# CLASS 10 MATH BASIC MATH TEST PAPER 2

## Class 10 - Mathematics

**Time Allowed: 3 hours** **Maximum Marks: 80**

**General Instructions:**

Read the following instructions carefully and follow them:

1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion-Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study-based questions carrying 4 marks each with sub-parts of the values of 1,1 and 2 marks each respectively.
8. All Questions are compulsory. However, an internal choice in 2 Questions of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

### Section A

1. The prime factorisation of 432 is: **[1]**

   a) $2^3 \times 3^3$ b) $2^4 \times 3^4$

   c) $2^4 \times 3^3$ d) $2^3 \times 3^4$

2. The product of two numbers is 1600 and their HCF is 5. The LCM of the numbers is **[1]**

   a) 1600 b) 8000

   c) 1605 d) 320

3. If one root of the equation $3x^2$ - 10x + 3 = 0 is $\frac{1}{3}$ then the other root is **[1]**

   a) $\frac{1}{3}$ b) 3

   c) $\frac{-1}{3}$ d) -3

4. If x - y = 2 and $\frac{2}{x+y} = \frac{1}{5}$ then **[1]**

   a) x = 6, y = 4 b) x = 7, y = 5

c) x = 5, y = 3

d) x = 4, y = 2

5. If the equation $x^2 + 5kx + 16 = 0$ has no real roots then **[1]**

a) $k > \frac{8}{5}$

b) $k < \frac{-8}{5}$

c) $\frac{-8}{5} < k < \frac{8}{5}$

d) $k > \frac{-8}{5}$

6. The distance of the point (5, 0) from the origin is **[1]**

a) $5^2$

b) 5

c) 0

d) $\sqrt{5}$

7. $\triangle PQR \sim \triangle XYZ$ and the perimeters of $\triangle PQR$ and $\triangle XYZ$ are 30 cm and 18 cm respectively. If QR = 9 cm, then, YZ is equal to **[1]**

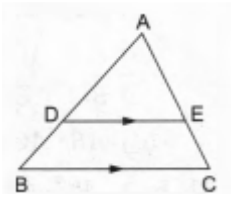
a) 4.5 cm.

b) 5.4 cm.

c) 12.5 cm.

d) 9.5 cm.

8. In a $\triangle ABC$, if DE is drawn parallel to BC, cutting AB and AC at D and E respectively such that AB = 7.2 cm, AC = 6.4 cm and AD = 4.5 cm. Then, AE = ? **[1]**



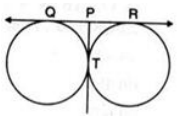

a) 4 cm

b) 5.4 cm

c) 3.2 cm

d) 3.6 cm

9. In the given figure if QP = 4.5 cm, then the measure of QR is equal to **[1]**




a) 15 cm

b) 9 cm

c) 18 cm

d) 13.5 cm

10. If $\sin\theta = \frac{1}{2}$ then $\cot\theta$ = ? **[1]**

a) $\frac{1}{\sqrt{3}}$

b) 1

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

d) $\sqrt{3}$

11. A kite is flying at a height of 30 m from the ground. The length of string from the kite to the ground is 60 m. Assuming that there is no slack in the string, the angle of elevation of the kite at the ground is **[1]**

a) 30°

b) 45°

c) 90°

d) 60°

12. The value of $2\sin^2 30^o + 3\tan^2 60^o - \cos^2 45^o$ is: **[1]**

a) 9

b) $\frac{19}{2}$

c) $3\sqrt{3}$

d) $\frac{9}{4}$

13. The length of the minute hand of a wall clock is 7 cm, then area swept by the minute hand in 10 minutes is **[1]**

a) 30 $cm^2$

b) 25.66 $cm^2$

c) 30.66 $cm^2$

d) 28.69 $cm^2$

14. A circular disc of radius 6 cm is divided into three sectors with central angles $90^o$, $120^o$ and $150^o$. The ratio of the areas of the three sectors is **[1]**

a) 4 : 5 : 6

b) 3 : 4 : 5

c) 1 : 5 : 6

d) 2 : 3 : 4

15. The probability that it will rain on a particular day is 0.76. The probability that it will not rain on that day is **[1]**

a) 0.24

b) 0.76

c) 0

d) 1

16. For the following distribution: **[1]**

| **Marks Below** | 10 | 20 | 30 | 40 | 50 | 60 |
|---|---|---|---|---|---|---|
| **Number of Students** | 3 | 12 | 27 | 57 | 75 | 80 |

