

# Class – X Guess Paper: Mathematics

Time allowed: 3 hours

M.M: 80

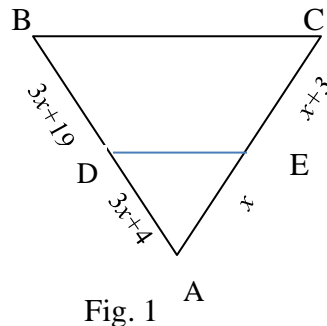
## General Instructions:

- All questions are **compulsory**.
- The question paper consists of **30** questions divided into four **sections A, B, C and D**. **Section-A** comprises of **6** questions of **1 mark** each, **Section-B** comprises of questions of **2 marks** each, **Section-C** comprises of **10** questions of **3 marks** each and **Section-D** comprises of **8** questions of **4 marks** each.
- There is no overall choice. However, internal choices have been provided in 3 questions of 4 marks and 4 questions of 3 marks. Please attempt any one question from these choices.
- Use of calculator is not permitted.
- Do not write anything on the question paper except roll number.

## SECTION-A

(6x1=6)

1. Find the value of  $x$  for which  $DE \parallel BC$  (Figure 1)



2. “If all the zeroes of a cubic polynomial are negative, then all the coefficients of the cubic polynomial along with the constant term will have the same sign.” Justify the statement as True or False.
3. From a well shuffled pack of playing cards, black jacks, black kings and black aces are removed. Find the probability of choosing not a diamond card.
4. If the remainder of  $\frac{(5m+1)(5m+3)(5m+4)}{5}$  is a natural number, then find the remainder.
5. If one zero of the polynomial  $5z^2 + 13z + p$  is reciprocal of the other, find the value of  $p$

6. The radius of a semi-circular protractor is 21cm. Find its perimeter.

**SECTION-B**

**(6X2=12)**

7. Find the remaining area of a semi-circular park, if the largest possible triangle is inscribed in it.
8. Write whether every positive integer can be written in the form of  $4q+2$ , for some positive integer  $q$ .
9. Figure 2 below shows co-ordinates of two points, A and B situated at a distance of 2 units from the origin in their respective axes. Find the vertices of a third point C, such that it is equidistant from the vertices of AOB.

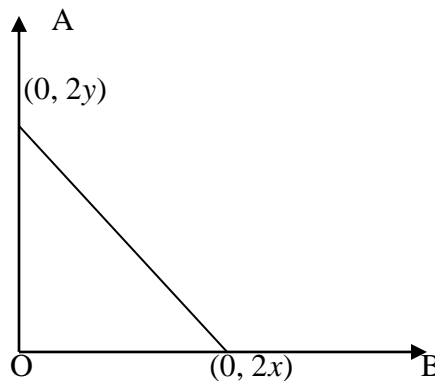


Figure 2

10. If  $\alpha$  and  $\beta$  are the roots of a quadratic polynomial,  $ax^2 + bx + c$  find a polynomial whose roots are  $\frac{1}{\alpha}, \frac{1}{\beta}$
11. Find the value of  $k$  if  $k^2+4k+8, 2k^2+3k+8$  and  $3k^2+4k+4$  are 3 consecutive terms of an AP
12. Given:  $\tan(\theta + \phi) = \frac{\tan(\theta)+\tan(\phi)}{1-\tan(\theta)\tan(\phi)}$ , find the value of  $\tan(75^\circ)$

**SECTION-C**

**(10X3=30)**

13. Show that  $\sqrt{7} - 4$  is an irrational number. Also, find its value upto 2 places of decimal.
14. Construct a triangle ABC with AC= 6cm,  $\angle A=45^\circ$  and  $\angle B=105^\circ$ . Then draw another triangle whose sides are  $\frac{4}{5}$  of the corresponding sides of triangle ABC.

15. Solve for  $x$  and  $y$ .

$$(a + c)x - (a - c)y = 2ab$$

$$(a + b)x - (a - b)y = 2ab$$

**OR**

Solve the following system of simultaneous linear equations algebraically.

$$43x + 67y = -24$$

$$67x + 43y = 24$$

16. If the sum of first 6 terms of an AP is 36, and that of 16 terms is 256, find the sum of first 10 terms of the AP.

17. AB is a line segment and M is the mid point of AB. Using M as the centre, semi circles are drawn on the same side of AB as shown in Figure 3. A circle with centre O is drawn such that it touches all the three semi-circles. Find the radius of the circle in terms of AB

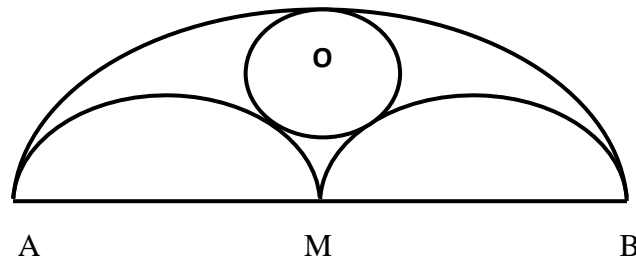


Figure 3

18. Aastha is running a blood donation camp and has the blood group details of twenty four volunteers as shown in Table 1.

