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1. The number of values of 'p' for which the equation

$$(p^2 - 5p + 6)x^2 - (p^2 - 3p + 2)x + 2p - p^2 = 0$$

has more than two roots.

- (a) 1
 - (b) 2
 - (c) 5
 - (d) 6
2. Let $\alpha \neq \beta$ and $\alpha^2 + 3 = 5\alpha$ while $\beta^2 = 5\beta - 3$. The quadratic equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$ is :
- (a) $3x^2 + 19x - 3 = 0$
 - (b) $3x^2 - 31x + 3 = 0$
 - (c) $6x^2 - 19x + 3 = 0$
 - (d) None of these
3. Find all values of 'p' for which the inequality $(2p - 1)x^2 - 2px + (p - 3) < 0$ is satisfied for all real values of x.
- (a) $p < \frac{1}{2}$
 - (b) $p < \frac{7 - \sqrt{37}}{2}$
 - (c) $p \in \left(\frac{7 - \sqrt{37}}{2}, \frac{7 + \sqrt{37}}{2} \right)$
 - (d) $p > \frac{1}{2}$
4. Consider the equations $x^2 - 2bx + (c - 1) = 0$ and $4x^2 + cs + (b - 1) = 0$, $b, c \in R$ then :
- (a) Both equations have real roots
 - (b) Atleast one equation has real roots
 - (c) Both equations have imaginary roots
 - (d) Atleast one equation has imaginary root

5. Find the value of

$$\binom{n}{0} \binom{2n}{n} - \binom{n}{1} \binom{2n-1}{n} + \binom{n}{2} \binom{2n-2}{n} + \dots + (-1)^n \binom{n}{n} \binom{n}{n} :$$

- (a) 0
- (b) -1

(c) 2^{2n}

(d) None of these

6. In quadrilateral ABCD if

$$\sin\left(\frac{A+B}{2}\right)\cos\left(\frac{A-B}{2}\right) + \sin\left(\frac{C+D}{2}\right)\cos\left(\frac{C-D}{2}\right) = 2,$$

then find the value of

$$\sin\left(\frac{A}{2}\right)\sin\left(\frac{B}{2}\right)\sin\left(\frac{C}{2}\right)\sin\left(\frac{D}{2}\right)$$

(a) $\frac{1}{2}$

(b) $\frac{1}{4}$

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

(d) $\frac{1}{16}$

7. Find the total number of integral values of n so that

$$\sin x(\sin x + \cos x) = n$$

has at least one solution.

(a) 8

(b) 2

(c) 1

(d) 4

8. Number of natural numbers which are less than 3×10^4 and can be formed with the digits 2, 3, 4 only is equal to:

(a) $\frac{3^5 + 2 \times 3^4 - 3}{2}$

(b) $\frac{3^6 - 2 \times 3^4 + 3}{2}$

(c) $\frac{3^5 - 2 \times 3^4 + 3}{2}$

(d) $\frac{3^6 + 2 \times 3^4 - 3}{2}$

9. A person throws four standard six sided distinguishable dice. Number of ways in which he can throw if:

the product of the four number shown on the upper faces is 144 is:

(a) 24

(b) 36

(c) 42

(d) 48

10. The total number of combinations 6 at a time which can be formed from 6 alike white, 6 alike blue,

6 alike green and 6 alike red balls is:

(a) 90

(b) 84

(c) 78

(d) None of these