SAAT Mathematics

Sample Paper – 3

Duration: 40 Minutes **Maximum Marks: 40**

Instructions

- This paper contains **40** Multiple Choice Questions (Single Correct Answer), modelled on the Mathematics section of the **SAAT** (Siksha 'O' Anusandhan Admission Test).
- Each correct answer carries **+1 mark**. There is **no negative marking** for incorrect or unattempted answers.
- Only **one** option is correct. Attempt every question, since wrong answers are not penalised.
- Use of mobile phones, calculators, or other electronic gadgets is strictly prohibited.

Q1. If a set A has 5 elements, then the number of subsets of A is

(A) 25

(B) 32

(C) 10

(D) 64

Q2. The range of the function $f(x) = x^2 + 1$, where $x \in \mathbb{R}$, is

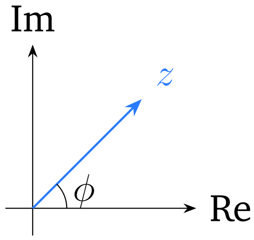
(A) $[1, \infty)$

(B) $(-\infty, \infty)$

(C) $(0, \infty)$

(D) $[0, \infty)$

Q3. The argument (amplitude) of the complex number $z = 1 + i$, plotted below, is



(A) $\frac{\pi}{3}$

(B) $\frac{\pi}{6}$

(C) $\frac{\pi}{4}$

(D) $\frac{\pi}{2}$

Q4. The value of i^{10} is

(A) 1

(B) i

(C) $-i$

(D) -1

Q5. The nature of the roots of the quadratic equation $x^2 - 4x + 4 = 0$ is

(A) real and equal

(B) real and distinct

(C) complex (non-real)

(D) one real, one complex

Q6. A square matrix A is called *symmetric* if

(A) $A^T = -A$

(B) $A^T = A$

(C) $A^2 = A$

(D) $A^T = A^{-1}$

Q7. The value of the determinant $\begin{vmatrix} 2 & 5 & 7 \\ 3 & 1 & 4 \\ 2 & 5 & 7 \end{vmatrix}$, in which two rows are identical, is

(A) 14

(B) 7

(C) 0

(D) 1

Q8. A square matrix A is invertible if and only if

(A) $A = A^T$

(B) $|A| = 1$

(C) A is of even order

(D) $|A| \neq 0$

Q9. The number of distinct arrangements of the letters of the word **LEVEL** is

(A) 30

(B) 120

(C) 60

(D) 20

Q10. The number of ways of selecting a committee of 3 members from 6 persons is

(A) 18

(B) 20

(C) 120

(D) 216

Q11. The middle term in the binomial expansion of $(1 + x)^6$ is

(A) $15x^2$

(B) $6x^3$

(C) $15x^4$

(D) $20x^3$

Q12. The arithmetic mean between 7 and 19 is

(A) 26

(B) 12

(C) 13

(D) 11

Q13. The sum of the first 5 terms of the geometric progression $3, 6, 12, \ldots$ is

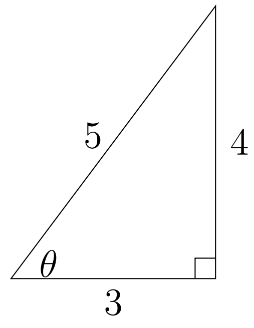
(A) 93

(B) 96

(C) 48

(D) 189

Q14. If $\cos\theta = \dfrac{3}{5}$ for the angle shown, then $\cos 2\theta$ equals



(A) $\dfrac{9}{25}$

(B) $-\dfrac{7}{25}$

(C) $\dfrac{7}{25}$

(D) $\dfrac{24}{25}$

Q15. The general solution of $\tan\theta = 1$ is ($n \in \mathbb{Z}$)

(A) $2n\pi + \dfrac{\pi}{4}$

(B) $n\pi + \dfrac{\pi}{3}$

(C) $n\pi + \dfrac{\pi}{4}$

(D) $2n\pi + \dfrac{\pi}{3}$

Q16. The principal value of $\tan^{-1}(1)$ is

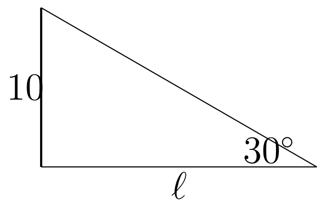
(A) $\dfrac{\pi}{6}$

(B) $\dfrac{\pi}{3}$

(C) $\dfrac{\pi}{2}$

(D) $\dfrac{\pi}{4}$

Q17. The Sun is at an elevation of 30°. The length of the shadow cast by a vertical pole of height 10 m is



(A) 10 m

(B) $10\sqrt{3}$ m

(C) $\dfrac{10}{\sqrt{3}}$ m

(D) 5 m

Q18. The value of $\lim_{x\to 0} \dfrac{e^x - 1}{x}$ is

(A) 1

(B) 0

(C) e

(D) ∞

Q19. The function $f(x) = \dfrac{x^2 - 9}{x - 3}$ $(x \neq 3)$ has, at $x = 3$, a

(A) jump discontinuity

(B) infinite discontinuity

(C) point of continuity

(D) removable discontinuity

Q20. Using the first principle, the derivative of $f(x) = x^2$ is

(A) x

(B) x^2

(C) $2x$

(D) 2

Q21. The derivative of $\dfrac{x}{x+1}$ with respect to x is

(A) $\dfrac{1}{(x+1)^2}$

(B) $\dfrac{1}{x+1}$

(C) $\dfrac{-1}{(x+1)^2}$

(D) $\dfrac{2x+1}{(x+1)^2}$

Q22. The radius of a circle increases at 2 cm/s. When the radius is 5 cm, the rate of change of its area is

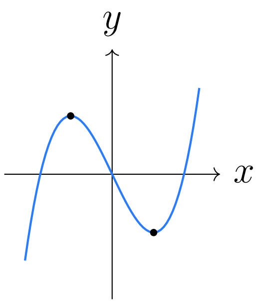
(A) 10π cm^2/s

(B) 20π cm^2/s

(C) 25π cm^2/s

(D) 4π cm^2/s

Q23. The number of critical points of the function $f(x) = x^3 - 3x$, whose graph is shown, is



