

**Sample Paper -2008**  
**Class – X**  
**Subject-Mathematics**

Time-3hrs

M.M-80

**SECTION – A**

1. Write a quadratic equation whose roots are  $3+\sqrt{3}$  and  $3-\sqrt{3}$ .
2. Show that any positive odd integer is of the form  $4q+1$  or  $4q+3$ , where  $q$  is some integer.
3. If  $\tan B = \frac{3}{4}$ , and  $A+B = 90^\circ$ , then find the value of  $\cot A$ .
4. If the zeros of the polynomial  $f(x) = x^3 - 3x^2 + x + 1$  are  $(a-b)$ ,  $a$  and  $(a+b)$  find the value of  $a$  and  $b$ .
5. A cylinder, a cone and a hemi-sphere have equal base and same height. What is the ratio of their volumes?
6. Give an example of polynomial  $p(x)$ ,  $g(x)$ ,  $q(x)$  and  $r(x)$ , satisfying  $P(x) = g(x).q(x) + r(x)$ ,  $\deg r(x) = 0$
7. A die is thrown once. What is the probability of getting an even prime number?
8. Find the 20<sup>th</sup> term of the sequence -2, 0, 2, 4 -----.
9. Find the perimeter of the sector whose base radius is 14 cm and central angle is  $120^\circ$ .
10. For what value of 'k' the following pair of linear equations has infinitely many solutions?  
 $10x + 5y - (k-5) = 0$  and  $20x + 10y - k = 0$ .

**SECTION – B**

11. Express  $\sin 52^\circ + \cos 67^\circ$  in terms of trigonometric ratios of angles between  $0^\circ$  and  $45^\circ$ .  
'OR'  
 $\sin(A+B) = \frac{1}{2}$  and  $\cos(A+B) = \frac{1}{2}$ ,  $0^\circ < A+B \leq 90^\circ$ ,  $A > B$ , find  $A$  and  $B$ .
12. How many three digit numbers are divisible by 7?
13. Find the values of  $y$  for which the distance between the points  $A(-3, 2)$  and  $B(4, y)$  is 7.
14.  $ABC$  is a triangle right angled at  $A$  and  $AD \perp BC$ . Show that  $AC^2 = BC \cdot CD$ .
15. Two dice are thrown once. What is the probability that the sum of the two numbers appearing on the top of the dice is less than or equal to 12?

**SECTION – C**

16. While covering a distance of 30km Ajeet takes 2hrs more than Amit. If Ajeet doubles his pace, he would take 1 hour less than Amit. Find the ratio of their walking.  
'OR'  
A number consists of two digits, the difference of digits is 3. If 4 times the number is equal to 7 times the number obtained on reversing digits. Find the number.
17. Find the zeroes of the quadratic equation:  
 $f(x) = ax^2 + (b^2 - ac)x - bc$ .
18. The angles of a quadrilateral in AP whose common difference is  $10^\circ$ . Find the angles.  
'OR'  
Which term of the AP: 114, 109, 104, ----- is the first negative term?
19. Draw the graph of the following pair of linear equations:  $x + 3y = 6$  and  $2x - 3y = 12$  and find the area of the region bounded by  $x = 0$ ,  $y = 0$  and  $2x - 3y = 12$ .

20. Prove that  $\frac{\sin A + \cos A}{\sin A - \cos A} + \frac{\sin A - \cos A}{\sin A + \cos A} = \frac{2}{\sin^2 A - \cos^2 A}$   
OR

If  $2 \tan A = 1$ , find the value of  $\frac{3 \cos A + 2 \sin A}{2 \cos A - \sin A}$

21. For what value of 'k' the points A (1, 5), B (k, 1) and C (4, 11) are collinear?
22. Draw a  $\triangle ABC$  in which  $BC=6\text{cm}$ ,  $AB=5\text{cm}$  and  $\angle ABC=60^\circ$  then construct a  $\triangle$  similar to the given  $\triangle$  whose each corresponding side is  $\frac{3}{4}$ th of that of  $\triangle ABC$ .
23. A train overtakes two persons who are walking at a speed of 2 km/hr and 4 km/hr respectively in the same direction in which the train is going, the train overtakes them in 9 seconds and 10 seconds respectively. Find the length and speed of the train.
24. Find the ratio in which the line segment joining the points A (3, -6) and B (5, 3) is divided by x-axis.
25. Water flows at the rate of 10 m/min through a circular pipe of 5 mm diameter. How long would it take to fill a conical vessel whose diameter at the base is 40 cm and depth 24 cm?
26. Prove that in a right triangle the square of the hypotenuse is equal to the sum of square of the other two sides. Using the result of this theorem prove that the sum of squares on the sides of a rhombus is equal to the sum of squares on its diagonals.
27. If the angle of elevation of a cloud from a point h metres above a lake is  $\alpha$  and the angle of depression of its reflection in the lake is  $\beta$ . Prove that the distance of the cloud from the point of observation is  $2h \sec \alpha / (\tan \beta - \tan \alpha)$ .