the modal class is:

a) 50 – 60

b) 40 – 50

c) 20 – 30

d) 30 – 40

17. A solid is hemispherical at the bottom and conical above. If the surface areas of the two parts are equal, then the ratio of its radius and the height of its conical part is **[1]**

a) 1 : 1

b) 1 : $\sqrt{3}$

c) $\sqrt{3}$ : 1

d) 1 : 3

18. If $\sum f_i x_i$ = 625 and $\sum f_i$ = 25, then the value of $\bar{x}$ is **[1]**

a) 63

b) 64

c) 25

d) 26

19. **Assertion (A):** The point (0,-3) lies on the y-axis. **[1]**

**Reason (R):** The x - coordinate of the point on y-axis is zero.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

c) A is true but R is false.

d) A is false but R is true.

20. **Assertion (A):** For any two positive integers a and b, HCF(a, b) $\times$ LCM(a, b) = a $\times$ b **[1]**

**Reason (R):** The HCF of two numbers is 5 and their product is 150. Then their LCM is 40.

a) Both A and R are true and R is the correct explanation of A.

b) Both A and R are true but R is not the correct explanation of A.

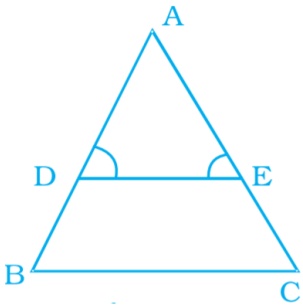
c) A is true but R is false.

d) A is false but R is true.

## Section B

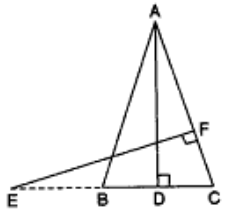
21. Find two numbers whose sum is 75 and difference is 15. **[2]**

22. In given Figure $\angle \mathrm{D} = \angle \mathrm{E}$ and $\frac{\mathrm{AD}}{\mathrm{DB}} = \frac{\mathrm{AE}}{\mathrm{EC}}$. Prove that BAC is an isosceles triangle. **[2]**

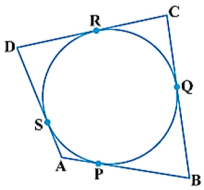



OR

In the figure, E is the point on side CB produced on an isosceles triangle ABC with AB = AC. If AD ⊥ BC and EF⊥ AC, prove that △ABD ∼ △ECF.




23. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC **[2]**




24. If $\sin \alpha = \frac{1}{\sqrt{2}}$ and $\cot \beta = \sqrt{3}$, then find the value of cosec $\alpha$ + cosec $\beta$. **[2]**

25. The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes. **[2]**

OR

Find the area of the segment of a circle of radius 14 cm, if the length of the corresponding arc APB is 22 cm.

**Section C**

26. Prove that $3 + 2\sqrt{5}$ is irrational. **[3]**

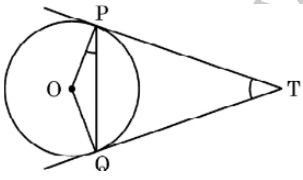
27. Find a quadratic polynomial, the sum and product of whose zeroes are $\sqrt{2}$ and $\frac{1}{3}$, respectively. **[3]**

28. The ratio of incomes of two persons is 9 : 7 and the ratio of their expenditures is 4 : 3. If each of them manages to save ₹ 2000 per month, then find their monthly incomes. **[3]**

OR

If 217x + 131y = 913 and 131x + 217y = 827, then solve the equations for the values of x and y.

29. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠PTQ = 2 ∠OPQ. **[3]**




30. In $\triangle ABC$, right angled at B, if $\tan A = \frac{1}{\sqrt{3}}$. Find the value of sin A cos C + cos A sin C. **[3]**

OR

In a △ABC, right angled at A, if $\tan C = \sqrt{3}$, find the value of sin B cos C + cos B sin C.

31. A group consists of 12 persons, of which 3 are extremely patient, other 6 are extremely honest and rest are extremely kind. A person from the group is selected at random. Assuming that each person is equally likely to be selected, find the probability of selecting a person who is **[3]**

i. extremely patient,

ii. extremely kind or honest.

which of the above values you prefer more?