(A) 0

(B) 1

(C) 2

(D) 3

Q24. The value of $\int e^x\,dx$ is

(A) $x\,e^x + C$

(B) $\dfrac{e^x}{x} + C$

(C) $e^{x-1} + C$

(D) $e^x + C$

Q25. The value of $\int 2x\,(x^2+1)\,dx$ is

(A) $\dfrac{(x^2+1)^2}{2} + C$

(B) $(x^2+1)^2 + C$

(C) $2(x^2+1) + C$

(D) $\dfrac{x^4}{2} + C$

Q26. The value of $\int_0^1 x^2\,dx$ is

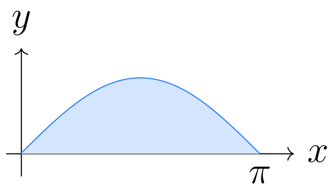
(A) 1

(B) $\frac{1}{3}$

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

(D) $\frac{2}{3}$

Q27. The area bounded by the curve $y = \sin x$ and the x-axis from $x = 0$ to $x = \pi$, shown below, is



(A) 0

(B) 1

(C) 2

(D) π

Q28. The order of the differential equation $\frac{d^3y}{dx^3} + 2\frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$ is

(A) 0

(B) 1

(C) 2

(D) 3

Q29. The solution of the differential equation $\frac{dy}{dx} = \frac{x}{y}$ is

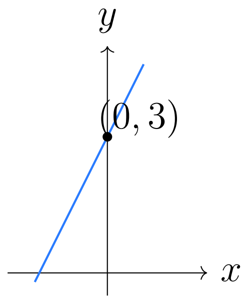
(A) $y^2 - x^2 = C$

(B) $y^2 + x^2 = C$

(C) $y - x = C$

(D) $xy = C$

Q30. The y-intercept of the straight line $y = 2x + 3$, shown below, is



(A) 2

(B) 3

(C) $-\frac{3}{2}$

(D) 0

Q31. The angle between the lines $y = x$ and $y = -x$ is

(A) $30°$

(B) $45°$

(C) $90°$

(D) $60°$

Q32. The equation of the circle with centre $(1, -2)$ and radius 3 is

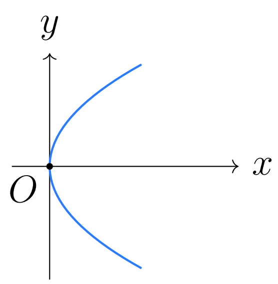
(A) $(x-1)^2 + (y-2)^2 = 9$

(B) $(x+1)^2 + (y-2)^2 = 3$

(C) $(x-1)^2 + (y+2)^2 = 3$

(D) $(x-1)^2 + (y+2)^2 = 9$

Q33. The vertex of the parabola $y^2 = 12x$, shown below, is



(A) $(3, 0)$

(B) $(0, 0)$

(C) $(0, 3)$

(D) $(12, 0)$

Q34. The conic represented by the equation $\frac{x^2}{9} + \frac{y^2}{4} = 1$ is

(A) a circle

(B) a parabola

(C) an ellipse

(D) a hyperbola

Q35. The scalar projection of $\vec{a} = 3\hat{i} + 4\hat{j}$ on $\vec{b} = \hat{i}$ is

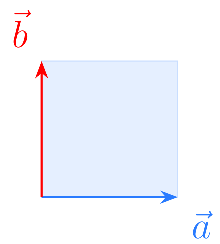
(A) 3

(B) 4

(C) 5

(D) 7

Q36. For the vectors $\vec{a} = 3\hat{i}$ and $\vec{b} = 4\hat{j}$, the area of the parallelogram with $\vec{a}$ and $\vec{b}$ as adjacent sides, shown below, is



(A) 7

(B) 0

(C) 5

(D) 12

Q37. If l, m, n are the direction cosines of a line, then $l^2 + m^2 + n^2$ equals

(A) 0

(B) 1

(C) 3

(D) depends on the line

Q38. The mode of the data $4, 5, 5, 6, 7, 5, 8, 9$ is

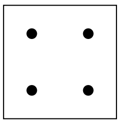
(A) 5

(B) 6

(C) 7

(D) 4

Q39. A fair die is rolled once. The probability of getting the number 4 is



(A) $\frac{1}{3}$

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

(C) $\frac{1}{6}$

(D) $\frac{2}{3}$

Q40. Two identical bags are given. Bag I has 3 red and 2 black balls; Bag II has 1 red and 4 black balls. A bag is chosen at random and a red ball is drawn. The probability that it came from Bag I is

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

(B) $\frac{3}{5}$

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

(D) $\frac{3}{4}$

Detailed Solutions

Q1.

Solution

Concept — Number of subsets: A set with n elements has exactly 2^n subsets, because each element can either be included or left out (2 choices each).

Step 1 — Read off n: The set A has 5 elements, so $n = 5$.

Step 2 — Write the formula: Number of subsets $= 2^n$.

Step 3 — Substitute $n = 5$: Number of subsets $= 2^5$.

Step 4 — Expand the power: $2^5 = 2 \times 2 \times 2 \times 2 \times 2$.

Step 5 — Multiply step by step: $2 \times 2 = 4$; $4 \times 2 = 8$; $8 \times 2 = 16$; $16 \times 2 = 32$.

Step 6 — State the count: Number of subsets $= 32$.

Why other options are wrong: $25 = 5^2$ swaps base and exponent; $10 = 2 \times 5$ multiplies instead of raising to a power; $64 = 2^6$ uses the wrong exponent.

Final Answer: $2^5 = 32 \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q1

Q2.

Solution

Concept — Range of $x^2 + 1$: The range is the set of all output values $f(x)$ as x runs over the reals. We find the smallest possible output and check it can be reached.

Step 1 — Bound the squared term: For every real x, a square is never negative, so $x^2 \geq 0$.

Step 2 — Add 1 to both sides: $x^2 + 1 \geq 0 + 1$.

Step 3 — Simplify the inequality: $f(x) = x^2 + 1 \geq 1$.

Step 4 — Check the minimum is attained: Put $x = 0$, then $f(0) = 0^2 + 1 = 1$, so the value 1 is actually reached.

Step 5 — Check large values: As x grows, x^2 grows without bound, so $f(x)$ takes every value above 1 up to ∞.

Step 6 — Write the range: Outputs run from 1 (included) to ∞, so the range is

$[1, \infty)$.

