

National Achievement Survey : MODEL TEST



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MATHEMATICS

To be Filled by Student

Your Name	<input type="text"/>
Your Gender (Boy/Girl)	<input type="text"/>
Your Social Group (SC/ST/OBC/General)	<input type="text"/>
Your School Name	<input type="text"/>

To be Checked / Filled by School Examination Incharge

<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>	Location of School { 1- Rural } <input type="checkbox"/>
State Code	Student ID	{ 2- Urban } <input type="checkbox"/>
<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>		Management of School { 1- Govt. } <input type="checkbox"/>
School Code		{ 2- Aided } <input type="checkbox"/>
		{ 3- Private } <input type="checkbox"/>



Educational Survey Division
राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING
Sri Aurobindo Marg, New Delhi-110 016.



INSTRUCTIONS FOR STUDENTS

(To be explained by the Invigilator)

1. This booklet has **60 Items**.
2. You have **90 Minutes** to complete this booklet.
3. Answer **ALL** the items. Marks will not be cut for wrong answers.
4. In each item, there are four choices, **only one** of them is correct. Choose the correct option and **darken** the serial number of the correct choice in the OMR sheet.
5. Answer carefully on the OMR sheet. Once selected, the answer cannot be changed.

Here is an example.

To fill in the blanks in the following questions, encircle the serial number of the correct option.

Q1. Which one of the following is the largest number?

1. 273
2. 275
3. 253
4. 257

1	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

In this example Choice '2' is darkened because 'am' is the correct answer among the four choices.

Now you can START

Q1. The roots of the equation $ax^2 + bx + c = 0$ are:

1. $\frac{b \pm \sqrt{b^2 - 4ac}}{2a}$
2. $\frac{b \pm \sqrt{b^2 - 4ac}}{2c}$
3. $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
4. $\frac{2a}{-b \pm \sqrt{b^2 - 4ac}}$

Q2. Point $(-3, 5)$ lies in the :

1. first quadrant
2. second quadrant
3. third quadrant
4. fourth quadrant

Q3. The mean of $x - 2a, x - a, x, x + a, x + 2a$ is :

1. x
2. $5x$
3. a
4. not possible to find unless value of a is given

Q4. The sum of all the three interior angles of a triangle equals

1. one right angle
2. two right angles
3. three right angles
4. four right angles

Q5. A solid metallic sphere is melted to form a cone and a cylinder with same radius and height. If the radius of the cylinder is the same as that of sphere, then the ratio of the diameter of the sphere to the height of the cylinder will be:

1. 2 : 1
2. 1 : 2
3. 1 : 1
4. 4 : 3

Q6. Which one of the following statements is true?

1. Every integer is a whole number
2. Every rational number is an integer
3. Every irrational number is a real number
4. Every real number is an irrational number

Q8. The value $\cos 30^\circ \cdot \cos 60^\circ - \sin 30^\circ \cdot \sin 60^\circ$ is :

1. 2
2. 1
3. 0
4. $\frac{3}{2}$

Q9. For the equation $4x - 3y = 7$

1. $(1, -1), (3, 4)$ are solutions
2. $(-1, 1), (3, 4)$ are solutions
3. $(1, -1), (4, 3)$ are solutions
4. $(-1, 1), (4, 3)$ are solutions

Q10. If A $(-5, 7)$, B $(-4, -5)$, C $(-1, -6)$ and D $(4, 5)$ are the vertices of a quadrilateral, then the area of the quadrilateral ABCD is:

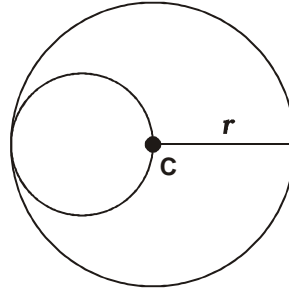
1. 53 sq. units
2. 72 sq. units
3. 27 sq. units
4. 35 sq. units

Q11. If $\triangle ABC \cong \triangle PQR$, then which of the following is true?