A,B,B,AB,B,O,O,AB,O,B,A AB, A,O,O,AB,B,O,A,AB,O,B,A
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Table 1

Based on the above table, answer the following questions:

- i. Construct a frequency distribution of the following data.
- ii. If a person is randomly selected, what is the probability that the chosen person has a blood group that is not O type?
- iii. What are the values demonstrated by Aastha in running her campaign.

19. Water in a canal 6m wide and 1.5m deep, is flowing with a speed of 10kmph. How much area will it irrigate in 30 minutes, if 8cm of standing water is required for irrigation?

20. Find the values of  $x$  and  $y$  if the mean of the group data is 21.4 and total frequency is 40.

Class Interval	0-8	8-16	16-24	24-32	32-40
Frequency	6	$x$	10	$y$	9

Table 2

21. If  $1 + \sin^2\theta = 3\sin\theta \cdot \cos\theta$ , show that  $\tan\theta = \frac{1}{2}$  or 2.

**OR**

Given,  $\sin\theta + 2\cos\theta = 1$ , prove that  $2\sin\theta + \cos\theta = 1$

22. Show that:  $(\sin\theta + \operatorname{cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = \tan^2\theta + \cot^2\theta + 7$

**OR**

Find the value of  $\tan 45^\circ$ , geometrically.

### SECTION-D

**(8X4=24)**

23. If the roots of the quadratic equation  $(a^2 + b^2)x^2 - (2ac + bd)x + (c^2 + d^2) = 0$  are equal, show that:  $\frac{a}{b} = \frac{c}{d}$

**OR**

If the roots of  $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$  are equal, show either  $a = 0$  or  $a^3 + b^3 + c^3 = 0$ .

24. Draw a more than type and a less than type ogive for the following data, and hence find the median value. (See Table 3)

Class Interval	25-29	30-34	35-39	40-44	45-49	50-55	55-59	Total
Frequency	4	14	22	16	6	5	3	70

Table 3

25. A toy is in the form of a hemisphere, mounted on a right circular cone. The height of the cone is 4cm and diameter of the base is 8cm. Determine the volume of the toy. If a cube

circumscribes the toy, find the difference of the volumes of the cube and the toy. Also find the total surface area of the toy.

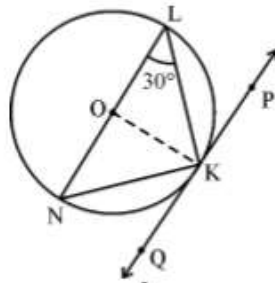
**OR**

A building is in the form of a cylinder surmounted by a hemispherical dome. The base diameter of the dome is  $\frac{2}{3}$  of the total height of the building. If the building contains  $67\frac{1}{21}$  cubic centimeter of air, find the total height and surface area of the building.

- 26.** The points A ( $x_1, y_1$ ), B ( $x_2, y_2$ ) and C ( $x_3, y_3$ ) are the three vertices of a triangle ABC.
- The median from A intersects BC at D. Find the coordinates of D.
  - Find the coordinates of P on AD such that AP:PD = 2:1
  - Find the coordinates of Q and R on medians BE and CF respectively such that BQ:QE = 2:1 and CR:RF = 2:1
  - Hence find the coordinates of the centroid of the triangle ABC
- 27.** State and Prove the Basic Proportionality Theorem.

**OR**

Prove that a tangent to a circle and the radius at the point of contact intersect at right angles. Using it, find the measurement of  $\angle PKL$ . (Figure 4)



- 28.** In an equilateral triangle ABC, D is a point on BC such that  $BD = \frac{1}{3} BC$  Prove that:  $9AD^2 = 7AB^2$
- 29.** A vertical tower stands on a horizontal plane and is surmounted by a vertical staff flag of height  $h$ . At a point on the plane, the angles of elevation at the top and bottom of the flag are  $\beta$  and  $\alpha$  respectively, show that the height of the tower is  $\frac{h \tan \alpha}{\tan \beta - \tan \alpha}$

**30.** Out of a number of Saras birds, one fourth of the birds are moving around the Lotus plant; one-ninth coupled (along with) one fourth as well as 7 times the square root of the number move on a hill and 56 remain in valuka trees. What is the total number of birds?

**OR**

A man bought 4 horses and 9 cows for a price of 1340 INR. He sells the cows at a profit of 20% and the horses at a profit of 10% and his whole gain are 188 INR. What price did the man pay for the horse?

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