



# Young Scholars Foundation

**Prizes**

## MATHEMATICS

**GRADE  
9**

<p><b>1st Rank</b> Trip to Dubai</p> 	<p><b>2nd Rank</b> ₹ 25000</p>	<p><b>3rd Rank</b> ₹ 10000</p>
+	+	+
Gold Medal + Certificate of Excellence	Silver Medal + Certificate of Excellence	Bronze Medal + Certificate of Excellence

**4<sup>th</sup> TO 10<sup>th</sup>  
Rank  
Rs 1100**

+ Certificate of Excellence

**11<sup>th</sup> TO 50<sup>th</sup>  
Rank  
Wrist Watch**

+ Certificate of Excellence



### Instructions

Time : 1 hour

Maximum Marks : 100

- Maximum Time is 1 hour & You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
- Write your **Name, School Code, Class, Roll No.** and **Mobile Number** clearly on the **OMR Sheet** and do not forget to sign it.
- The Question Paper comprises four sections:  
**Mathematical Reasoning** (15 Questions), **General Maths** (15 Questions), **Logical Reasoning** (10 Questions) and **Wise Wizard** (10 Questions). Each question carries two marks.
- All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
- To mark your choice of answers by darkening the circles on the OMR Sheet, use **HB Pencil** or **Blue / Black ball point pen** only.

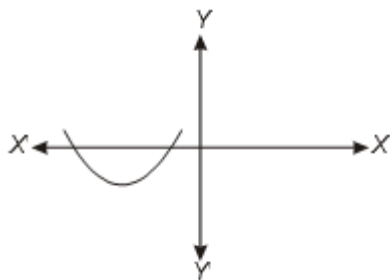
Roll No

Student Name

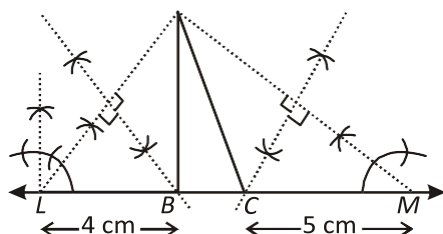
Father's Name

## SECTION - A (MATHEMATICAL REASONING)

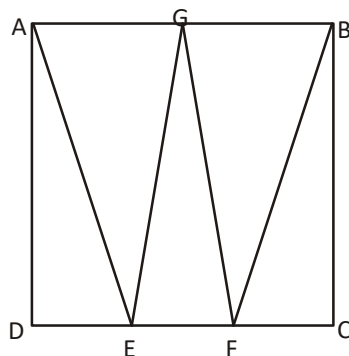
- Q1. The graph of a polynomial is shown in the given figure. The sum of the zeros of the polynomial is always



- a. Positive                      b. Negative                      c. Zero                      d. Non-real
- Q2. Which of the following is not correct?
- a. The edges of a surface are lines  
 b. A point is that which has no part  
 c. A surface is that which has length and breadth only  
 d. A line segment can be extended in one direction only
- Q3. If  $a = 2^{444}$ ,  $b = 4^{222}$  and  $c = 8^{148}$ , then find  $\frac{a^2 + b^2 + c^2}{ab + bc + ca}$
- a. 1                      b. 2                      c. 4                      d. 128
- Q4. In the given figure, if  $\angle B = 90^\circ$  and  $\angle C = 60^\circ$ , then  $AB + AC$  equals



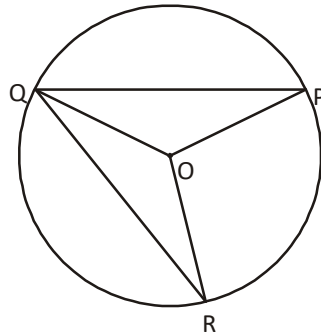
- a. 12cm                      b. 5cm                      c. 4cm                      d. 9cm
- Q5. In the given figure, ABCD is a square. E and F lie on DC such that  $DE = EF = FC$  and G lies on AB such that  $AG = GB$ . The value of  $(\angle BGE + \angle AEG - \angle EGF + \angle BFC)$  equals



- a.  $90^\circ$                       b.  $180^\circ$                       c.  $270^\circ$                       d.  $120^\circ$