1. $B \leftrightarrow R$
2. $C \leftrightarrow Q$
3. $A \leftrightarrow R$
4. $A \leftrightarrow P$

Q12. In a circle of 'C' as center and radius 'r', units, a hole is created as shown in the figure. The area of the remaining part in square units is :

1. $\frac{\pi r^2}{4}$
2. $\frac{3}{4}\pi r^2$
3. $\frac{\pi r^2}{3}$
4. $\frac{5}{4}\pi r^2$



Q13. The value of $\frac{1}{\sqrt{7}-\sqrt{6}}$ is :

1. $\sqrt{7}+\sqrt{6}$
2. $\sqrt{42}$
3. $\sqrt{13}$
4. $\sqrt{7}-\sqrt{6}$

Q14. Two concentric circles are drawn. The radius of the outer circle is 10 cm and the length of the chord of the outer circle which is a tangent to the inner circle is 12 cm. Then radius of the inner circle is :

1. 2 cm
2. 6 cm
3. $\sqrt{44}$ cm
4. 8 cm

Q15. The factors of $x^2 - 13x + 30$ are :

1. $(x-3)$ and $(x-10)$
2. $(x-3)$ and $(x+10)$
3. $(x+3)$ and $(x-10)$
4. $(x-15)$ and $(x-2)$

Q16. What is the ordinate of the point $P(y, -x)$?

1. x
2. y
3. $-y$
4. $-x$

Q17. Two parallelograms are on equal bases and between same parallels. The ratio of their areas is :

1. 1 : 2
2. 1 : 1
3. 2 : 1
4. 3 : 1

Q18. If a sphere is cut into two hemi-spheres then:

1. volume and surface area both increase
2. volume remain same and surface area increases
3. volume changes but surface area remain same
4. volume remains same but surface area reduces

Q19. A rational number is defined as:

1. a number of the form $\frac{p}{q}$ where p and q are integers.
2. a number which can be expressed in the form $\frac{p}{q}$ where p and q are positive integers.
3. a number which is expressed in the form $\frac{p}{q}$ where p and q are positive integers and $q \neq 0$
4. a number which can be expressed in the form $\frac{p}{q}$ where p and q are integers and $q \neq 0$

Q20. Two dice are thrown at the same time. The probability of getting the sum equal to 13 is:

1. 0.1
2. 0.01
3. 0.5
4. 0

Q21. If $\sin(A + B) = \frac{\sqrt{3}}{2}$ where $A > B$ and $0^\circ < A + B < 90^\circ$ and

$\cos(A - B) = \frac{\sqrt{3}}{2}$, then:

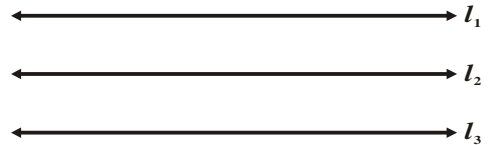
1. $B + 2A = 90^\circ$
2. $A + 2B = 90^\circ$
3. $A = 3B$
4. $B = 3A$

Q22. The factors of $x^2 - 41x - 450$ are :

1. $(x - 50)$ and $(x - 9)$
2. $(x + 50)$ and $(x - 9)$
3. $(x - 50)$ and $(x + 9)$
4. cannot be found

Q23. Given $l_1 \parallel l_2 \parallel l_3$. The figure contains only :

1. two pairs of parallel lines
2. three pairs of parallel lines
3. four pairs of parallel lines
4. six pairs of parallel lines.



Q24. Which of the following is true?

1. Similar triangles are always congruent
2. Congruent triangles need not be similar
3. Congruent triangles must be similar
4. Non-similar triangles can be congruent

Q25. If a_1, a_2, a_3, \dots upto a_{21} are in A.P. with common difference d , then a_1, a_5, a_9, a_{13} :

1. must be in A.P. with common difference $16d$
2. must be in A.P. with common difference d
3. must be in A.P. with common difference $4d$
4. may not be in A.P.