Why other options are wrong: $(-\infty, \infty)$ ignores the lower bound; $(0, \infty)$ wrongly starts at 0 and excludes it; $[0, \infty)$ uses minimum 0 instead of 1.

Final Answer: Range $= [1, \infty) \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q2

Q3.

Solution

Concept — Argument of a complex number: For $z = a + bi$ lying in the first quadrant, the argument is $\arg z = \tan^{-1}\left(\frac{b}{a}\right)$, the angle the line to z makes with the positive real axis.

Step 1 — Identify the real part: In $z = 1 + i$, the real part is $a = 1$.

Step 2 — Identify the imaginary part: The imaginary part is $b = 1$.

Step 3 — Form the ratio: $\frac{b}{a} = \frac{1}{1} = 1$.

Step 4 — Apply the formula: $\arg z = \tan^{-1}(1)$.

Step 5 — Evaluate the inverse tangent: The angle whose tangent is 1 is $\frac{\pi}{4}$, so $\arg z = \frac{\pi}{4}$.

Why other options are wrong: $\frac{\pi}{3}$ comes from $\tan^{-1}\sqrt{3}$ and $\frac{\pi}{6}$ from $\tan^{-1}\frac{1}{\sqrt{3}}$; $\frac{\pi}{2}$ is the argument of a purely imaginary number ($a = 0$).

Final Answer: $\arg z = \frac{\pi}{4} \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q3

Q4.

Solution

Concept — Powers of i cycle with period 4: The powers repeat in blocks of four: $i^1 = i$, $i^2 = -1$, $i^3 = -i$, $i^4 = 1$, then start again. So i^n depends only on the remainder of n when divided by 4.

Step 1 — Divide the exponent by 4: $10 \div 4 = 2$ with remainder 2.

Step 2 — Write 10 as $4 \times$ quotient $+$ remainder: $10 = 4 \times 2 + 2$.

Step 3 — Split the power: $i^{10} = i^{4\times2+2} = (i^4)^2 \cdot i^2$.

Step 4 — Use $i^4 = 1$: $(i^4)^2 = 1^2 = 1$, so $i^{10} = 1 \cdot i^2 = i^2$.

Step 5 — Evaluate i^2: $i^2 = -1$, so $i^{10} = -1$.

Why other options are wrong: 1, i and $-i$ correspond to remainders 0, 1 and 3; here the remainder is 2.

Final Answer: $i^{10} = -1 \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q4

Q5.

Solution

Concept — Discriminant: For $ax^2 + bx + c = 0$, the discriminant $D = b^2 - 4ac$ decides the nature of the roots: $D > 0$ gives real distinct roots, $D = 0$ gives real equal roots, $D < 0$ gives complex roots.

Step 1 — Read the coefficients: Comparing $x^2 - 4x + 4 = 0$ with $ax^2 + bx + c = 0$ gives $a = 1$, $b = -4$, $c = 4$.

Step 2 — Write the discriminant: $D = b^2 - 4ac$.

Step 3 — Substitute the values: $D = (-4)^2 - 4(1)(4)$.

Step 4 — Square the b term: $(-4)^2 = 16$.

Step 5 — Multiply the $4ac$ term: $4(1)(4) = 16$.

Step 6 — Subtract: $D = 16 - 16 = 0$.

Step 7 — Interpret: Since $D = 0$, the roots are real and equal.

Why other options are wrong: Real-and-distinct needs $D > 0$; complex needs $D < 0$; one-real-one-complex is impossible for real coefficients (complex roots come in pairs).

Final Answer: Real and equal $\Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q5

Q6.

Solution

Concept — Symmetric matrix: The transpose A^T is obtained by interchanging rows and columns of A. A matrix is symmetric when this interchange leaves it unchanged.

Step 1 — State the entry condition: Symmetry means every entry equals its mirror across the diagonal: $a_{ij} = a_{ji}$ for all i, j.

Step 2 — Rewrite in matrix form: Saying $a_{ij} = a_{ji}$ for all i, j is the same as saying A equals its transpose.

Step 3 — Write the definition: Therefore A is symmetric $\iff A^T = A$.

Why other options are wrong: $A^T = -A$ defines a skew-symmetric matrix; $A^2 = A$ is the idempotent condition; $A^T = A^{-1}$ defines an orthogonal matrix.

Final Answer: $A^T = A \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q6

Q7.

Solution

Concept — Equal rows: A standard property of determinants states that if two rows (or two columns) are identical, the determinant equals 0.

Step 1 — Write out row 1: Row $1 = (2,\ 5,\ 7)$.

Step 2 — Write out row 3: Row $3 = (2,\ 5,\ 7)$.

Step 3 — Compare the rows: Row 1 and row 3 are entry-by-entry identical.

Step 4 — Apply the property: Because two rows are equal, the determinant is 0.

Why other options are wrong: 14, 7 and 1 would require expanding the determinant and ignore the equal-row property that forces the value to 0.

Final Answer: Determinant $= 0 \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q7

Q8.

Solution

Concept — Existence of inverse: A square matrix A has an inverse exactly when it is non-singular, that is when its determinant is non-zero.

Step 1 — Recall the inverse formula: $A^{-1} = \frac{1}{|A|} \operatorname{adj} A$.

Step 2 — Spot the danger: The formula divides by $|A|$, and division is only allowed when $|A| \neq 0$.

Step 3 — Conclude the condition: Hence A^{-1} exists if and only if $|A| \neq 0$.

Why other options are wrong: Being symmetric, having $|A| = 1$, or being of even order are none of them required; a matrix can be invertible without any of these and can fail to be invertible while having them.

Final Answer: $|A| \neq 0 \Rightarrow \boxed{\text{D}}$

Answer: (D) **Go Back to Q8**

Q9.

Solution

Concept — Arrangements with repetition: If n letters contain repeats, the number of distinct arrangements is $\frac{n!}{\text{(factorials of each repeat count)}}$, because swapping identical letters does not create a new word.

Step 1 — Count the total letters: LEVEL has 5 letters, so $n = 5$.

Step 2 — Count each repeated letter: L appears 2 times and E appears 2 times; V appears once.

Step 3 — Write the formula: Arrangements $= \frac{5!}{2! \times 2!}$.

Step 4 — Compute $5!$**:** $5! = 5 \times 4 \times 3 \times 2 \times 1 = 120$.

