

Clay6.com CBSE XII Math Model Paper

PRACTICE TEST-1 FEB-01-14 - Practice Test for CBSE-2014 Board Exams

Time allowed: 180 min

Marks: 100

General Instructions

- The question paper consists of 3 parts. Each question of each part is compulsory.
- **SEC-A: (10 questions)** Questions 1 to 10 are of 1 mark(s) each
- **SEC-B: (12 questions)** Questions 11 to 22 are of 4 mark(s) each
- **SEC-C: (7 questions)** Questions 23 to 29 are of 6 mark(s) each
- Links to individual answers on clay6.com have also been provided.

SEC-A

(10 x 1 mark = 10 marks)

- 1) What is the angle between following planes $2x - 3y + 4z = 1$ and $-x + y = 4$?
- 2) What is the area of the parallelogram having diagonals $3\vec{i} + \vec{j} - 2\vec{k}$ and $\vec{i} - 3\vec{j} + 4\vec{k}$?
- 3) If $e^{x+y} = xy$, what is $\frac{dy}{dx}$?
- 4) Given $A = \begin{bmatrix} 3 & -3 & 4 \\ 2 & -3 & 4 \\ 0 & -1 & 1 \end{bmatrix}$ Express A^{-1} in terms of A?
- 5) What does $\cos^{-1} \frac{4}{5} + \cos^{-1} \frac{12}{13}$ reduce to?
- 6) If $\begin{bmatrix} xy & 4 \\ z+6 & x+y \end{bmatrix} = \begin{bmatrix} 8 & w \\ 0 & 6 \end{bmatrix}$ then find the value of x,y,z and w
- 7) If A,B and C are angles of a triangle ,then the determinant $\begin{vmatrix} 1 & \cos C & \cos B \\ \cos C & 1 & \cos A \\ \cos B & \cos A & 1 \end{vmatrix}$ is equal to
- 8) Integrate the function $e^x \left(\frac{1}{x} - \frac{1}{x^2} \right)$
- 9) Let $f : \{1, 3, 4\} \rightarrow \{1, 2, 5\}$ and $g : \{1, 2, 5\} \rightarrow \{1, 3\}$ be given by $f = \{(1, 2), (3, 5), (4, 1)\}$ and $g = \{(1, 3), (2, 3), (5, 1)\}$. Write down $g \circ f$.
- 10) Choose the correct answer. The planes: $2x - y + 4z = 5$ and $5x - 2.5y + 10z = 6$ are:

11) By using the properties of definite integrals, evaluate the integral

$$\int_{-10}^{10} |x + 2| dx$$

12) If x, y, z are all distinct and $\begin{vmatrix} x & x^2 & 1 + x^3 \\ y & y^2 & 1 + y^3 \\ z & z^2 & 1 + z^3 \end{vmatrix} = 0$ then the value of $\frac{-1}{xyz}$ is

13) Suppose you roll 5 dice and sum up the highest 3 numbers. What is the probability that the sum is 18?

14) If $*$ is a binary operation on the set $\{0, 1, 2, 3, 4, 5\}$ defined as

$$a * b = \begin{cases} a + b, & \text{if } a + b < 6 \\ a + b - 6, & \text{if } a + b \geq 6 \end{cases}$$

then draw the composition table for the operation and find the identity element and inverse of 4 if exists.

15) If $x = \sqrt{a \sin^{-1} t}$, $y = \sqrt{a \cos^{-1} t}$, what is the value of $\frac{dy}{dx}$

16) Let \vec{a}, \vec{b} , and \vec{c} be three vectors such that $|\vec{a}| = 3, |\vec{b}| = 4, |\vec{c}| = 5$ and each one of them being perpendicular to sum of the other two, find $|\vec{a} + \vec{b} + \vec{c}|$

17) Solve: $\sin[2 \cos^{-1}\{\cot(2 \tan^{-1} x)\}] = 0$

18) Find the equation of a curve passing through the point (1,1). If the tangent drawn at any point P(x,y) on the curve meets the coordinate axes at A and B such that P is the mid-point of AB.