Q26. A point is on the x - axis at a distance of 5 units from the origin. Its coordinates must be:

1. (5, 0) only
2. (5, 5) only
3. (-5, 0) only
4. (5, 0) or (-5, 0)

Q27. The median of the numbers 4, 15, 19, 21, 6 is :

1. 19
2. 15
3. 15.5
4. 17

Q28. If $ABCD$ is a parallelogram and AC and BD intersect at E then,

1. $AE = EC$ but $BE \neq DE$
2. $BE = DE$ but $AE \neq EC$
3. $AE = EC$ and $BE = DE$
4. $AE > DE$ and $CE = BE$

Q29. AD is a diameter of a circle and AB is a chord. If $AD=34$ cm, $AB=30$ cm, the distance of AB (in cm) from the centre of the circle is :

1. 17
2. 15
3. 8
4. 4`

Q30. The product of a non-zero rational and an irrational number is :

1. always irrational
2. always rational
3. rational or irrational
4. one

Q31. If the probability of an event is p , the probability of its complementary event will be :

1. $p-1$
2. $1-p$
3. p
4. $1-\frac{1}{p}$

Q32. If $\sin \theta = \cos \theta$ then θ equals to:

1. 30°
2. 45°
3. 60°
4. 90°

Q33. From a point A , the length of tangent to a circle is 30 cm and the distance of the point from the centre of the circle is 34 cm, then radius of the circle must be:

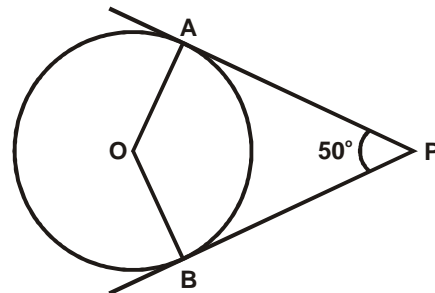
1. 16 cm
2. 32 cm
3. 5 cm
4. 64 cm

Q34. AOB is a sector of a circle of radius 4 cm subtending an angle of 45° at the centre 'O' of the circle. Area of the sector, in cm^2 , is :

1. π
2. 2π
3. 3π
4. 4π

Q35. In the figure, two tangents PA and PB are drawn to the circle with centre O . Tangents are inclined at an angle of 50° at P . Then measure of $\angle AOB$ is :

1. 100°
2. 130°
3. 140°
4. 150°

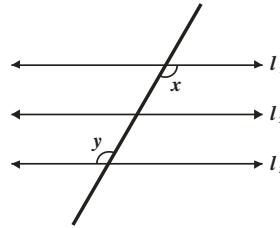


Q36. In quadrilateral $ABCD$, P , Q , R and S are mid-points of AB , BC , CD and AD respectively, then :

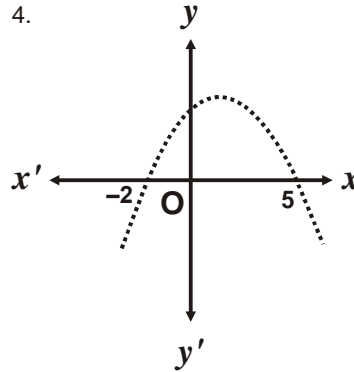
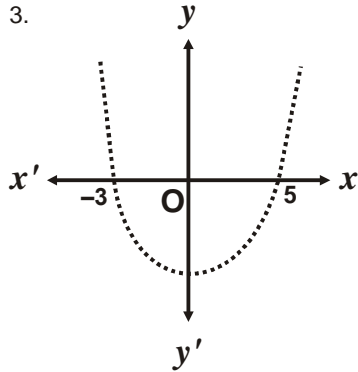
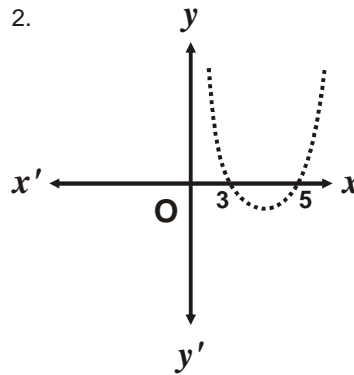
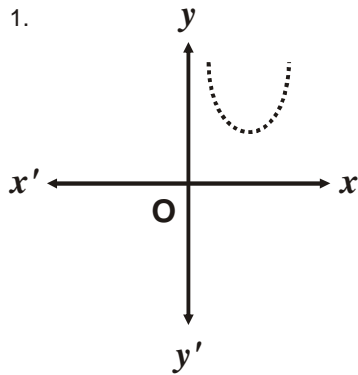
1. $PR \perp SQ$
2. PR and SQ bisect each other
3. PR bisects SQ but SQ does not bisect PR
4. SQ bisects PR but PR does not bisect SQ

Q37. Given $l_1 \parallel l_2 \parallel l_3$. Which of the following is true? (x and y are the measures of the angles indicated in the figure).