- Q6 How many linear equations in  $x$  and  $y$  can be satisfied by  $x = 2$  and  $y = -3$ ?
- a. Only one                      b. Two                      c. Three                      d. Infinitely many

- Q7 In the given figure,  $PQ$  and  $RQ$  are two chords of a circle equidistant from the centre  $O$  of the circle. The ratio of  $\angle POR$  to  $\angle OPQ$  equals



- a. 2 : 1                      b. 3 : 1                      c. 4 : 1                      d. 4 : 3
- Q8 With the help of a ruler and a compass, it is possible to construct an angle of
- a.  $50^\circ$                       b.  $46^\circ$                       c.  $22.5^\circ$                       d.  $38^\circ$
- Q9 If  $A$  is the area of a triangle in  $\text{cm}^2$ , whose sides are 9 cm, 10 cm and 11 cm, then which of the following is correct?
- a.  $40 \text{ cm}^2 < A < 45 \text{ cm}^2$                       b.  $A < 40 \text{ cm}^2$   
c.  $45 \text{ cm}^2 < A < 50 \text{ cm}^2$                       d.  $A > 50 \text{ cm}^2$
- Q10 The area of a field in the shape of trapezium is  $1440 \text{ m}^2$ . The perpendicular distance between its parallel side is 24 m. If the ratio of the parallel side is 5 : 3, then the length of the longer parallel side is
- a. 80 m                      b. 96 m                      c. 75 m                      d. 108 m
- Q11 The number of Euclid's postulates is
- a. 4                      b. 3                      c. 5                      d. 6
- Q12 If both the radius and height of a right circular cone are increased by 20%, then its volume will be increased by
- a. 20%                      b. 100%                      c. 72.8%                      d. 40%
- Q13 A card is drawn from a pack of 100 cards numbered 1 to 100. The probability of getting a number which is a perfect square and also an odd number is
- a.  $\frac{1}{5}$                       b.  $\frac{1}{20}$                       c.  $\frac{1}{10}$                       d.  $\frac{1}{2}$

Q14 If the mean of the given frequency distribution is 6.875, then the value of P equals

$x_i$	3	4	7	10	11
$f_i$	7	5	P	5	6

- a. 6                                      b. 7                                      c. 8                                      d. 9

Q15 If  $a + b + c = 0$ , then the value of

$$\frac{1}{a^2 + b^2 - c^2} + \frac{1}{a^2 + c^2 - b^2} + \frac{1}{b^2 + c^2 - a^2}$$

- a. 0                                      b. 2abc                                      c. 1                                      d. abc

### SECTION - B (GENERAL MATHS)

Q16 If 12 men can build a wall 42 m long in 8 days, then what length of a similar wall can be built by 27 men in 4 days?

- a. 49 m                                      b. 32.16 m                                      c. 52 m                                      d. 47.25 m

Q17 The weight (in kg) of 7 students in a class are 41, 26, 32, 28, x, 33, 25. If the mean weight of these 7 students is 31 kg, then the value of x is

- a. 38                                      b. 33                                      c. 32                                      d. 30

Q18 Which of the following represent the given statement?

“Age of Khajan exceeds the age of Monu by 5 years”

- a.  $x = 10y$                                       b.  $x + y = 5$                                       c.  $x - y = 5$                                       d.  $x - y = 2$

Q19 The capacity of a cuboidal container is 45,000 litres of water. The breadth of the container if its length and depth are 1.5 m and 10 m respectively is

- a. 1.4 m                                      b. 4 m                                      c. 2 m                                      d. 3 m

Q20 A factory manufacturing mobile batteries made a survey in the field about the life of these batteries.

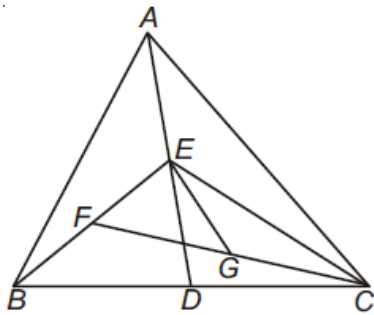
The data obtained is as under

Life of batteries (in months)	Less than 20	20-25	25-30	More than 30
Number of batteries	260	185	340	215

If the battery of this company is put in the mobile, then the probability that a battery will last for less than 30 months is

- a. 0.74                                      b. 0.80                                      c. 0.54                                      d. 0.785

- Q21 In the given figure, D, E, F and G the mid-points of side BC, AD, BE and FC respectively. Which of the following is correct?



