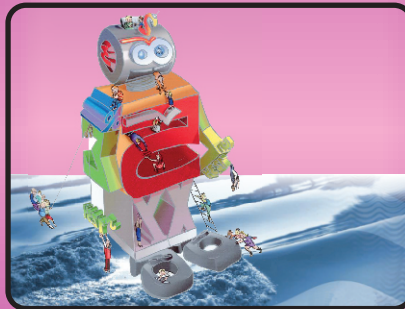


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OLYMPIAD EXPLORER



Workbook for

Nationwide Interactive **MATHS** Olympiad & Other
National/International Olympiads/Talent Search Exams.

Based on CBSE, ICSE, GCSE, State Board Syllabus & NCF (NCERT)

100's of Q's with answers

- Chapterwise Practice Q's
- Revision Q's
- Sample Paper



Class

8

EDUHEAL FOUNDATION

• LEARNING FOR LIFE •

EduHeal Foundation conducts 5 Olympiads annually reaching out to 3,500 + Schools
• 4 Lakh + Students • 50,000 Coordinating Teachers and having 500 Resource persons
in English / Maths / Science / Biotech / Computer & 300 Regional Coordinators.

PRIZES



WORKSHOP • TEACHER TRAINING PROG. • MAGAZINE/LAB GRANT • PRINCIPAL LEADERSHIP AWARD.

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SYLLABUS GUIDELINES

Based on CBSE, ICSE & GCSE Syllabus & NCF guidelines devised by NCERT.

Number System

(i) Rational Numbers:

- Properties of rational numbers. (including identities). Using general form of expression to describe properties.
- Consolidation of operations on rational numbers.
- Representation of rational numbers on the number line.
- Between any two rational numbers there lies another rational number (Making children see that if we take two rational numbers then unlike for whole numbers, in this case you can keep finding more and more numbers that lie between them.)
- Word problem (higher logic, two operations, including ideas like area)

(ii) Powers

- Integers as exponents.
- Laws of exponents with integral powers

(iii) Squares, Square roots, Cubes, Cube roots.

- Square and Square roots
- Square roots using factor method and division method for numbers containing (a) no more than total 4 digits and (b) no more than 2 decimal places
- Cubes and cubes roots (only factor method for numbers containing at most 3 digits)
- Estimating square roots and cube roots. Learning the process of moving nearer to the required number.

(iv) Playing with numbers

- Writing and understanding a 2 and 3 digit number *in generalized form* ($100a + 10b + c$, where a, b, c can be only digit 09) and engaging with various puzzles concerning this.

(Like finding the missing numerals represented by alphabets in sums involving any of the four operations.) Children to solve and create problems and puzzles.

- Number puzzles and games
- Deducing the divisibility test rules of 2,3,5,9,10 for a two or three digit number expressed in the general form.

Algebra

(i) Algebraic Expressions

- Multiplication and division of algebraic exp. (Coefficient should be integers)
- Some common errors $2 + x \neq 2x$, $7x + y \neq 7xy$
- Identities $(a \pm b)^2 = a^2 \pm 2ab + b^2$, $a^2 - b^2 = (a - b)(a + b)$ Factorisation (simple cases only) as examples of the following types $a(x + y)$, $(x \pm y)^2$, $a^2 - b^2$, $(x + a)(x + b)$
- Solving linear equations in one variable in contextual problems involving multiplication and division (word problems) (avoid complex coefficient in the equations).

Ratio and Proportion

- Slightly advanced problems involving applications on percentages, profit and loss, overhead expenses, discount, tax.
- Difference between simple and compound interest (compounded yearly upto 3 years or half yearly upto 3 steps only), Arriving at the formula for compound interest through patterns and using it for simple problems.
- Direct variation : Simple and direct word problems.
- Inverse variation : Simple and direct word problems.
- Time and work problems: Simple and direct word problems.

Geometry

(i) Understanding shapes

- Properties of quadrilaterals – Sum of angles of a quadrilateral is equal to 360° . (By verification)
- Properties of parallelogram (By verification)
- (i) Opposite sides of a parallelogram are equal,
- (ii) Opposite angles of a parallelogram are equal.
- (iii) Diagonals of a parallelogram bisect each other. [Why (iv), (v) and (v) follow from (ii)]
- (iv) Diagonals of a rectangle are equal and bisect each other.
- (v) Diagonals of a rhombus bisect each other at right angles.
- (vi) Diagonals of a square are equal and bisect each other at right angles.

(ii) Representing 3D in 2D

- Identify and Match pictures with objects [more complicated e.g. nested, joint 2D and 3D shapes (not more than 2)]
- Drawing 2D representation of 3D objects (Continued and extended)
- Counting vertices, edges and faces and verifying Euler's relation for 3D figures with flat faces (cubes, cuboids, tetrahedrons, prisms and pyramids).

(iii) Construction:

- Construction of Quadrilaterals:
- Given four sides and one diagonal.
- Three sides and two diagonals.
- Three sides and two included angles.
- Two adjacent sides and three angles.

Mensuration

- (i) Area of a trapezium and a polygon.

