

Algebra

1. If the sum of zeroes of the polynomial $p(x) = 2x^2 - k\sqrt{2}x + 1$ is $\sqrt{2}$, then value of k is:
 - (a) $\sqrt{2}$
 - (b) 2
 - (c) $2\sqrt{2}$
 - (d) $\frac{1}{2}$
2. If the roots of the equation $ax^2 + bx + c = 0, a \neq 0$ are real and equal, then which of the following relations is true?
 - (a) $a = \frac{b^2}{c}$
 - (b) $b^2 = ac$
 - (c) $ac = \frac{b^2}{4}$
 - (d) $c = \frac{b^2}{a}$
3. In an A.P., if the first term $a = 7$, n th term $a_n = 84$, and the sum of the first n terms $s_n = \frac{2093}{2}$, then n is equal to:
 - (a) 22
 - (b) 24
 - (c) 23
 - (d) 26
4. The zeroes of a polynomial $x^2 + px + q$ are twice the zeroes of the polynomial $4x^2 - 5x - 6$. The value of p is:
 - (a) $-\frac{5}{2}$
 - (b) $\frac{5}{2}$
 - (c) -5
 - (d) 10

5. In the given figure, graphs of two linear equations are shown. The pair of these linear equations is:

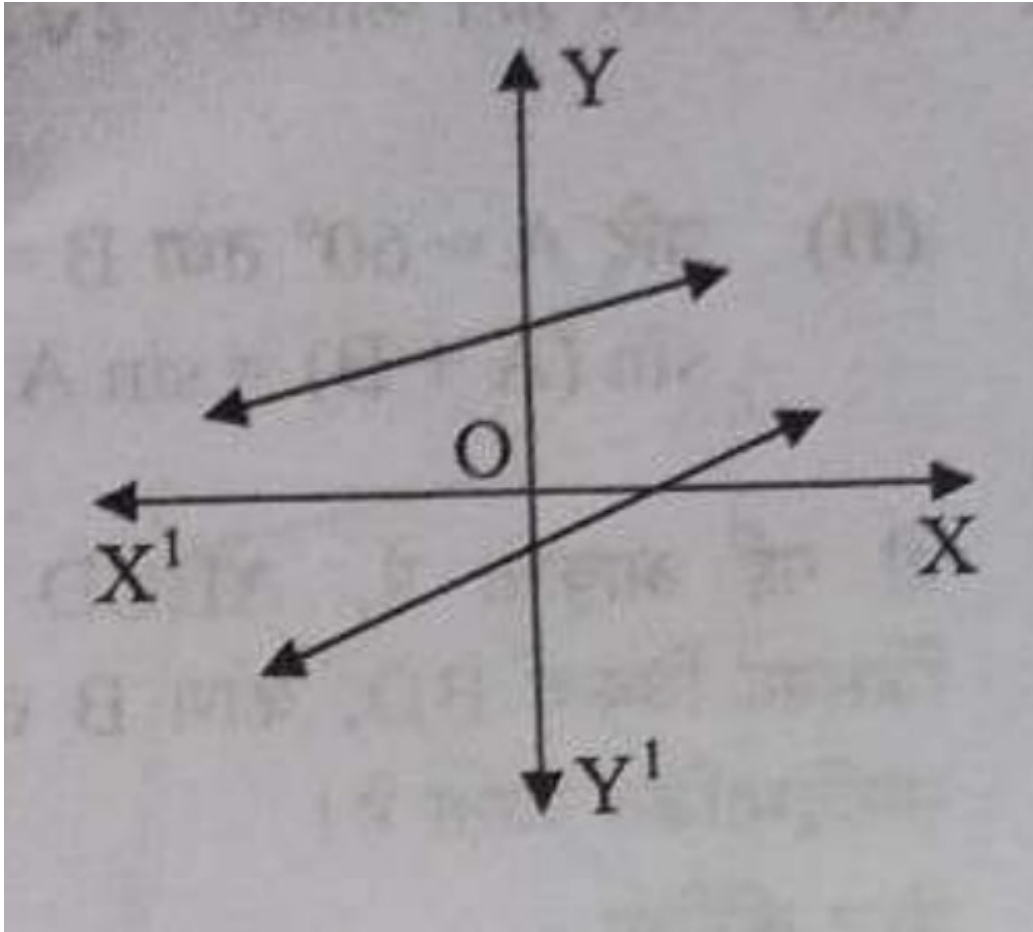


Figure 1

- (a) consistent with a unique solution.
- (b) consistent with infinitely many solutions.
- (c) inconsistent.
- (d) inconsistent but can be made consistent.