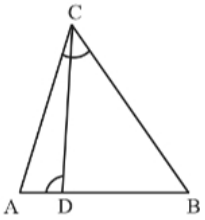
**Section D**

32. If the price of a book is reduced by ₹5, a person can buy 5 more books for ₹ 300. Find the original list price of the book. **[5]**

OR

The sum of the ages of a boy and his sister (in years) is 25 and product of their ages is 150. Find their present ages.

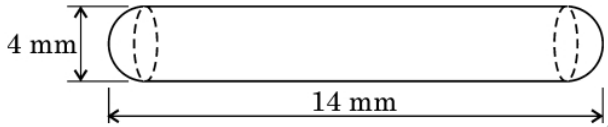
33. In the given figure, $\angle ADC = \angle BCA$ ; prove that $\triangle ACB \sim \triangle ADC$. Hence find BD if AC = 8 cm and AD = 3 cm. **[5]**




34. Two cubes each of volume 125 $cm^3$ are joined end to end. Find the volume and the surface area of the resulting cuboid. **[5]**

OR

A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 4 mm, find its surface area. Also, find its volume.




35. The median of the following data is 525. Find the values of x and y, if the total frequency is 100. **[5]**

| Class interval | Frequency |
|---|---|
| 0-100 | 2 |
| 100-200 | 5 |
| 200-300 | x |
| 300-400 | 12 |
| 400-500 | 17 |
| 500-600 | 20 |
| 600-700 | y |
| 700-800 | 9 |
| 800-900 | 7 |
| 900-1000 | 4 |

**Section E**

36. **Read the following text carefully and answer the questions that follow:** **[4]**

While preparing for a competitive examination, Akbar came across a match-stick pattern based question. The

pattern is given below:

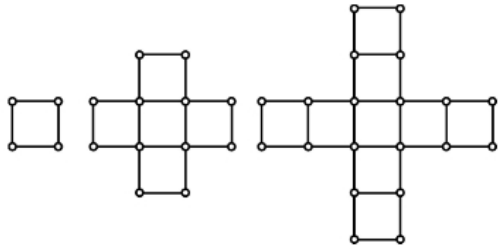


**Fig. (1)** **Fig. (2)** **Fig. (3)**

Based on the above information, answer the following questions:

i. Write first term and common difference of the A.P. formed by number of squares in each figure.

ii. Write first term and common difference of the A.P. formed by number of sticks used in each figure.

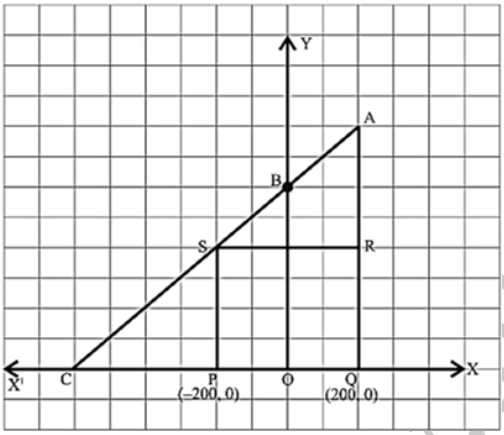
iii. a. How many squares are there in Fig. (10)? Also, write the number of sticks used in Fig. (10).

**OR**

b. If 88 sticks are used to make mth figure (Fig. (m)), find the value of m. How many squares are formed in this figure?

37. **Read the following text carefully and answer the questions that follow:** **[4]**

Jagdish has a field which is in the shape of a right angled triangle AQC. He wants to leave a space in the form of a square PQRS inside the field for growing wheat and the remaining for growing vegetables (as shown in the figure). In the field, there is a pole marked as O.




i. Taking O as origin, coordinates of P are (-200, 0) and of Q are (200, 0). PQRS being a square, what are the coordinates of R and S? (1)

ii. What is the area of square PQRS? (1)

iii. What is the length of diagonal PR in square PQRS? (2)

**OR**

If S divides CA in the ratio K : 1, what is the value of K, where point A is (200, 800)? (2)

38. **Read the following text carefully and answer the questions that follow:** **[4]**

Two trees are standing on flat ground. The angle of elevation of the top of Both the trees from a point X on the ground is $60^o$. If the horizontal distance between X and the smaller tree is 8 m and the distance of the top of the

two trees is 20 m.


i. Calculate the distance between the point X and the top of the smaller tree. (1)

ii. Calculate the horizontal distance between the two trees. (1)

iii. Find the height of big tree. (2)

**OR**

Find the height of small tree. (2)