- (ii) Concept of volume, measurement of volume using a basic unit, volume of a cube, cuboid and cylinder.
- (iii) Volume and capacity (measurement of capacity).
- (iv) Surface area of a cube, cuboid and cylinder.

Data handling

- (i) Ungrouped data, arranging it into groups, representation of grouped data through bargraphs, constructing and interpreting bargraphs.
- (ii) Simple Pie charts with reasonable data numbers
- (iii) Consolidating and generalising the notion of chance in events like tossing coins, dice etc. Relating it to chance in life events. Visual representation of frequency outcomes of repeated throws of the same kind of coins or dice. Throwing a large number of identical dice/coins together and aggregating the result of the throws to get large number of individual events. Observing the aggregating numbers over a large number of repeated events. Comparing with the data for a coin. Observing strings of throws, notion of randomness.

Introduction to graphs:

Preliminaries:

- (i) Axes (Same units), Cartesian Plane.
- (ii) Plotting points for different kind of situations (perimeter Vs length for squares, area as a function of side of a square, plotting of multiples of different numbers, simple interest Vs number of years etc.).
- (iii) Reading off from the graphs.
 - Reading of linear graphs.
 - Reading of distance vs time graph.



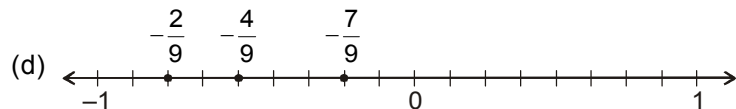
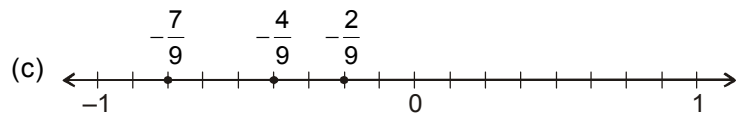
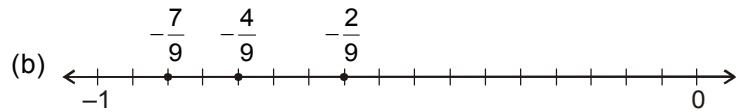
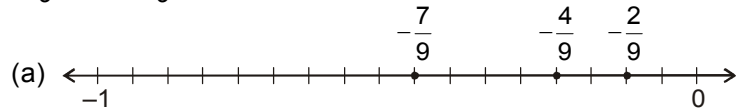
- Q.1.** Some statements are given as
- (i) The multiplicative inverse of a negative rational number is negative.
 - (ii) The multiplicative inverse of x is $-x$.
 - (iii) The additive inverse of $-p$ is p .
 - (iv) Subtraction is associative for rational numbers.
- Which two given statements are **incorrect**?
- (a) ii and iii
 - (b) ii and iv
 - (c) i and iii
 - (d) i and iv
- Q.2.** Which of the following statements is **correct**?
- (a) The additive inverse of number 0 does not exist.
 - (b) The additive inverse of number 1 does not exist.
 - (c) The multiplicative inverse of number 0 does not exist.
 - (d) The multiplicative inverse of number 1 does not exist.
- Q.3.** If $\frac{p}{q} \times \frac{a}{b} = 1$, where $\frac{p}{q}$ and $\frac{a}{b}$ are rational numbers, then what is the multiplicative inverse of $\frac{p}{q}$?
- (a) $\frac{a}{b}$
 - (b) $-\frac{p}{q}$
 - (c) $-\frac{q}{p}$
 - (d) $\frac{b}{a}$
- Q.4.** What is the multiplicative inverse of $3\frac{1}{4}$?
- (a) 4
 - (b) $\frac{4}{3}$
 - (c) $\frac{4}{13}$
 - (d) None of these
- Q.5.** What is the additive inverse of $2\frac{1}{2}$?
- (a) $-\frac{5}{2}$
 - (b) $-\frac{1}{2}$
 - (c) $\frac{1}{2}$
 - (d) -2

- Q.6.** Which property is illustrated by the relation $\frac{a}{b} + 0 = \frac{a}{b}$, where a and $b \neq 0$ are integers?
- (a) Commutative property of rational numbers under addition.
 (b) Associative property of rational numbers under addition.
 (c) Multiplicative identity of rational numbers.
 (d) Additive identity of rational numbers.
- Q.7.** Which of the following relations exhibits the commutative property of rational numbers under multiplication?
- (a) $\left(-\frac{21}{5}\right) \times \frac{6}{7} = \frac{6}{7} \times \left(-\frac{21}{5}\right)$ (b) $\left(\frac{3}{8} \times \frac{8}{7}\right) \times \frac{-6}{11} = \frac{3}{5} \times \left(\frac{8}{7} \times \frac{-6}{11}\right)$
 (c) $7\frac{1}{2} \times 1 = 7\frac{1}{2}$ (d) $-\frac{9}{8} \times \frac{8}{-9} = 1$
- Q.8.** Which of the following relations illustrates the associative property of rational numbers under addition?
- (a) $\frac{1}{2} + \frac{-7}{5} = -\frac{7}{5} + \frac{1}{2}$
 (b) $\frac{1}{3} + \left(\frac{2}{5} + \frac{-11}{8}\right) = \left(\frac{1}{3} + \frac{2}{5}\right) + \frac{-11}{8}$
 (c) $-\frac{6}{7} + 0 = -\frac{6}{7}$
 (d) $\left(-\frac{8}{9}\right) + \frac{8}{9} = 0$
- Q.9.** What is the product of the additive inverse of -0.8 and the multiplicative inverse of 0.2 ?
- (a) 3 (b) -5
 (c) -6 (d) 4
- Q.10.** If x , y and z be any three rational numbers, then $(x + y) + z = x + (y + z)$.
 The property of rational numbers is called
- (a) Closure property of addition
 (b) Commutative property of addition
 (c) Associative property of addition
 (d) None of these
- Q.11.** If $x + 0 = 0 + x = x$, where x is a rational number, then 0 is called
- (a) Identity element for addition of rational numbers
 (b) Identity element for multiplication of rational numbers
 (c) Additive inverse of x
 (d) Reciprocal of x