- a.  $\text{ar}(\triangle EGF) = \frac{1}{16} \text{ar}(\triangle ABC)$       b.  $\text{ar}(\triangle EGF) = \frac{1}{8} \text{ar}(\triangle ABC)$
- c.  $\text{ar}(\triangle EGF) = \frac{8}{3} \text{ar}(\triangle ABC)$       d.  $\text{ar}(\triangle BED) = \frac{5}{3} \text{ar}(\triangle ABC)$
- Q22 The mean age of 100 employees in a company in 1997 was 50 years. In 1999, 20 employees retired from their job and their mean age was 60 years. In 2002, 40 employees were employed and their mean age was 35 years. The mean age of all the employees in 2005 was
- a. 50 years      b. 52 years      c. 53 years      d. 55 years
- Q23 The radius of a spherical balloon increases from 8 cm to 32 cm as air is being pumped into it. The ratios of the surface areas of the balloon in both cases can be
- a. 1 : 8      b. 2 : 5      c. 1 : 4      d. 1 : 16
- Q24 Mahesh, a farmer, represents his rectangular plot on the coordinate plane. If the coordinates of the corners of the plot are (5, 4), (5, -8), (K, -8) and (2, 4), then point (K + 2, K - 2) lies
- a. On the x-axis      b. On the y-axis
- c. On both the x-axis and the y-axis      d. In third quadrant
- Q25 Which of the following is not a factor of  $\frac{1}{a^8} - \frac{10}{a^4} + 9$ ?
- a.  $1 + 3a^2$       b.  $1 + \sqrt{3}a$       c.  $\sqrt{3} + a$       d.  $1 + a^2$
- Q26 A group of 4 students went for a picnic. They decided to play a game so that three of them stand on the ground such that their position represents the three vertices of a triangular field ABC which is scalene and acute-angled triangle. If the fourth friend wants to stand in the interior of the field ABC such that he will be equidistant from all of his three friends, then he must always stand at the \_\_\_\_\_ of the triangular field ABC.
- a. Incentre      b. Circumcentre      c. Centroid      d. Orthocentre

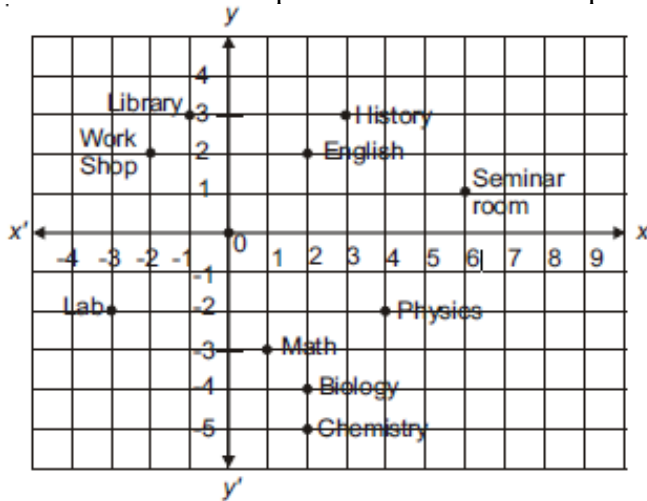
Q27 Some plants were planted in 200 schools on Earth day. The number of plants that were planted was recorded as given in the table below

Number of plants planted	Less than 50	50-100	100-150	More than 150
Number of Schools	60	50	40	50

If a school is selected at random for inspection, then the probability that there are more than 100 plants in that school is

- a.  $\frac{1}{4}$                       b.  $\frac{7}{20}$                       c.  $\frac{9}{20}$                       d.  $\frac{1}{5}$

Q28 Use the co-ordinate plane which shows a map of the rooms in a middle high school



Ram is in the lab. If Ram’s next class is 5 units to the right and 3 units down on the map from where he is now, then the next class of Ram is

- a. Chemistry                      b. Biology                      c. English                      d. History

Q29 If 18 spiders make 18 webs in 18 days, then 1 spider will make 1 web in

- a. 36 days                      b. 1 day                      c. 9 days                      d. 18 days

Q30 A person joins a company at a starting salary of Rs. 10,000 per month. After every year, there is an increment. The first 2 increments are 10% each and after that it is 20% always. His monthly salary in the 5th year is

- a. Rs.20,908.80                      b. Rs. 17,424.00                      c. Rs. 18,259.00                      d.Rs. 22,576.00

## SECTION - C (LOGICAL REASONING)

Q31 Choose a correct option to complete the given series

7175, 8200, 9225, 10250, ?