'OR'

A balloon moving in a straight line passes vertically above points A and B on a horizontal plane 1000 m apart. When above A it has an altitude of  $60^\circ$  as seen from B and when at B it has an altitude of  $45^\circ$  as seen from A. Find the distance from A of the point where the balloon will touch the ground.

28. The height of a cone is 30 cm. A small cone is cut off at the top by the plane parallel to the base. If its volume be  $\frac{1}{27}$  of the volume of the given cone, at what height above the base, the section has been made.
29. An employee finds that if he increases the wages of each worker by Rs50 and the employs one worker less he reduces his weekly wages bill by Rs230 from Rs6800 to Rs6570, taking the original weekly wages be x obtain eq in x and find the weekly wages of each worker.

30. Find the median from the following table:

Marks	No. of Students
Below 10	15
Below 20	35
Below 30	60
Below 40	84
Below 50	94
Below 60	127
Below 70	198
Below 80	249

**SAMPLE PAPER - 2008**  
**Class - X**  
**SUBJECT – MATHEMATICS**

**TIME: 3 HOURS**

**MAX MARKS: 80**

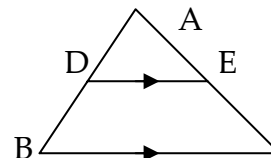
**GENERAL INSTRUCTIONS:**

1. All questions are compulsory.
2. The question paper consists of thirty questions divided into four sections A, B, C & D. Section A comprises of ten questions of 01 marks each, Section B comprises of five questions of 02 marks each, Section C comprises of ten questions of 03 marks each and section D comprises of five questions of 06 marks each.
3. All questions in section A are to be answered in one word, one sentence or as per the exact requirement of the question.
4. There is no overall choice. However internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 06 mark each. You have to attempt only one of the alternatives in all such questions.
5. In question on construction, drawings should be neat and exactly as per the given measurements.
6. Use of calculators is not permitted.

**SECTION - A**

1. If  $\cos \theta = \frac{4}{5}$  and  $\theta + \phi = 90^\circ$ , find the value of  $\sin \phi$ .
2. Find the quadratic polynomial, the sum and product of whose zeros are  $\frac{3}{2}$  and  $-\frac{2}{5}$  respectively.
3. Find the discriminant for the equation  $9x^2 - 12x + 4 = 0$ .
4. If one root of the equation  $3x^2 + 11x + k = 0$  is the reciprocal of the other, find the value of  $k$ .
5. If  $\tan 2A = \cot (A - 18^\circ)$ , where  $2A$  is an acute angle, find the value of  $A$ .
6. A bag contains 8 red, 2 black and 5 white balls. One ball is drawn at random. What is the probability that the ball drawn is neither black nor red?
7. State Euclid's Division Lemma.

8. The curved surface area of a cylinder is  $1760 \text{ cm}^2$  and its base radius is  $14 \text{ cm}$ , find the height of the cylinder?
9. In  $\triangle ABC$ ,  $DE \parallel BC$ , so that  $AD = 2.4 \text{ cm}$ ,  $DB = 3.2 \text{ cm}$ , and  $AC = 9.6 \text{ cm}$ , then find  $EC$ ?



C

10. Both the ogives (less than and more than) for a data intersect at  $P(30, 23)$ . Find the median for the data.

### SECTION - B

11. Anand Patil started working in a firm in 1995 at an annual salary of Rs. 5000 and received an increment of Rs. 200 each year. In what year did his annual salary will reach Rs. 7000?
12. If  $4 \sin \theta = 3 \cos \theta$ , find the value of  $\frac{5 \sin \theta + 7 \cos \theta}{7 \sin \theta + 5 \cos \theta}$ .