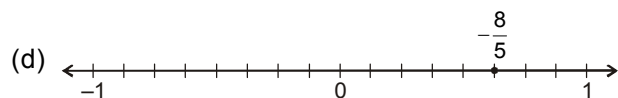
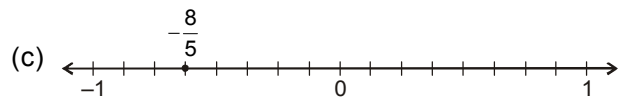
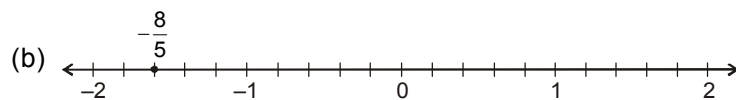
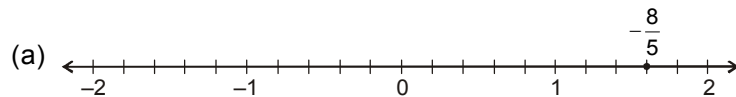
- Q.12.** The product of $-\frac{1}{3}$ and $-\frac{1}{4}$ is
- (a) $\frac{-1}{12}$ (b) $\frac{1}{12}$
 (c) $\frac{1}{3}$ (d) $\frac{1}{4}$
- Q.13.** $\frac{2}{5} \div \frac{-5}{7}$ is equal to
- (a) $\frac{-2}{7}$ (b) $\frac{2}{7}$
 (c) $\frac{12}{25}$ (d) $\frac{-14}{25}$
- Q.14.** The sum of $\frac{-3}{5}$ and $\frac{13}{5}$ is equal to
- (a) 2 (b) -2
 (c) $\frac{16}{5}$ (d) None of these
- Q.15.** The expression $\left(\frac{6}{11} \times \frac{3}{2}\right) + \left(-4 \times \frac{6}{11}\right)$ is an equivalent form of which of the following expression?
- (a) $\frac{3}{2} \times \left(\frac{6}{11} - 4\right)$ (b) $\left(-4 \times \frac{3}{2}\right) \times \frac{6}{11}$
 (c) $\frac{6}{11} \times \left(\frac{3}{2} + 4\right)$ (d) $\frac{6}{11} \times \left(\frac{3}{2} - 4\right)$
- Q.16.** Rational numbers are closed under addition because
- (a) Any two rational numbers can be added in any order.
 (b) The sum of any two rational numbers is again a rational number
 (c) The sum of any three rational numbers is independent of the way the three numbers are grouped together
 (d) The sum of 0 and any rational number is the same rational number
- Q.17.** Which of the following sets of rational numbers lies between the rational numbers $-\frac{1}{3}$ and $-\frac{1}{8}$?
- (a) $-\frac{11}{24}$ and $-\frac{13}{24}$ (b) $-\frac{1}{24}$ and $-\frac{3}{24}$

(c) $-\frac{5}{24}$ and $-\frac{7}{24}$ (d) $-\frac{17}{24}$ and $-\frac{1}{24}$

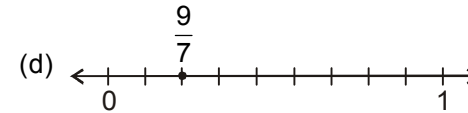
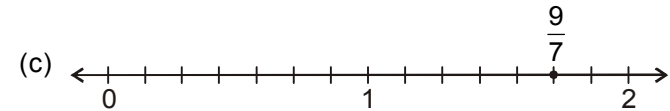
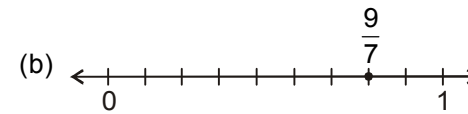
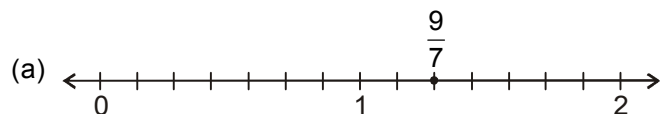
Q.18. Which number line correctly shows the rational numbers $-\frac{2}{9}$, $-\frac{4}{9}$, and $-\frac{7}{9}$?



