0)$ are collinear for-

A. $0 = \frac{\pi}{2}$

B. $0 \neq \frac{n\pi}{2}$

C. $0 = n\pi$

D. None of these

Answer: B

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22. The equation of a line which passes through point $A(1, 0, -1)$ and perperdicular to the straight lines $\overrightarrow{r} = 2\hat{j} - \hat{j} + \hat{k} + \lambda(2\hat{i} + 7\hat{j} - 3\hat{k})$ and $\overrightarrow{r} = 3\hat{i} - \hat{j} + 3\hat{k} + \lambda(2\hat{i} - 2\hat{j} + 5\hat{k})$, is -

A. $\frac{x-2}{29} = \frac{y}{-16} = \frac{z+1}{18}$

B. $\frac{x-1}{29} = \frac{y}{-16} = \frac{z+1}{-18}$

C. $\frac{x-1}{16} = \frac{y}{-16} = \frac{z+1}{-18}$

D. None of these

Answer: B

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23. The curve $y = ax^3 + bx^2 + cx$ is inclined by 45° to x-axis at origin and it touches x-axis at (1,0). Then

A. $a = -2, b = 1, c = 1$

B. $a = 1, b = 1, c = -2$

C. $a = 1, b = -2, c = 1$

D. $a = -1, b = 2, c = 1$

Answer: C

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24. If $x^2 + ax - 3x - (a + 2) = 0$ has real and distinct roots, then minimum value of $(a^2 + 1)/(a^2 + 2)$ is

A. 1

B. 0

C. $\frac{1}{2}$

D. $\frac{1}{4}$

Answer: C

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25.

$$i = \int \frac{e^x}{(x+2)}\{1 + (x+2)\log(x+2)\}dx =$$

A. $e^x . \log(x+2) + c$

B. $e^x / (x+2) + c$

C. $e^x(x+2) + c$

D. $e^x(x-2) + c$

Answer: A

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26. If R is a relation on N as

$R = \{(1 + x, 1 + x^2) : x \leq 5, X \in N\}$

which of the following is FALSE ?

A.

$R = \{(2, 2), (3, 5), (4, 10), (5, 17), (6, 25)\}$

B. Domain of $R = \{2, 3, 4, 5, 6\}$

C. Rangre of $R = \{2, 5, 10, 17, 26\}$

D. None of these

Answer: A

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27. Cosnsider the system of equation

$a_1x + b_1y + c_1z = 0, a_2x + b_2y + c_2z = 0,$

$a_3x + b_3y + c_3z = 0$ if $\begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix} = 0$, then

the

system has

A. More than two solutions

B. One trivial and one-non trivial solutions

C. No solution

D. Only trivial solution (0,0,0)

Answer: A

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28. A sample of 35 observations has the means 80 and SD. As 4. A second sample of 65 observations from the same population has

mean 70 and S.D.3. The S.D. of the combined sample is -

A. 5.83

B. 5.58

C. 34.2

D. None of these

Answer: A

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29. If A and B are two square matrices such that $B = -A^{-1}BA$, then $(A+B)^2$ is eual to-

A. 0

B. $A^2 + B^2$

C. $A^2 + 2AB + B^2$

D. $A + B$

Answer: B

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30. Given $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 4 & 1 \\ 2 & 3 & 1 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$.

Find P such that BPA= $\begin{bmatrix} 1 & 0 & 1 \\ 0 & 1 & 0 \end{bmatrix}$

A. $\begin{vmatrix} -4 & 7 & -7 \\ 3 & -5 & 5 \end{vmatrix}$

B. $\begin{vmatrix} 7 & 4 & -7 \\ 5 & 3 & -5 \end{vmatrix}$

C. $\begin{vmatrix} -7 & 7 & -4 \\ 3 & 5 & -5 \end{vmatrix}$

D. $\begin{vmatrix} -4 & 7 & 7 \\ 5 & -5 & 3 \end{vmatrix}$

Answer: A

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