Step 5 — Compute the denominator: $2! = 2$, so $2! \times 2! = 2 \times 2 = 4$.

Step 6 — Divide: $\frac{120}{4} = 30$.

Why other options are wrong: 120 ignores the repeats; 60 divides by only one $2!$; 20 is unrelated.

Final Answer: 30 arrangements $\Rightarrow \boxed{\text{A}}$

Answer: (A) **Go Back to Q9**

Q10.

Solution

Concept — Selection (combination): The number of ways to choose r people from n, where order does not matter, is ${}^{n}C_r = \dfrac{n!}{r!\,(n-r)!}$.

Step 1 — Identify n and r: Choosing 3 members from 6 persons gives $n = 6$, $r = 3$.

Step 2 — Write the formula: ${}^{6}C_3 = \dfrac{6!}{3!\,(6-3)!} = \dfrac{6!}{3!\,3!}$.

Step 3 — Cancel to a short form: Writing $6! = 6 \times 5 \times 4 \times 3!$ and cancelling one $3!$ gives ${}^{6}C_3 = \dfrac{6 \times 5 \times 4}{3!}$.

Step 4 — Expand the denominator: $3! = 3 \times 2 \times 1 = 6$.

Step 5 — Multiply the numerator: $6 \times 5 = 30$, then $30 \times 4 = 120$.

Step 6 — Divide: $\dfrac{120}{6} = 20$.

Why other options are wrong: 18 comes from a wrong multiplication; $120 = {}^{6}P_3$ counts ordered selections; $216 = 6^3$ allows repetition.

Final Answer: ${}^{6}C_3 = 20 \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q10

Q11.

Solution

Concept — Middle term: In $(1+x)^n$ there are $n+1$ terms. When n is even there is exactly one middle term, namely the $\left(\frac{n}{2}+1\right)$th term, and the general term is $T_{r+1} = {}^{n}C_r\, x^r$.

Step 1 — Read off n: Here $n = 6$.

Step 2 — Locate the middle term: The middle term is the $\left(\frac{6}{2}+1\right) = (3+1) = 4$th term, T_4.

Step 3 — Find r for T_4: Since $T_{r+1} = T_4$, we have $r + 1 = 4$, so $r = 3$.

Step 4 — Write the term: $T_4 = {}^{6}C_3\, x^3$.

Step 5 — Evaluate the coefficient: ${}^{6}C_3 = \dfrac{6 \times 5 \times 4}{3 \times 2 \times 1} = \dfrac{120}{6} = 20$.

Step 6 — Assemble: $T_4 = 20x^3$.

Why other options are wrong: $15x^2$ and $15x^4$ are the neighbouring terms T_3 and T_5; $6x^3$ uses an incorrect coefficient.

Final Answer: Middle term $= 20x^3 \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q11

Q12.

Solution

Concept — Arithmetic mean: The arithmetic mean (AM) of two numbers a and b is their sum divided by 2: AM $= \frac{a+b}{2}$.

Step 1 — Identify the numbers: Here $a = 7$ and $b = 19$.

Step 2 — Write the formula: AM $= \frac{a+b}{2} = \frac{7+19}{2}$.

Step 3 — Add the numerator: $7 + 19 = 26$, so AM $= \frac{26}{2}$.

Step 4 — Divide: $\frac{26}{2} = 13$.

Why other options are wrong: 26 forgets to divide by 2; 12 and 11 are arithmetic slips.

Final Answer: AM $= 13 \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q12

Q13.

Solution

Concept — Sum of n terms of a GP: For a geometric progression with first term a and common ratio $r > 1$, the sum of the first n terms is $S_n = \frac{a(r^n - 1)}{r - 1}$.

Step 1 — First term: The first term is $a = 3$.

Step 2 — Common ratio: Dividing a term by the previous one, $r = \frac{6}{3} = 2$ (check: $\frac{12}{6} = 2$).

Step 3 — Number of terms: We need the first 5 terms, so $n = 5$.

Step 4 — Substitute into the formula: $S_5 = \frac{3(2^5 - 1)}{2 - 1}$.

Step 5 — Evaluate the power: $2^5 = 32$.

Step 6 — Simplify inside the bracket: $32 - 1 = 31$.

Step 7 — Simplify the denominator: $2 - 1 = 1$.

Step 8 — Finish: $S_5 = \dfrac{3 \times 31}{1} = 93$.

Why other options are wrong: 96 is 3×32 (forgets the -1); 48 is the 5th term alone; 189 uses a wrong ratio.

Final Answer: $S_5 = 93 \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q13

Q14.

Solution

Concept — Double angle: The double-angle identity $\cos 2\theta = 2\cos^2\theta - 1$ lets us find $\cos 2\theta$ from $\cos\theta$ alone.

Step 1 — Write the identity: $\cos 2\theta = 2\cos^2\theta - 1$.

Step 2 — Substitute $\cos\theta = \frac{3}{5}$: $\cos 2\theta = 2\left(\dfrac{3}{5}\right)^2 - 1$.

Step 3 — Square the fraction: $\left(\dfrac{3}{5}\right)^2 = \dfrac{9}{25}$.

Step 4 — Multiply by 2: $2 \times \dfrac{9}{25} = \dfrac{18}{25}$.

Step 5 — Write 1 over 25: $1 = \dfrac{25}{25}$.

Step 6 — Subtract: $\dfrac{18}{25} - \dfrac{25}{25} = \dfrac{18 - 25}{25} = -\dfrac{7}{25}$.

Why other options are wrong: $\frac{9}{25}$ is just $\cos^2\theta$; $\frac{7}{25}$ drops the negative sign; $\frac{24}{25}$ is $\sin 2\theta$.

Final Answer: $\cos 2\theta = -\dfrac{7}{25} \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q14

Q15.

Solution

Concept — General solution of $\tan\theta = k$**:** Since $\tan$ repeats every π, if $\tan\alpha = k$ then all solutions are $\theta = n\pi + \alpha$, $n \in \mathbb{Z}$.

Step 1 — Write the equation: We are given $\tan\theta = 1$, so here $k = 1$.

Step 2 — Find the principal angle: We need α with $\tan\alpha = 1$; since $\tan\frac{\pi}{4} = 1$, we take $\alpha = \frac{\pi}{4}$.