Q.19. Which number line correctly shows the rational number $-\frac{8}{5}$?



Q.20. Which number line correctly shows the rational number $\frac{9}{7}$?



Q.21. Some statements are given as

- There are finite integers between any two different integers.
- There are finite rational numbers between any two different rational numbers.
- There are infinite rational numbers between any two different integers.
- There are infinite integers between any two different rational numbers.

Which two given statements are **correct**?

- (a) i and iii (b) ii and iv
(c) i and iv (d) ii and iii

Q.22. $-\frac{5}{7}$ lies

- To the left 0 on the number line
- To the right 0 on the number line
- Sometimes to the left and sometime to the right of 0 on the number line
- None of these

Q.23. 1 is called

- Identity element for multiplication of rational numbers
- Identity element for addition of rational numbers
- Identity element for subtraction of rational numbers
- None of these

Q.24. Multiplicative inverse of a negative rational number is

- A positive rational number
- A negative rational number
- Neither positive nor negative
- None of these

- Q.25.** Multiplicative inverse of $\frac{0}{1}$ is
 (a) 0 (b) 1
 (c) -1 (d) Not determinable
- Q.26.** $\frac{7}{8} \times \frac{1}{2} + \frac{7}{8} \times \frac{1}{2}$ is equal to
 (a) $\frac{7}{8}$ (b) $\frac{7}{16}$
 (c) $\frac{14}{8}$ (d) None of these
- Q.27.** Which property is used in the identity given below:
 $x + y = y + x$
 (a) Associative property
 (b) Commutative property of addition
 (c) Distributive property
 (d) Reflexive property
- Q.28.** Which of the following illustrates the inverse property of addition?
 (a) $3 - 3 = 0$ (b) $3 + 3 = 6$
 (c) $3 + 0 = 0$ (d) $3 - 0 = 3$
- Q.29.** $9\frac{3}{4} + 11\frac{1}{2} + 8\frac{1}{4}$ equals
 (a) 28.5 (b) 27.5
 (c) 30.5 (d) 29.5
- Q.30.** The difference between the largest and the smallest of the fractions $\frac{5}{8}, \frac{7}{12}, \frac{1}{3}, \frac{2}{5}$ is
 (a) $\frac{1}{4}$ (b) $\frac{5}{24}$
 (c) $\frac{7}{24}$ (d) $\frac{13}{21}$



ANSWERS

1. (b) 2. (c) 3. (a) 4. (c) 5. (a) 6. (d) 7. (a) 8. (b)
 9. (d) 10. (c) 11. (a) 12. (b) 13. (d) 14. (a) 15. (d) 16. (b)
 17. (c) 18. (c) 19. (b) 20. (a) 21. (a) 22. (a) 23. (a) 24. (b)
 25. (d) 26. (a) 27. (b) 28. (a) 29. (d) 30. (c)



- Q.1.** Anil was given his weekly allowance on Monday. Out of this amount, he spent Rs. 20 on Monday. He spent half the remaining amount on Tuesday. On Wednesday, he spent half the amount that he had. After this, he was left with Rs. 45.

If Anil's weekly allowance be taken as x , then which equation correctly represents the given situation?

(a) $4x - \text{Rs. } 20 = \text{Rs. } 45$ (b) $\frac{x + \text{Rs. } 20}{4} = \text{Rs. } 45$

(c) $x - \text{Rs. } 20 = \text{Rs. } 45$ (d) $\frac{x - \text{Rs. } 20}{4} = \text{Rs. } 45$

- Q.2.** A square and a rectangle have equal perimeters. Each side of the square measures 45 cm, while the length of the rectangle is 10 cm more than its breadth.

If the length of the rectangle is assumed as x , then which equation correctly represents the given situation?

(a) $2 \times (x + x - 10 \text{ cm}) = 180 \text{ cm}$

(b) $4 \times (x + x + 10 \text{ cm}) = 180 \text{ cm}$

(c) $2 \times (x + x + 10 \text{ cm}) = 180 \text{ cm}$

(d) None of these

- Q.3.** Three numbers a , b and c are such that a and b are the ratio 4 : 5 and c is 5 less than a . The sum of the three numbers is 60.

If the value of b is taken as $5p$, then which situation correctly represents the given information?

(a) $4p + 5p + 5p - 5 = 60$ (b) $4p + 5p + 5p + 5 = 60$

(c) $4p + 5p + 4p - 5 = 60$ (d) None of these

- Q.4.** What is the value of p in the equation $\frac{7}{2}p + 11 = 53$?

(a) 10

(b) 12

(c) 14

(d) 16

- Q.5.** What is the value of a in the equation $1.5a = \frac{7}{2}$?