1. $x > y$
2. $x = y$
3. $x + y = 180$
4. $x < y$



Q38. Which graph represent the polynomial $x^2 - 2x - 15$?

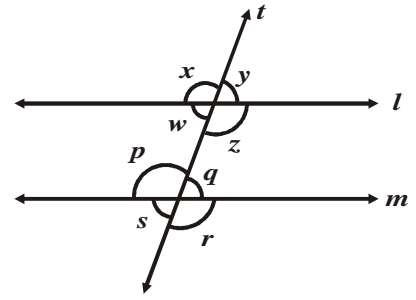


Q39. A point lies in a Cartesian plane. It does not lie in any of its four quadrants. It lies on :

1. origin
2. x - axis only
3. y - axis only
4. either x - axis or on y - axis

Q40. If $l \parallel m$ and t is a transversal, then which one of the following is NOT correct?

1. $x = p = r$
2. $y = q = s$
3. $w = q = y$
4. $s = q = z$



Q41. The perimeter of an equilateral triangle is 60m. The area is :

1. $10\sqrt{3} \text{ m}^2$
2. $15\sqrt{3} \text{ m}^2$
3. $20\sqrt{3} \text{ m}^2$
4. $100\sqrt{3} \text{ m}^2$

Q42. If the HCF of 65 and 117 is expressible in the form $65m - 117$, then the value of m is :

1. 4
2. 2
3. 1
4. 13

Q43. A letter is selected at random from the letters of the word 'ASSASSINATION'. The probability that the selected letter is NOT 'S' is:

1. $\frac{4}{13}$
2. $\frac{1}{2}$
3. $\frac{9}{13}$
4. $\frac{13}{9}$

Q44. If in a $\triangle ABC$, right angled at A, $\angle B = 30^\circ$ and $AC = 5$ cm, then BC will be of length:

1. $\frac{5}{2}$ cm
2. 5 cm
3. 10 cm
4. $\sqrt{5}$ cm

Q45. Which one of the following is a factor of the polynomial $x^4 + x^3 + 2x^2 + 5x - 9$?

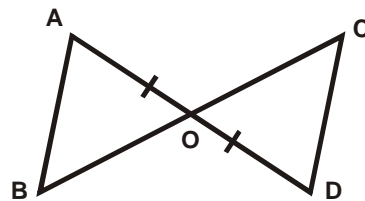
1. $x - 1$
2. $x + 1$
3. $x - 3$
4. $x + 3$

Q46. The vertices of $\triangle ABC$ are (3, 2), (3, 6) and (7, 6). The triangle ABC must be : The vertices of $\triangle ABC$ are (3, 2), (3, 6) and (7, 6). The triangle ABC must be :

1. equilateral
2. right angled but not isosceles
3. isosceles but not right angled
4. right angled and isosceles

Q47. In the figure, $AB \parallel CD$ and $AO = DO$.
By which Congruence rule $\triangle AOB \cong \triangle DOC$?

1. SSS
2. SAS
3. RHS
4. ASA



Q48. A quadratic equation whose roots are 3 and 5, is:

1. $x^2 + 8x + 15 = 0$
2. $x^2 - 8x + 15 = 0$
3. $x^2 - 8x - 15 = 0$
4. $x^2 + 8x - 15 = 0$

Q49. What is the coordinate of the centroid of a triangle whose vertices are (3, 4), (1, 3) and (2, 5) ?