- a. 11364                      b. 10344                      c. 11275                      d. 11366

Q32 Read the given information carefully and answer the following question

Five friends Aman, Bhanu, Chander, Deepak and Ektalike five different colours such that each likes only one colour black, grey, red, pink and yellow, but not in order. Bhanu is lighter than Aman and does not like black, grey and red colour. Ekta is lighter than Deepak and likes pink colour. Deepak is lighter than Bhanu and does not like yellow colour. Chander is lighter than Ekta and does not like black and grey colour.

**Who likes yellow colour?**

- a. Bhanu                      b. Chander                      c. Ekta                      d. Aman

Q33 Read the given information carefully and answer the following question

Five friends Aman, Bhanu, Chander, Deepak and Ektalike five different colours such that each likes only one colour black, grey, red, pink and yellow, but not in order. Bhanu is lighter than Aman and does not like black, grey and red colour. Ekta is lighter than Deepak and likes pink colour. Deepak is lighter than Bhanu and does not like yellow colour. Chander is lighter than Ekta and does not like black and grey colour.

**Which of the following order is correct according to their weight?**

- a. Aman > Deepak > Bhanu > Ekta > Chander      b. Aman > Bhanu > Ekta > Deepak > Chander  
c. Aman > Bhanu > Chander > Ekta > Deepak      d. Aman > Bhanu > Deepak > Ekta > Chander

Q34 A person moves towards north a distance of 56 m from a point A and reaches at B. He turns 90° in clockwise direction and goes 42 m and reaches at C. The shortest distance of point C from the point A is

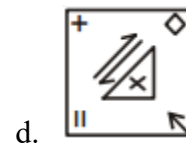
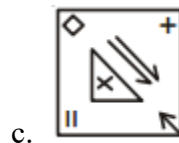
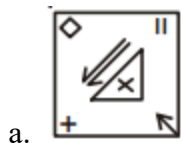
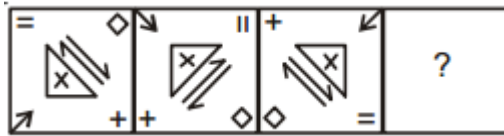
- a. 75 m                      b. 70 m                      c. 77 m                      d. 98 m

Q35 Complete the Analogy :

315 : 3 :: 445 : 5 :: 729 : 4 :: 696 : ?

- a. 5                      b. 7                      c. 6                      d. 4

Q36 Which will be the next figure in the following question?



Q37 Choose the odd one figure from the given four options.



Q38 In a certain code language 'QZM' means 'BLUE IS GOOD', 'TZMO' means 'EVERY ROAD IS GOOD', and 'OQMN' means 'BLUE ROAD IS RED'. Which of the following does mean 'EVERY GOOD IS RED' in that code language?

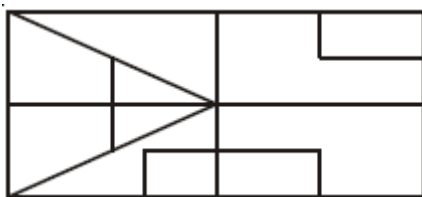
a. TZMO

b. ONZT

c. ONZQ

d. TZMN

Q39 Find the maximum number of rectangle in the given Figure



a. 9

b. 5

c. 8

d. 13

Q40 Choose the odd one in the following questions.