(a) $\frac{7}{3}$

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

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

(d) None of these

- Q.6.** What is the value of z in the equation $\frac{3z+15}{1-2z} - 4 = 0$?
 (a) -3 (b) -1
 (c) 2 (d) 4
- Q.7.** What is the value of x in the equation $\frac{5-3x}{6x} = \frac{9}{2}$?
 (a) $\frac{1}{3}$ (b) $\frac{1}{4}$
 (c) $\frac{1}{5}$ (d) $\frac{1}{6}$
- Q.8.** What is the value of x in the equation $\frac{4-3x}{5} + x = \frac{7+9x}{10}$?
 (a) $\frac{1}{4}$ (b) $\frac{1}{5}$
 (c) $\frac{1}{6}$ (d) $\frac{1}{7}$
- Q.9.** The solution of the equation $4x - 8 = 2x + 6$ is
 (a) $x = 5$ (b) $x = 6$
 (c) $x = 7$ (d) $x = -4$
- Q.10.** The root of the equation $2x + \frac{3}{10} = \frac{-5}{2}$ is
 (a) $x = \frac{2}{5}$ (b) $x = \frac{5}{2}$
 (c) $x = \frac{-5}{2}$ (d) $x = -\frac{7}{5}$
- Q.11.** If $x - \frac{15}{2} = 19$, then x is equal to
 (a) $\frac{51}{2}$ (b) $\frac{-51}{2}$
 (c) $\frac{2}{51}$ (d) $\frac{53}{2}$
- Q.12.** If $25y - 80 = -50$, then the value of y is
 (a) 15 (b) 12
 (c) 25 (d) 1.2
- Q.13.** If $5(z - 3) - 4(z - 2) = 0$, then the value of z is
 (a) 7 (b) -7
 (c) 8 (d) -8

- Q.14.** What is the value of x in the equation $2(0.75x + 1) = 0.04(50x - 25)$?
 (a) 9 (b) 8
 (c) 7 (d) 6
- Q.15.** If the sum of three consecutive odd numbers is 33, then what is the mean of these numbers?
 (a) 9 (b) 10
 (c) 11 (d) 12
- Q.16.** Ganesh has Rs. 120 in the piggy bank in the denominations of Rs. 5 and Rs. 2 coins only. The ratio of the number of Rs. 5 coins to Rs. 2 coins is 6 : 5.
 What is the total number of coins in Ganesh's piggy bank?
 (a) 25 (b) 27
 (c) 30 (d) 33
- Q.17.** The sum of the digits of a two digit number is 9. If the digits are interchanged, then the resulting number is 9 less than the original number.
 What is the original number?
 (a) 72 (b) 54
 (c) 63 (d) 45
- Q.18.** The present age of Rohan and Rohit are in the ratio 11 : 6. Six year ago, Rohan was twice as old as Rohit.
 What is the present age of Rohit?
 (a) 30 years (b) 36 years
 (c) 28 years (d) 32 years
- Q.19.** The numerator of a fraction is greater than its denominator by 4. If the numerator is decreased by 6 and the denominator is increased by 3, then the fraction becomes $\frac{3}{4}$.
 What is the fraction?
 (a) $\frac{23}{14}$ (b) $\frac{21}{17}$
 (c) $\frac{17}{21}$ (d) None of these
- Q.20.** The present ages of Sohan and Mohan are in the ratio 6 : 7. Five years ago, the ratio of their ages was 11 : 13.
 What is the mean of the ages of Sohan and Mohan?
 (a) 50 years (b) 65 years
 (c) 70 years (d) 75 years

- Q.21.** The perimeter of a rectangle is 28 cm. If the length and breadth of the rectangle are increased by 4 cm each, then the ratio of the breadth and the length becomes 5 : 6. What is the area of the rectangle?
 (a) 42 cm² (b) 44 cm²
 (c) 46 cm² (d) 48 cm²
- Q.22.** A motorboat covers a certain distance downstream in a river in 4 hours. It covers the same distance upstream in 5 hours. The speed of the motorboat in still water is 27 km/h. What is the speed of the stream?
 (a) 6 km/h (b) 5 km/h
 (c) 4 km/h (d) 3 km/h
- Q.23.** If $\frac{5m}{6} + \frac{3m}{4} = \frac{19}{12}$ then the value of m is
 (a) -1 (b) -2
 (c) 1 (d) 2
- Q.24.** If $y - \frac{y}{2} = \frac{7}{2}$, then the value of y is
 (a) 5 (b) 6
 (c) -6 (d) 7
- Q.25.** If $\frac{a-1}{5} = 3 - \left(\frac{a-9}{2}\right)$, then the value of a is
 (a) 11 (b) 9
 (c) 10 (d) 8
- Q.26.** Five times the number increased by 4 is equal to 39. The number is
 (a) 4 (b) 5
 (c) 7 (d) 6
- Q.27.** The sum of three consecutive even numbers is 42. The numbers are
 (a) 10, 12, 14 (b) 12, 14, 16
 (c) 14, 16, 18 (d) 16, 18, 22
- Q.28.** If 10 is added to four times a certain number the result is 5 less than five times the number. The number is
 (a) 30 (b) 15
 (c) 10 (d) 25

- Q.29.** Three fourths of a number is 60 more than its one-third. The number is,
 (a) 108 (b) 84
 (c) 144 (d) 116
- Q.30.** The sum of a number n and its reciprocal is 18. Then the equation showing the relation is
 (a) $n + \frac{1}{n} = 18$ (b) $n - 18 = \frac{1}{n}$
 (c) $n - \frac{1}{n} = 18$ (d) $n + 18 = \frac{1}{n}$