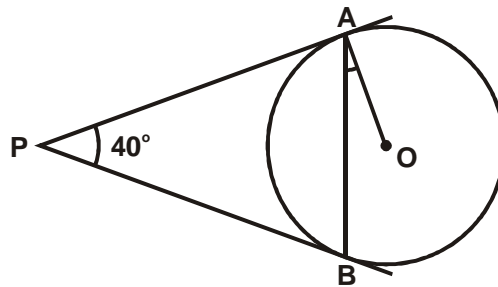
1. (2, 4)
2. (2, 2)
3. (3, 4)
4. (12, 3)

Q50. If the symbols have the usual meanings, the step-deviation formula for calculating mean of a grouped frequency distribution is :

1. $\bar{x} = a + h \left(\frac{\sum fu}{\sum f} \right)$
2. $\bar{x} = (a + h) \left(\frac{\sum fu}{\sum f} \right)$
3. $\bar{x} = a + h + \frac{\sum fu}{\sum f}$
4. $\bar{x} = a - h \left(\frac{\sum fu}{\sum f} \right)$

Q51. In the figure, PA and PB are tangent to circle 'O', if $\angle APB = 40^\circ$, then $\angle BAO$ is equal to :

1. 20°
2. 10°
3. 30°
4. 35°



Q52. The ratio of the volume of a cylinder and a cone having the same radius and same height is :

1. 1 : 3
2. 3 : 1
3. $1 : 3^3$
4. $3^3 : 1$

Q53. $\frac{2^5 \times 3^4 \times 5^6}{64 \times 625 \times 27} =$

1. $\frac{325}{2}$
2. 37.5
3. $\frac{75}{4}$
4. $\frac{125}{8}$

Q54. A girl has 4 coins of Rs 5 each and 3 coins of Rs 10 each, in her pocket. She randomly draws a coin from her pocket.

Rohan says : Probability of drawing a coin of Rs 10 is more because it is of bigger denomination than the coin of Rs 5.

Sheela says : Probability of drawing a coin of Rs 5 is more than that of the coin of Rs 10 as the number of coins of Rs 5 is more.

Which of the following statements is true?

1. Rohan is correct
2. Sheela is correct
3. Both are incorrect
4. Both are correct

Q55. The value of $\frac{2 \tan 30^\circ}{1 - \tan^2 30^\circ}$ is :

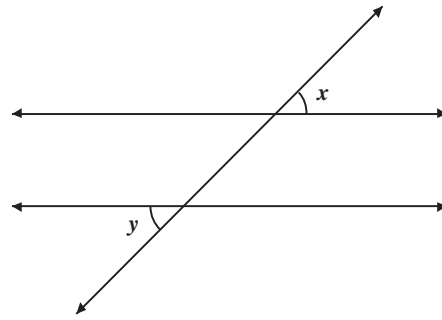
1. $\cos 60^\circ$
2. $\sin 60^\circ$
3. $\tan 60^\circ$
4. $\sin 30^\circ$

Q56. The sum of the series $1 + 2 + 3 + \dots + 100$ equals to :

1. 106
2. 5050
3. 10000
4. 10006

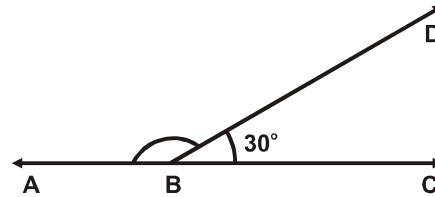
Q57. In the figure, x and y form a pair of

1. vertically opposite angles
2. alternate exterior angles
3. corresponding angles
4. alternate interior angles



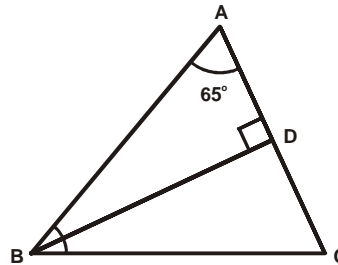
Q58. In the given figure $\angle ABD =$

1. 70°
2. 120°
3. 150°
4. 330°



Q59. In $\triangle ABC$, BD is the bisector of $\angle B$, and $BD \perp AC$. Then $\angle DBC =$

1. 50°
2. 155°
3. 25°
4. 65°



Q60. In the figure, AOB is diameter and $BC = OB$, then $\angle BAC$ is :

1. 20°
2. 30°
3. 45°
4. 60°