Step 3 — Apply the general form: Substitute $\alpha = \frac{\pi}{4}$ into $\theta = n\pi + \alpha$.

Step 4 — Write the solution: $\theta = n\pi + \frac{\pi}{4}$, $n \in \mathbb{Z}$.

Why other options are wrong: The tangent has period π (not 2π), so the $2n\pi$ forms are wrong; $\frac{\pi}{3}$ is not the angle whose tangent is 1.

Final Answer: $\theta = n\pi + \frac{\pi}{4} \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q15

Q16.

Solution

Concept — Principal value of $\tan^{-1}$**:** The principal value of $\tan^{-1} x$ is the unique angle in the open interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ whose tangent is x.

Step 1 — Set up the requirement: We want the angle θ in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ with $\tan\theta = 1$.

Step 2 — Test a known angle: $\tan\frac{\pi}{4} = 1$.

Step 3 — Check it is in range: $\frac{\pi}{4}$ lies inside $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$, so it is the principal value.

Step 4 — Conclude: $\tan^{-1}(1) = \frac{\pi}{4}$.

Why other options are wrong: $\frac{\pi}{6}$ gives $\tan = \frac{1}{\sqrt{3}}$; $\frac{\pi}{3}$ gives $\tan = \sqrt{3}$; $\frac{\pi}{2}$ is outside the principal range and $\tan$ is undefined there.

Final Answer: $\tan^{-1}(1) = \frac{\pi}{4} \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q16

Q17.

Solution

Concept — Elevation and shadow: In the right triangle formed by the pole and its shadow, $\tan(\text{angle of elevation}) = \dfrac{\text{height (opposite)}}{\text{shadow (adjacent)}}$.

Step 1 — Label the triangle: Height (opposite the 30° angle) $= 10$ m; shadow (adjacent) $= \ell$.

Step 2 — Write the relation: $\tan 30^\circ = \dfrac{10}{\ell}$.

Step 3 — Insert the value of $\tan 30^\circ$: $\dfrac{1}{\sqrt{3}} = \dfrac{10}{\ell}$.

Step 4 — Cross-multiply: $\ell \times 1 = 10 \times \sqrt{3}$.

Step 5 — Read off the shadow: $\ell = 10\sqrt{3}$ m.

Why other options are wrong: 10 assumes a 45° elevation; $\frac{10}{\sqrt{3}}$ inverts the ratio (puts shadow over height); 5 is unrelated.

Final Answer: Shadow $= 10\sqrt{3}$ m $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q17

Q18.

Solution

Concept — Standard limit: This is a standard limit whose value is $\lim_{x \to 0} \dfrac{e^x - 1}{x} = 1$. We verify it using the series for e^x.

Step 1 — Write the series for e^x: $e^x = 1 + x + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \cdots$.

Step 2 — Subtract 1: $e^x - 1 = x + \dfrac{x^2}{2!} + \dfrac{x^3}{3!} + \cdots$.

Step 3 — Divide by x: $\dfrac{e^x - 1}{x} = 1 + \dfrac{x}{2!} + \dfrac{x^2}{3!} + \cdots$.

Step 4 — Let $x \to 0$: Every term containing x vanishes, leaving 1.

Step 5 — State the limit: $\lim_{x \to 0} \dfrac{e^x - 1}{x} = 1$.

Why other options are wrong: The limit exists and equals 1, so 0, e and ∞ are all incorrect.

Final Answer: The limit is $1 \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q18

Q19.

Solution

Concept — Removable discontinuity: A discontinuity at a point is called removable if the two-sided limit exists there but the function is either undefined or has the wrong value; the gap can be patched by redefining a single point.

Step 1 — Factor the numerator: $x^2 - 9$ is a difference of squares, so $x^2 - 9 = (x-3)(x+3)$.

Step 2 — Rewrite the function: $\dfrac{x^2-9}{x-3} = \dfrac{(x-3)(x+3)}{x-3}$.

Step 3 — Cancel the common factor: For $x \neq 3$, $\dfrac{(x-3)(x+3)}{x-3} = x+3$.

Step 4 — Take the limit at $x = 3$: $\lim_{x\to 3}(x+3) = 3+3 = 6$, which is a finite number.

Step 5 — Compare with $f(3)$: $f(3)$ is not defined (denominator is 0), yet the limit exists, so the single missing point can be filled in.

Step 6 — Classify: A finite limit at an undefined point means the discontinuity is removable.

Why other options are wrong: There is no sudden jump and no infinite blow-up, and the function is not defined at 3, so it is not a point of continuity either.

Final Answer: Removable discontinuity $\Rightarrow$ $\boxed{\text{D}}$

Answer: (D) Go Back to Q19

Q20.

Solution

Concept — First principle: The derivative from first principles is $f'(x) = \lim_{h\to 0}\dfrac{f(x+h)-f(x)}{h}$.

Step 1 — Write $f(x+h)$: With $f(x) = x^2$, $f(x+h) = (x+h)^2$.

Step 2 — Form the difference quotient: $\dfrac{f(x+h)-f(x)}{h} = \dfrac{(x+h)^2 - x^2}{h}$.

Step 3 — Expand $(x+h)^2$: $(x+h)^2 = x^2 + 2xh + h^2$.

Step 4 — Subtract x^2 in the numerator: $x^2 + 2xh + h^2 - x^2 = 2xh + h^2$.

Step 5 — Divide by h: $\frac{2xh+h^2}{h} = 2x + h$.

Step 6 — Take the limit $h \to 0$: $2x + h \to 2x + 0 = 2x$.

Step 7 — State the derivative: $f'(x) = 2x$.

Why other options are wrong: x and 2 drop terms during differentiation; x^2 is the original function, not its derivative.

Final Answer: $f'(x) = 2x \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q20

Q21.

Solution

Concept — Quotient rule: To differentiate a fraction $\frac{u}{v}$, use $\frac{d}{dx}\frac{u}{v} = \frac{u'v - uv'}{v^2}$.

Step 1 — Identify u and v: $u = x$ and $v = x + 1$.

Step 2 — Differentiate u: $u' = \frac{d}{dx}(x) = 1$.

Step 3 — Differentiate v: $v' = \frac{d}{dx}(x+1) = 1$.

Step 4 — Substitute into the rule: $\frac{u'v - uv'}{v^2} = \frac{(1)(x+1) - (x)(1)}{(x+1)^2}$.