ANSWERS

1. (d) 2. (a) 3. (c) 4. (b) 5. (a) 6. (b) 7. (d) 8. (b)
 9. (c) 10. (d) 11. (d) 12. (d) 13. (a) 14. (d) 15. (c) 16. (d)
 17. (b) 18. (b) 19. (b) 20. (b) 21. (d) 22. (d) 23. (c) 24. (d)
 25. (a) 26. (c) 27. (b) 28. (b) 29. (c) 30. (a)



NATIONWIDE INTERACTIVE MATHS OLYMPIAD (NIMO) SAMPLE PAPER

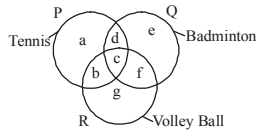
Total duration : 60 Minutes

Total Marks : 50

SECTION - A

MENTAL ABILITY

- Given is the set : (6, 13, 22), choose the similar set?
(a) (6, 13, 27) (b) (10, 16, 28)
(c) (11, 18, 27) (d) None of these
- Five boys took part in a race. Raj finished before Mohit but behind Gaurav. Ashish finished before Sanchit but behind Mohit. Who won the race?
(a) Raj (b) Gaurav (c) Mohit (d) None of these
- The figure given below consists of three intersecting circles which represent sets of students who play Tennis, Badminton and Volley Ball. Each region in the figure is represented by a small letter. On the basis of this figure, answer the following question.



Which letter represents the set of persons who play Tennis and Badminton but not Volley Ball?

- (a) b (b) c (c) d (d) None of these
- If \div means $+$, $-$ means \div , \times means $-$ and $+$ means \times , then $\frac{(36 \times 4) - 8 \times 4}{4 + 8 \times 2 + 16 \div 1} = ?$
(a) 0 (b) 8 (c) 12 (d) None of these
 - Choose the suitable figure, so that a series is formed by the figures A, B, C, D taken in order.

(a) (b) (c) (d) None of these
 - If BOMBAY is written as MYMYMY, how will TAMILNADU be written in that code?
(a) TIATITIA (b) MNUMNUMNU
(c) IATITIAT (d) None of these
 - If MACHINE is coded as 19-7-9-14-15-20-11, how will you code DANGER?
(a) 10-7-20-13-11-24 (b) 11-7-20-16-11-24

- (c) 13-7-20-9-11-25 (d) None of these
- In a certain code language, 'Mink Yang Pe' means 'Fruits are ripe', 'Pe Lao May Mink' means 'Oranges are not ripe' and 'May Pe Nue Mink' means 'Mangoes are not ripe'. Which word in that language means 'Mangoes'?
(a) May (b) Pe (c) Nue (d) None of these
 - Neelam, who is Deepak's daughter, says to Deepika, "Your mother Rekha is the younger sister of my father who is the third child of Ramlal." How is Ramlal related to Deepika?
(a) Father-in-Law (b) Father
(c) Grandfather (d) None of these

Directions : In the following question. Figures A, B, C and D constitute the problem set while figures (a), (b) and (c) constitutes the Answer Set. There is definite relationship between figures A and B. Establish a similar relationship between figures C and D by choosing a suitable figure (D) from the Answer set.

- Problem set**

Answer set

- (a) (b) (c) (d) None of these
- Rectangle ABCD has side AB and BC in the ratio 3 : 1. If the diagonal AC is 5, then the area of the rectangle is
(a) 9 (b) $\frac{15}{2}$ (c) 8 (d) None of these
 - If $\frac{2x-3y}{x+2y} = 3$, then the numerical value of $\frac{2x+y}{3x+10y}$ is
(a) 1 (b) $\frac{1}{2}$ (c) $\frac{2}{3}$ (d) None of these
 - The area of one side of a rectangular box is 126 cm^2 . The area of another side of the rectangular box is 153 cm^2 . The area of the top of the rectangular box is 238 cm^2 . Then the volume of the box is
(a) 2140 cm^3 (b) 2142 cm^3
(c) 2145 cm^3 (d) None of these
 - If $n = 5$ then the value of $(7n - 5)(n^2 - 5)(n^3 + 5)$ is
(a) 70000 (b) 78000 (c) 5000 (d) None of these
 - A square is divided into 4 identical rectangles as shown in the diagram.

The perimeter of each of the four rectangles is 30 units. What is the perimeter of the square?



- (a) 36 (b) 40 (c) 48 (d) None of these

16. The product of two numbers is 504 and each of the numbers is divisible by 6. Neither of the two number is 6. What is the larger of the two numbers?

- (a) 48 (b) 84 (c) 42 (d) None of these

17. If each interior angle of a regular polygon measures 150° , then the number of sides (n) is

- (a) 6 (b) 12 (c) 10 (d) None of these

18. If $\frac{x}{y} = 0.75$, then the value of $(x + 2y)/x$ equals

- (a) $\frac{11}{3}$ (b) $\frac{3}{11}$ (c) $\frac{11}{8}$ (d) None of these

19. Half of 2^{20} equals

- (a) 1^{10} (b) 1^{20} (c) 4.2^{17} (d) None of these

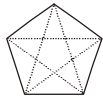
20. What is the units digit of 4^{2003} ?