19) Find the values of p and q so that $f(x) = \begin{cases} x^2 + 3x + p, & \text{if } x \leq 1 \\ qx + 2, & \text{if } x > 1 \end{cases}$ is differentiable at $x = 1$.

20) Find the shortest distance between the lines: $\frac{x+1}{7} = \frac{y+1}{-6} = \frac{z+1}{1}$ and $\frac{x-3}{1} = \frac{y-5}{-2} = \frac{z-7}{1}$

21) Find the particular solution satisfying the given condition

$$2xy + y^2 - 2x^2 \frac{dy}{dx} = 0; y = 2 \text{ when } x = 1$$

- 22)** A rectangular sheet of tin 45 cm by 24 cm is to be made into a box without top, by cutting off square from each corner and folding up the flaps. What should be the side of the square in cms to be cut off so that the volume of the box is maximum?

SEC-C

(7 x 6 mark = 42 marks)

- 23)** Evaluate: $\int_{-1}^{3/2} |x \sin \pi x| dx$

- 24)** Use product $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix} \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$ to solve the system of equations : $x - y + 2z = 1$
 $2y = 3z = 1$
 $3x - 2y + 4z = 2$

- 25)** If the sum of the surface areas of cube and a sphere is constant. What is the ratio of an edge of the cube to the diameter of the sphere, when the sum of their volumes is minimum?
- 26)** A company manufactures two types of sweaters : type A sweaters type B. It costs Rs 360 to make a type A sweater and Rs 120 to make a type B sweater. The company can make at most 300 sweaters and spend at most Rs 72,000 a day. The number of sweaters of type B cannot exceed the number of sweaters of type A by more than 100. The company makes a profit of Rs 200 for each sweater of type A and Rs 120 for every sweater of type B. What is the maximum profit (in Rs.)?
- 27)** Find the equation of the plane which is perpendicular to the plane $5x + 3y + 6z + 8 = 0$ and which contains the line of intersection of the planes $x + 2y + 3z - 4 = 0$ and $2x + y - z + 5 = 0$.
- 28)** Find the area of the region $(x, y) : y^2 \leq 4x, 4x^2 + 4y^2 \leq 9$
- 29)** Assume that the chances of a patient having a heart attack is 40%. It is also assumed that a meditation and yoga course reduce the risk of heart attack by 30% and prescription of certain drug reduces its chances by 25%. At a time a patient can choose any one of the two options with equal probabilities. It is given that after going through one of the two options the patient selected at random suffers a heart attack. Find the probability that the patient followed a course of meditation and yoga?

Answer key		
Q No.	Correct Answer	Full answer
1	$\cos^{-1} \frac{-5}{\sqrt{58}}$	View
2	$5\sqrt{3}$	View
3	(A) $\frac{y(1-x)}{x(y-1)}$	View
4	(D) A^3	View
5	$\cos^{-1} \frac{33}{65}$	View
6	$x = 2$ or 4 $y = 2$ or 4 $z = -6$ $w = 4$	View
7	(A) 0	View
8	$\frac{e^x}{x} + c$	View
9	$gof = \{(1, 3), (3, 1), (4, 3)\}$	View
10	parallel	View
11		View
12		View
13		View
14	0 is identity and inverse of 4 is 2	View
15	$-\frac{y}{x}$	View
16	$5\sqrt{2}$	View
17	$-1 \pm \sqrt{2}$	View
18	(D) $xy = 1$	View
19	(A) $p = 3, q = 5$	View
20	$2\sqrt{29}$	View
21	(B) $y[\log x - 1] + 2x = 0$	View
22	5 cm	View
23	$\frac{3}{\pi} + \frac{1}{\pi^2}$	View
24	(C) 0, 5, 3	View
25	A : 1 : 1	View
26	(B) 48000	View
27	$51x + 15y - 50z + 173 = 0$	View
28	$\frac{\sqrt{2}}{6} + \frac{9\pi}{8} - \frac{9}{4} \sin^{-1} \left(\frac{1}{3} \right)$ sq.units.	View
29	$\frac{14}{29}$	View