Step 5 — Simplify the numerator: $(x + 1) - x = 1$.

Step 6 — Write the result: $\frac{1}{(x+1)^2}$.

Why other options are wrong: $\frac{1}{x+1}$ forgets to square v; the negative sign and $\frac{2x+1}{(x+1)^2}$ come from sign or algebra slips.

Final Answer: $\frac{1}{(x+1)^2} \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q21

Q22.

Solution

Concept — Related rates: The area of a circle is $A = \pi r^2$; differentiating both sides with respect to time links the rate of change of area to the rate of change of radius.

Step 1 — Write the area: $A = \pi r^2$.

Step 2 — Differentiate with respect to t: Using the chain rule, $\frac{dA}{dt} = \pi \cdot 2r \cdot \frac{dr}{dt} = 2\pi r \frac{dr}{dt}$.

Step 3 — List the given data: $r = 5$ cm and $\frac{dr}{dt} = 2$ cm/s.

Step 4 — Substitute: $\frac{dA}{dt} = 2\pi(5)(2)$.

Step 5 — Multiply the numbers: $2 \times 5 = 10$, then $10 \times 2 = 20$.

Step 6 — State the rate: $\frac{dA}{dt} = 20\pi$ cm^2/s.

Why other options are wrong: 10π uses $\frac{dr}{dt} = 1$; 25π is the area πr^2 itself; 4π drops the factor r.

Final Answer: $\frac{dA}{dt} = 20\pi$ cm^2/s $\Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q22

Q23.

Solution

Concept — Critical points: Critical points are the x-values where the derivative $f'(x)$ is zero (or undefined). Counting them tells us how many turning points the curve can have.

Step 1 — Differentiate term by term: For $f(x) = x^3 - 3x$, $\frac{d}{dx}(x^3) = 3x^2$ and $\frac{d}{dx}(-3x) = -3$, so $f'(x) = 3x^2 - 3$.

Step 2 — Set the derivative to zero: $3x^2 - 3 = 0$.

Step 3 — Factor out 3: $3(x^2 - 1) = 0$.

Step 4 — Divide by 3: $x^2 - 1 = 0$.

Step 5 — Solve for x: $x^2 = 1$, so $x = +1$ or $x = -1$.

Step 6 — Count the solutions: There are 2 values of x, hence 2 critical points (one local max and one local min, matching the graph).

Why other options are wrong: 0 and 1 undercount the solutions of $x^2 = 1$; 3 over-counts.

Final Answer: 2 critical points $\Rightarrow$ $\boxed{\text{C}}$

Answer: (C) Go Back to Q23

Q24.

Solution

Concept — Integral of e^x: Integration reverses differentiation, so the integral of e^x is the function whose derivative is e^x.

Step 1 — Recall the derivative: $\dfrac{d}{dx}(e^x) = e^x$.

Step 2 — Reverse it: Since differentiating e^x returns e^x, the antiderivative of e^x is e^x.

Step 3 — Add the constant: An indefinite integral always carries an arbitrary constant, so $\displaystyle\int e^x\,dx = e^x + C$.

Step 4 — Check by differentiating: $\dfrac{d}{dx}(e^x + C) = e^x + 0 = e^x$, confirming the answer.

Why other options are wrong: Differentiating $x\,e^x$, $\frac{e^x}{x}$ or e^{x-1} does not give back e^x, so none is the correct antiderivative.

Final Answer: $e^x + C \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q24

Q25.

Solution

Concept — u-substitution: When an integrand contains a function and its derivative, substitute u for the inner function to simplify.

Step 1 — Choose the substitution: Let $u = x^2 + 1$.

Step 2 — Differentiate u: $\dfrac{du}{dx} = 2x$, so $du = 2x\,dx$.

Step 3 — Rewrite the integral: The integrand is $2x(x^2+1)\,dx = (x^2+1)\,(2x\,dx) = u\,du$.

Step 4 — Integrate in u: $\int u\,du = \frac{u^2}{2} + C$.

Step 5 — Substitute back $u = x^2 + 1$: $\frac{(x^2+1)^2}{2} + C$.

Why other options are wrong: $(x^2+1)^2$ omits the $\frac{1}{2}$; $2(x^2+1)$ is a derivative, not the integral; $\frac{x^4}{2}$ ignores the inner function $+1$.

Final Answer: $\frac{(x^2+1)^2}{2} + C \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q25

Q26.

Solution

Concept — Definite integral of a power: Use the power rule $\int x^n\,dx = \frac{x^{n+1}}{n+1}$, then substitute the upper and lower limits and subtract.

Step 1 — Apply the power rule: With $n = 2$, $\int x^2\,dx = \frac{x^3}{3}$.

Step 2 — Write with limits: $\int_0^1 x^2\,dx = \left[\frac{x^3}{3}\right]_0^1$.

Step 3 — Substitute the upper limit $x = 1$: $\frac{1^3}{3} = \frac{1}{3}$.

Step 4 — Substitute the lower limit $x = 0$: $\frac{0^3}{3} = 0$.

Step 5 — Subtract: $\frac{1}{3} - 0 = \frac{1}{3}$.

Why other options are wrong: 1 forgets the $\frac{1}{3}$; $\frac{1}{2}$ integrates x instead of x^2; $\frac{2}{3}$ doubles wrongly.

Final Answer: The integral $= \frac{1}{3} \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q26

Q27.

Solution

Concept — Area under a curve: Since $\sin x \geq 0$ on $[0, \pi]$, the area between the curve and the x-axis is $\int_0^{\pi} \sin x \, dx$.

Step 1 — Recall the antiderivative: $\int \sin x \, dx = -\cos x$.

Step 2 — Write with limits: Area $= [-\cos x]_0^{\pi}$.

Step 3 — Substitute the upper limit $x = \pi$: $-\cos \pi = -(-1) = 1$.

Step 4 — Substitute the lower limit $x = 0$: $-\cos 0 = -(1) = -1$.

Step 5 — Subtract (upper minus lower): $1 - (-1) = 1 + 1$.

Step 6 — Compute: $= 2$.

Why other options are wrong: 0 is the value of $\int_0^{2\pi} \sin x \, dx$ (positive and negative areas cancel); 1 and π are miscomputations.

Final Answer: Area $= 2 \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q27

Q28.