- (a) 0 (b) 2 (c) 4 (d) None of these

21. If $20x - 25$ is expressed in the form $a(4x + b)$, then the value of $a + b$ is

- (a) -20 (b) -10 (c) 0 (d) None of these

22. (i) A regular polygon with five side has five diagonals, indicated by the dotted lines.



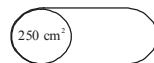
(ii) A regular polygon with six sides has nine diagonals, indicated by the dotted lines.



The number of diagonals that can be drawn in a regular polygon with twenty sides (icosagon), is

- (a) 190 (b) 180 (c) 170 (d) None of these

23. The area of the cross-section of a pipe is 250 cm^2 . Water flows through the pipe at a rate of 3 litres per second.



The speed at which the water flows through the pipe in cm/s is

- (a) 15 (b) 12 (c) 8 (d) None of these

24. The formula below can be used to determine f , the total braking

distance, in feet, that a car moving at n miles per hour will travel after the driver applies the brakes.

$$f = \frac{n^2}{20}$$

Using this formula, what is the total braking distance that a car moving at 60 miles per hour will travel after the driver applies the brakes?

- (a) 6 feet (b) 60 feet (c) 180 feet (d) None of these

25. In the formula $M = \frac{10n}{1+2n}$, n is any positive integer. If n increases, M will

- (a) decrease (b) increase
(c) stay the same (d) None of these

26. Rishi said that 12% of the oranges were not sold. Hari said that is the same as 360 oranges! How many oranges were sold?

- (a) 2400 (b) 2640 (c) 3000 (d) None of these

27. If $b = 3a$ and $c = 2b$, then $a + b + c$ is equal to

- (a) $6a$ (b) $8a$ (c) $10a$ (d) None of these

28. A regular six point star is formed by extending the sides of a regular hexagon. If the perimeter of the star is 96 cm then the perimeter of the hexagon (in cm) is



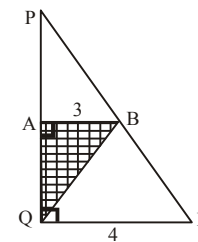
- (a) 30 (b) 36 (c) 48 (d) None of these

29. Anu took 60 minutes to cycle 25 kilometres after which she increased her average speed by 5 kilometres per hour.

How long will it take her to cover the next 25 kilometres if she maintains the new average speed?

- (a) 35 min (b) 40 min (c) 50 min (d) None of these

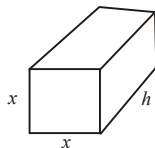
30. The area of the shaded triangle is $4\frac{1}{2} \text{ cm}^2$. Angles PQR and QAB are right angles. $QR = 4$ and $AB = 3$. then $\angle ABQ$ is



- (a) 15° (b) 30° (c) 45° (d) None of these

31. A rectangular right prism has the dimensions x cm by x cm by h cm.

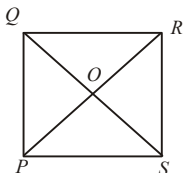
The surface area of the prism is $14x^2 \text{ cm}^2$.



Find h in terms of x .

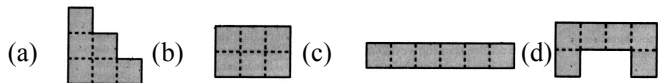
- (a) $3x$ (b) $\frac{x}{2}$ (c) $4x$ (d) None of these

32. The diagonals of square $PQRS$ intersect at O . Triangle SOR has area 16. The length of PQ is



- (a) 2 (b) 8 (c) 6 (d) None of these

33. All the shapes have the same area. Which shape has the smallest perimeter?



34. Which one of the following is an even number?

- (a) $2007^3 + 4$ (b) $2008^3 + 5$
(c) $2009^3 + 7$ (d) None of these

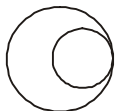
35. Each tyre of car A has circumference 200 cm. Each tyre of car B has circumference 250 cm. On a journey of 20 km, the difference in the number of revolutions made by a wheel of car A and a wheel of car B equals

- (a) 800 (b) 1000 (c) 2000 (d) None of these

36. Two-thirds of the members of a committee use three-quarters of the chairs in a room. What is the smallest number of members that the committee can consist of?