a. G N U

b. H O T

c. B I P

d. E L S

### SECTION - D (WISE WIZARD)

Q41 Let 'a' and 'b' be single digit numbers from 0 to 9 (both 0 and 9 included). If 'p' is a positive integer such that  $0.17ab17ab17ab \dots = \frac{p}{99}$ , then the value of  $a + b + p$  equals

a. 4

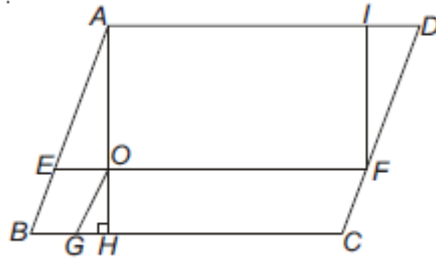
b. 9

c. 16

d. 25

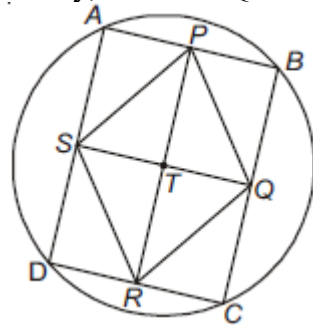


- Q42 In the given figure, ABCD and BGOE are parallelograms. If  $AO = 2OH$ ,  $AH \perp BC$  and  $FI \perp AD$ , then the ratio of  $\text{ar}(BGOE)$  to  $\text{ar}(\triangle DIF)$  is equal to



- a. 2 : 1                      b. 4 : 1                      c. 1 : 1                      d. 1 : 2

- Q43 In the given figure, if  $AB = DC$  and  $AB \parallel DC$  and P, Q, R and S are the mid points of AB, BC, CD and DA respectively, then  $\angle PTQ$  does not always equal to



- a.  $\angle SAP$                       b.  $\angle PBQ$                       c.  $\angle PSR$                       d.  $\angle RCQ$

- Q44 If  $\sqrt{2015 + \sqrt{2015^2 - 1}} = \sqrt{a} + \sqrt{b}$  ( $a > b$ ), a and b are natural and  $x = \frac{1}{\sqrt{a} + \sqrt{b}}$ , then  $x^3 + 3x\sqrt{1007} \cdot \sqrt{1008}$  equals

- a.  $a^3 - b^3$                       b.  $a^{\frac{3}{2}} - b^{\frac{3}{2}}$                       c.  $a^2 - b^2$                       (d)  $a^{\frac{1}{3}} - b^{\frac{1}{3}}$

- Q45 Rohan and Smrat are two friends whose houses are 36 km apart. Both of them decide to meet somewhere between their houses. Rohan travels at a speed of 12 km/hr by cycle and leaves his house at 10 : 30 am, while Smrat leaves at 11 : 00 am and travels at a speed of 13 km/hr. The time at which they will meet is

- a. 11 : 30 am                      b. 12 : 12 pm                      c. 12 : 15 pm                      d. 12 : 00 pm

- Q46 If 3 men or 4 boys take 55 hours to complete a task, then the time taken to complete the same task by 6 men and 3 boys together is

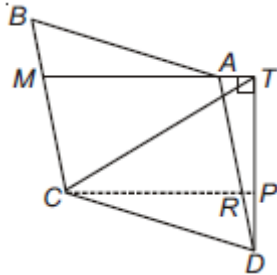
- a. 40 hours                      b. 20 hours                      c. 15 hours                      d. 10 hours

- Q47 Two circles of equal radii are drawn with the centre of one lying on the other and intersecting at points P and Q. If any line through P intersects the circles at A and B, then  $\angle QAB$  is always

- a. Scalene                      b. Equilateral                      c. Right angled                      d. Isosceles

- Q48 The number of values of natural number  $n$  for which  $n^5 + n^4 + 1$  is a prime number is
- a. 0                      b. 1                      c. 2                      d. More than 2

- Q49 In the given figure, ABCD is a parallelogram, M and R are the mid-points of sides BC and AD respectively. If DT is drawn from D perpendicular to MA produced at T, then  $\angle CTD$  is equal to



- a.  $\angle ACR$                       b.  $\angle TCD$                       c.  $\angle TDC$                       d.  $\angle ADC$
- Q50 If three points A, B and C are collinear such that B lies between A and C and their coordinates are  $(a, 1)$ ,  $(0, 0)$  and  $(1, b)$  respectively, then which of the following condition is always correct?
- a.  $a + b = 1$                       b.  $ab^{-1} = 1$                       c.  $ab = 1$                       (d)  $a^{-1} + b^{-1} = 1$

**Space for rough work**

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**Space for rough work**

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