Solution

Concept — Order of a differential equation: The order is the order of the highest derivative that appears in the equation.

Step 1 — List the derivatives present: The equation contains $\frac{d^3y}{dx^3}$, $\frac{d^2y}{dx^2}$ and $\frac{dy}{dx}$, of orders 3, 2 and 1.

Step 2 — Pick the highest: The largest of $3, 2, 1$ is 3, coming from $\frac{d^3y}{dx^3}$.

Step 3 — State the order: Therefore the order $= 3$.

Why other options are wrong: 0, 1 and 2 ignore the third derivative, which is the highest present.

Final Answer: Order $= 3 \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q28

Q29.

Solution

Concept — Variable separable: Move all y terms to one side and all x terms to the other, then integrate both sides.

Step 1 — Write the equation: $\frac{dy}{dx} = \frac{x}{y}$.

Step 2 — Cross-multiply to separate: Multiply both sides by $y\,dx$ to get $y\,dy = x\,dx$.

Step 3 — Integrate both sides: $\int y\,dy = \int x\,dx$.

Step 4 — Apply the power rule: $\frac{y^2}{2} = \frac{x^2}{2} + c$.

Step 5 — Multiply through by 2**:** $y^2 = x^2 + 2c$.

Step 6 — Rearrange and rename the constant: $y^2 - x^2 = 2c = C$.

Why other options are wrong: $y^2 + x^2 = C$ comes from $\frac{dy}{dx} = -\frac{x}{y}$; $y - x = C$ and $xy = C$ do not satisfy the given equation when differentiated.

Final Answer: $y^2 - x^2 = C \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q29

Q30.

Solution

Concept — Slope–intercept form: A line written as $y = mx + c$ has slope m and y-intercept c (the value of y where $x = 0$).

Step 1 — Compare with the standard form: Matching $y = 2x+3$ with $y = mx+c$ gives $m = 2$ and $c = 3$.

Step 2 — Set $x = 0$ **to find the intercept:** $y = 2(0) + 3 = 3$.

Step 3 — Conclude: The line meets the y-axis at $(0, 3)$, so the y-intercept is 3.

Why other options are wrong: 2 is the slope m; $-\frac{3}{2}$ is the x-intercept (where $y = 0$); 0 would mean the line passes through the origin.

Final Answer: y-intercept $= 3 \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q30

Q31.

Solution

Concept — Angle between lines: For two lines with slopes m_1 and m_2, the angle ϕ between them satisfies $\tan\phi = \left|\dfrac{m_1 - m_2}{1 + m_1 m_2}\right|$.

Step 1 — Slope of the first line: $y = x$ has $m_1 = 1$.

Step 2 — Slope of the second line: $y = -x$ has $m_2 = -1$.

Step 3 — Compute the denominator: $1 + m_1 m_2 = 1 + (1)(-1) = 1 - 1 = 0$.

Step 4 — Interpret a zero denominator: Dividing by 0 makes $\tan\phi$ infinitely large, which happens at $\phi = 90°$.

Step 5 — Conclude: The lines are perpendicular, so the angle is $90°$.

Why other options are wrong: $30°$, $45°$ and $60°$ do not satisfy the perpendicularity condition $m_1 m_2 = -1$ that holds here.

Final Answer: Angle $= 90° \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q31

Q32.

Solution

Concept — Circle equation: A circle with centre (h, k) and radius r has equation $(x - h)^2 + (y - k)^2 = r^2$.

Step 1 — Read the centre: $(h, k) = (1, -2)$, so $h = 1$ and $k = -2$.

Step 2 — Read the radius: $r = 3$.

Step 3 — Substitute into the x term: $(x - h)^2 = (x - 1)^2$.

Step 4 — Substitute into the y term: $(y - k)^2 = (y - (-2))^2 = (y + 2)^2$.

Step 5 — Square the radius: $r^2 = 3^2 = 9$.

Step 6 — Assemble the equation: $(x - 1)^2 + (y + 2)^2 = 9$.

Why other options are wrong: $(x - 1)^2 + (y - 2)^2 = 9$ has the wrong sign on k; the other two use $r = 3$ instead of $r^2 = 9$ or wrong signs.

Final Answer: $(x - 1)^2 + (y + 2)^2 = 9 \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q32

Q33.

Solution

Concept — Standard parabola $y^2 = 4ax$: A parabola of the form $y^2 = 4ax$ opens rightward with its vertex fixed at the origin $(0, 0)$ and focus at $(a, 0)$.

Step 1 — Match the equation: $y^2 = 12x$ matches $y^2 = 4ax$, so $4a = 12$.

Step 2 — Solve for a: $a = \frac{12}{4} = 3$.

Step 3 — Identify the vertex: For $y^2 = 4ax$ the vertex is always at the origin, regardless of a, so the vertex is $(0, 0)$.

Why other options are wrong: $(3, 0)$ is the focus $(a, 0)$; $(0, 3)$ swaps the coordinates; $(12, 0)$ misreads $4a$ as the x-coordinate.

Final Answer: Vertex $= (0, 0) \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q33

Q34.

Solution

Concept — Identifying a conic: An equation $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ with both terms positive (a $+$ sign) and unequal denominators represents an ellipse.

Step 1 — Read the denominators: Comparing with the standard form, $a^2 = 9$ and $b^2 = 4$.

Step 2 — Check the sign: Both squared terms are added (a $+$ sign), ruling out a hyperbola.

Step 3 — Compare the denominators: $9 \neq 4$, so $a^2 \neq b^2$, which rules out a circle.

Step 4 — Conclude: Two positive, unequal denominators with a $+$ sign means the conic is an ellipse.

Why other options are wrong: A circle needs $a^2 = b^2$; a parabola has only one squared variable; a hyperbola has a minus sign between the terms.

Final Answer: Ellipse $\Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q34

Q35.

Solution

Concept — Scalar projection: The scalar projection of $\vec{a}$ onto $\vec{b}$ is $\dfrac{\vec{a}\cdot\vec{b}}{|\vec{b}|}$.

Step 1 — Write the components: $\vec{a} = 3\hat{i} + 4\hat{j}$ and $\vec{b} = \hat{i} = 1\hat{i} + 0\hat{j}$.

Step 2 — Form the dot product: $\vec{a}\cdot\vec{b} = (3)(1) + (4)(0)$.