Statistics and Probability

6. If the probability of a player winning a game is 0.79, then the probability of his losing the same game is:
- (a) 1.79
 - (b) 0.31
 - (c) 0.21
 - (d) 0.21
7. From the data 1, 4, 7, 9, 16, 21, 25, if all the even numbers are removed, then the probability of getting at random a prime number from the remaining is:
- (a) $\frac{2}{5}$
 - (b) $\frac{1}{5}$
 - (c) $\frac{1}{7}$
 - (d) $\frac{2}{7}$
8. For some data x_1, x_2, \dots, x_n with respective frequencies f_1, f_2, \dots, f_n , the value of $\sum_i^n f_i (x_i - \bar{x})$ is equal to:
- (a) $n\bar{x}$
 - (b) 1
 - (c) $\sum f_i$
 - (d) 0
9. The middle-most observation of every data arranged in order is called:
- (a) mode
 - (b) median
 - (c) mean
 - (d) deviation

10. Two dice are rolled together. The probability of getting a sum of numbers on the two dice as 2, 3, or 5 is:
- (a) $\frac{7}{36}$
 - (b) $\frac{11}{36}$
 - (c) $\frac{5}{36}$
 - (d) $\frac{4}{9}$

Geometry

11. A solid sphere is cut into two hemispheres. The ratio of the surface areas of the sphere to that of the two hemispheres taken together is:
- (a) 1 : 1
 - (b) 1 : 4
 - (c) 2 : 3
 - (d) 3 : 2
12. The volume of the largest right circular cone that can be carved out from a solid cube of edge 2 cm is:
- (a) $\frac{4\pi}{3}$ cucm
 - (b) $\frac{5\pi}{3}$ cucm
 - (c) $\frac{8\pi}{3}$ cucm
 - (d) $\frac{2\pi}{3}$ cucm
13. **Assertion (A):** The tangents drawn at the end points of a diameter of a circle are parallel.
- Reason (R):** The diameter of a circle is the longest chord.
- (a) Both Assertion (A) and Reason (R) are true, and Reason (R) is the correct explanation of Assertion (A).
 - (b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation for Assertion (A).
 - (c) Assertion (A) is true, but Reason (R) is false.
 - (d) Assertion (A) is false, but Reason (R) is true.

Co-ordinate Geometry

14. AD is a median of $\triangle ABC$ with vertices $A(5, -6)$, $B(6, 4)$, and $C(0, 0)$. The length of AD is equal to:
- (a) $\sqrt{68}$ units
 - (b) $2\sqrt{15}$ units
 - (c) $\sqrt{101}$ units
 - (d) 10 units
15. If the distance between the points $(3, -5)$ and $(x, -5)$ is 15 units, then the values of x are:
- (a) 12, -18
 - (b) -12, 18
 - (c) 18, 5
 - (d) -9, -12
16. The center of a circle is at $(2, 0)$. If one end of a diameter is at $(6, 0)$, then the other end is at:
- (a) $(0, 0)$
 - (b) $(4, 0)$
 - (c) $(-2, 0)$
 - (d) $(-6, 0)$

Number System

17. If two positive integers p and q can be expressed as $p = 18a^2b^4$ and $q = 20a^3b^2$ where a and b are prime numbers, then $\text{LCM}(p, q)$ is:
- (a) $2a^2b^2$
 - (b) $180a^2b^2$
 - (c) $12a^2b^2$
 - (d) $180a^3b^4$

Trigonometry

18. If $\sec \theta - \tan \theta = m$, then the value of $\sec \theta + \tan \theta$ is:

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

19. If $\cos(\alpha + \beta) = 0$ then the value of $\cos\left(\frac{\alpha + \beta}{2}\right)$ is equal to:

- (a) $\frac{1}{\sqrt{2}}$
- (b) $\frac{1}{2}$
- (c) 0
- (d) $\sqrt{2}$