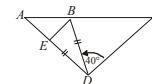
- (a) 6 (b) 8 (c) 9 (d) None of these

37. In the figure the diameter of the smaller circles is the radius of the bigger circle. The ratio of the area of the bigger circle to the area of the smaller circle equals



- (a) $\pi : 2\pi$ (b) $3 : 2$ (c) $4 : 1$ (d) None of these

38. In the figure given below, $AD = DC$; $ED = BD$ and $\angle BDC = 40^\circ$. Find $\angle ABE$.

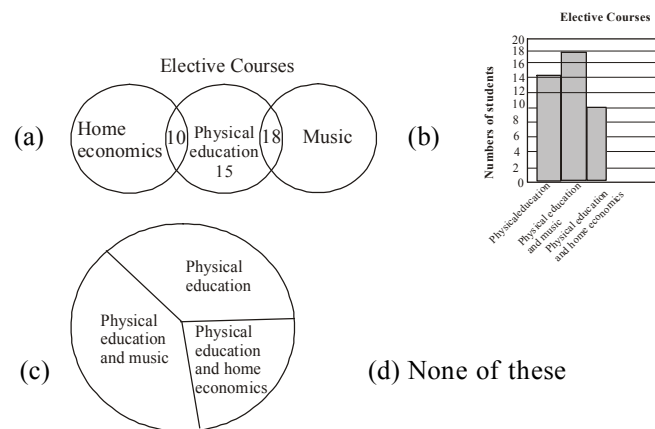


- (a) 10° (b) 20° (c) 30° (d) None of these

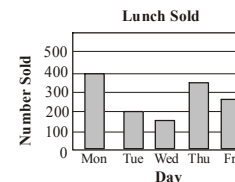
39. A counsellor at Learnium Middle School collected the following data about students taking elective courses.

Courses	Number of Students
Physical education only	15
Physical education and music	18
Physical education and home economics	10

Which graph best represents these data?



40. Following graph shows the number of lunches sold during a week



What was the daily average (mean) number of lunches sold during the week?

- (a) 270 (b) 250 (c) 225 (d) None of these
41. Which of the following ordered pairs represents a point in the third quadrant of a coordinate plane?
- (a) $(-5, -7)$ (b) $(-6, 4)$ (c) $(3, -2)$ (d) None of these
42. If $x + y + z = 0$ then the value of $x^3 + y^3 + z^3$ is

- (a) 0 (b) xyz (c) $3xyz$ (d) None of these

43. The list below shows the interest rates for car loans at four different car dealerships

$$7\frac{1}{2}\%, 7.4\%, 7\frac{3}{8}\%, 7.2\%$$

Which of the following lists show the interest rates in order from least to greatest?

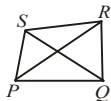
- (a) $7.2\%, 7\frac{3}{8}\%, 7.4\%, 7\frac{1}{2}\%$ (b) $7.2\%, 7.4\%, 7\frac{3}{8}\%, 7\frac{1}{2}\%$
 (c) $7\frac{1}{2}\%, 7.2\%, 7\frac{3}{8}\%, 7.4\%$ (d) None of these
44. The cube root of 0.006859 is
 (a) 0.019 (b) 1.9 (c) 0.19 (d) None of these
45. The value of $z^3 - 2z^2 - z + 2$ is
 (a) $(z-2)(z-1)(z+1)$ (b) $(z-2)(z-1)^2$
 (c) $(z-2)(z^2+1)$ (d) None of these

SECTION - C

INTERACTIVE SECTION

46. If the diagonals of a quadrilateral bisect each other, then the quadrilateral is a

- (a) Rhombus (b) Parallelogram
 (c) Trapezium (d) None of these



47. 120% of Nisha's weight equals 75% of Riya weight. The ratio of Nisha's weight to Riya's weight is

- (a) $\frac{5}{8}$ (b) $\frac{5}{6}$ (c) $\frac{1}{5}$ (d) None of these

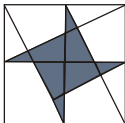
48. A rectangle is divided into four rectangles as shown. The areas of three of the rectangles are given. The area of the fourth rectangle is

- (a) 16 (b) 12
 (c) 15 (d) None of these

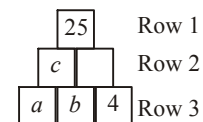
6	16
	32

49. In the diagram a corner of the shaded star is at the midpoint of each side of the large square. The fraction of the large square covered by the star is

- (a) $\frac{1}{5}$ (b) $\frac{1}{4}$
 (c) $\frac{1}{3}$ (d) None of these



50. The game Pyramaths works as follows : 2 adjoining block's sum is equal to the block above the 2 adjoining blocks, e.g. $a + b = c$.



If the sum of the numbers in row 3 is 17, then the value of a is

- (a) 2 (b) 3 (c) 5 (d) None of these

☺ END OF THE EXAM ☺

ANSWERS

- | | | | | |
|---------|---------|---------|---------|---------|
| 1. (c) | 2. (b) | 3. (c) | 4. (a) | 5. (b) |
| 6. (b) | 7. (a) | 8. (c) | 9. (c) | 10. (c) |
| 11. (b) | 12. (a) | 13. (b) | 14. (b) | 15. (c) |
| 16. (c) | 17. (b) | 18. (a) | 19. (c) | 20. (c) |
| 21. (c) | 22. (c) | 23. (b) | 24. (c) | 25. (b) |
| 26. (b) | 27. (c) | 28. (c) | 29. (c) | 30. (c) |
| 31. (a) | 32. (b) | 33. (b) | 34. (c) | 35. (c) |
| 36. (c) | 37. (c) | 38. (b) | 39. (a) | 40. (a) |
| 41. (a) | 42. (c) | 43. (a) | 44. (c) | 45. (a) |
| 46. (b) | 47. (a) | 48. (b) | 49. (b) | 50. (c) |