Step 3 — Evaluate the dot product: $= 3 + 0 = 3$.

Step 4 — Find $|\vec{b}|$: $|\vec{b}| = \sqrt{1^2 + 0^2} = 1$.

Step 5 — Divide: Projection $= \dfrac{3}{1} = 3$.

Why other options are wrong: 4 is the projection on $\hat{j}$; $5 = |\vec{a}|$ is the length of $\vec{a}$; 7 wrongly adds the two components.

Final Answer: Projection $= 3 \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q35

Q36.

Solution

Concept — Area of a parallelogram: When $\vec{a}$ and $\vec{b}$ are adjacent sides, the area equals the magnitude of their cross product, $|\vec{a}\times\vec{b}| = |\vec{a}||\vec{b}|\sin\theta$, where θ is the angle between them.

Step 1 — Find $|\vec{a}|$: $\vec{a} = 3\hat{i}$, so $|\vec{a}| = 3$.

Step 2 — Find $|\vec{b}|$: $\vec{b} = 4\hat{j}$, so $|\vec{b}| = 4$.

Step 3 — Find the angle: $\hat{i}$ and $\hat{j}$ are perpendicular, so $\theta = 90^\circ$ and $\sin 90^\circ = 1$.

Step 4 — Substitute into the area formula: Area $= |\vec{a}||\vec{b}|\sin\theta = 3 \times 4 \times 1$.

Step 5 — Multiply: $3 \times 4 = 12$, then $12 \times 1 = 12$.

Why other options are wrong: 7 adds the magnitudes; 0 is the area for parallel vectors $(\sin 0^\circ = 0)$; 5 is unrelated.

Final Answer: Area $= 12 \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q36

Q37.

Solution

Concept — Direction cosines: The direction cosines l, m, n of a line are the cosines of the angles it makes with the x, y, z axes, and they are the components of a unit vector along the line.

Step 1 — Write the unit vector: A unit vector along the line is $\hat{u} = l\hat{i} + m\hat{j} + n\hat{k}$.

Step 2 — Use the unit-length condition: A unit vector has magnitude 1, so $|\hat{u}| = 1$.

Step 3 — Write magnitude in components: $|\hat{u}| = \sqrt{l^2 + m^2 + n^2}$.

Step 4 — Set equal to 1 and square: $\sqrt{l^2 + m^2 + n^2} = 1 \Rightarrow l^2 + m^2 + n^2 = 1$.

Why other options are wrong: 0 and 3 are wrong constants; the sum is always exactly 1 and never depends on the particular line.

Final Answer: $l^2 + m^2 + n^2 = 1 \Rightarrow \boxed{\text{B}}$

Answer: (B) Go Back to Q37

Q38.

Solution

Concept — Mode: The mode of a data set is the value that occurs most often.

Step 1 — List the data: $4,\ 5,\ 5,\ 6,\ 7,\ 5,\ 8,\ 9$.

Step 2 — Count each value: 4 once; 5 three times; 6 once; 7 once; 8 once; 9 once.

Step 3 — Pick the highest frequency: The largest count is 3, belonging to the value 5.

Step 4 — State the mode: The mode is 5.

Why other options are wrong: 6, 7 and 4 each occur only once, far fewer times than 5.

Final Answer: Mode $= 5 \Rightarrow \boxed{\text{A}}$

Answer: (A) Go Back to Q38

Q39.

Solution

Concept — Equally likely outcomes: For equally likely outcomes, $P(\text{event}) = \dfrac{\text{number of favourable outcomes}}{\text{total number of outcomes}}$.

Step 1 — Count total outcomes: A fair die has 6 faces, so total outcomes $= 6$.

Step 2 — Count favourable outcomes: Exactly one face shows the number 4, so favourable $= 1$.

Step 3 — Form the ratio: $P(4) = \dfrac{\text{favourable}}{\text{total}} = \dfrac{1}{6}$.

Why other options are wrong: $\frac{1}{3}$, $\frac{1}{2}$ and $\frac{2}{3}$ would require more than one favourable face out of six.

Final Answer: $P(4) = \dfrac{1}{6} \Rightarrow \boxed{\text{C}}$

Answer: (C) Go Back to Q39

Q40.

Solution

Concept — Bayes' theorem: Given that a red ball was drawn, the probability it came from Bag I is $P(B_1 \mid R) = \dfrac{P(B_1)P(R \mid B_1)}{P(B_1)P(R \mid B_1) + P(B_2)P(R \mid B_2)}$.

Step 1 — Probability of choosing each bag: A bag is chosen at random, so $P(B_1) = P(B_2) = \dfrac{1}{2}$.

Step 2 — Red probability from Bag I: Bag I has 3 red of 5 balls, so $P(R \mid B_1) = \dfrac{3}{5}$.

Step 3 — Red probability from Bag II: Bag II has 1 red of 5 balls, so $P(R \mid B_2) = \dfrac{1}{5}$.

Step 4 — Numerator (Bag I path): $P(B_1)P(R \mid B_1) = \dfrac{1}{2} \times \dfrac{3}{5} = \dfrac{3}{10}$.

Step 5 — Second term (Bag II path): $P(B_2)P(R \mid B_2) = \dfrac{1}{2} \times \dfrac{1}{5} = \dfrac{1}{10}$.

Step 6 — Denominator (total red): $\dfrac{3}{10} + \dfrac{1}{10} = \dfrac{4}{10}$.

Step 7 — Divide numerator by denominator: $P(B_1 \mid R) = \dfrac{3/10}{4/10} = \dfrac{3}{4}$.

Why other options are wrong: $\frac{1}{2}$ ignores the red-ball evidence; $\frac{3}{5}$ is the conditional $P(R \mid B_1)$; $\frac{1}{4}$ is the complement $P(B_2 \mid R)$.

Final Answer: $P(B_1 \mid R) = \frac{3}{4} \Rightarrow \boxed{\text{D}}$

Answer: (D) Go Back to Q40

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	A	3	C	4	D	5	A
6	B	7	C	8	D	9	A	10	B
11	D	12	C	13	A	14	B	15	C
16	D	17	B	18	A	19	D	20	C
21	A	22	B	23	C	24	D	25	A
26	B	27	C	28	D	29	A	30	B
31	C	32	D	33	B	34	C	35	A
36	D	37	B	38	A	39	C	40	D