OR

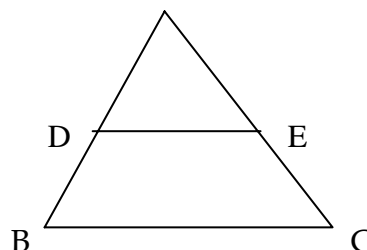
Prove the following identity:

$$(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A \quad A$$

13. In the given figure,

$$\frac{AD}{DB} = \frac{AE}{EC} \text{ and } \angle ADE = \angle ACB.$$

Prove that  $\triangle ABC$  is isosceles.



14. Find the value of  $x$  for which the distance between the points  $P(2, -3)$  and  $Q(x, 5)$  is 10 units.
15. A jar contains 54 marbles each of which is blue, green or white. The probability of selecting a blue marble at random is  $\frac{1}{3}$ , and the probability of selecting a green marble at random is  $\frac{4}{9}$ . How many white marbles does the jar contain?

### SECTION - C

16. Using Euclid's division algorithm find the H C F of 84, 90 and 120.

17. Find the values of  $k$  for which the quadratic equation  $x^2 - 2x(1 + 3k) + 7(3 + 2k) = 0$

has real and equal roots.

**OR**

Solve for  $x$ :  $\frac{1}{x+1} + \frac{2}{x+2} = \frac{4}{x+4}$ ,  $x \neq -1, -2, -4$

18. Find the zeros of the polynomial  $f(x) = 4\sqrt{3}x^2 + 5x - 2\sqrt{3}$ , and verify the relationship between the zeros and its coefficients.

19. Prove that:  $2 \sec^2 \theta - \sec^4 \theta - 2 \operatorname{cosec}^2 \theta + \operatorname{cosec}^4 \theta = \cot^4 \theta - \tan^4 \theta$

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20. Three numbers are in A.P. If the sum of these numbers is 27 and their product is

648, find the numbers.

**OR**

Sum of first 7 terms of an A.P. is 20 and the sum of next 7 terms is 17. Find the A.P.

21. Determine the ratio in which the point  $P(m, 6)$  divides the join of  $A(-4, 3)$  and  $B(2, 8)$ . Also find the value of  $m$ .

**OR**

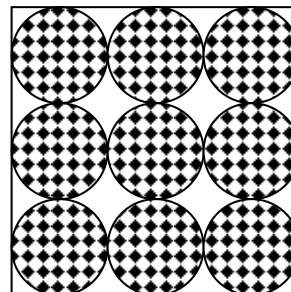
If  $(x, y)$  be on the line joining the two points  $(1, -3)$  and  $(-4, 2)$ ,  
prove that  $x + y + 2 = 0$ .

22. Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are  $(0, -1)$ ,  $(2, 1)$  and  $(0, 3)$ . Find the ratio of the area of the triangle formed to the area of the given triangle.

23. Construct a  $\Delta ABC$  in which  $AB = 5.5$  cm,  $BC = 4$  cm and  $\angle B = 75^\circ$ . Construct a triangle similar to  $\Delta ABC$ , each of whose sides are

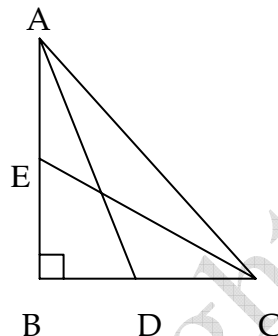
$\frac{3}{5}$  times the corresponding sides of  $\Delta ABC$ .

24. On a square handkerchief, nine circular designs each of radius 7 cm are made. Find the area of the



remaining portion of the handkerchief.

25. In the figure  $\Delta ABC$  is a right triangle, right angled at B. AD and CE are the two medians drawn from A and C respectively. If  $AC = 5$  cm and  $AD = \frac{3\sqrt{5}}{2}$  cm, find the length of CE.



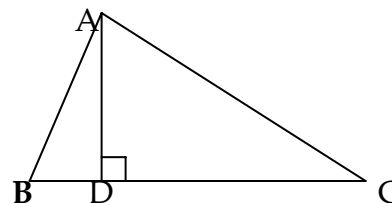
### SECTION - D

26. Form a pair of linear equations in two variables using the following information and solve it graphically.

Five years ago, Sagar was twice old as Vijay. Ten years later Sagar's age will be ten years more than Vijay's age. Find their present ages. What was the age of Sagar when Vijay was born?

27. State and prove the converse of Pythagoras theorem. Use the above theorem to prove the following:

In the figure,  $AD \perp BC$ . If  $AD^2 = BD \times DC$ ,  
Prove that ABC is a right triangle.

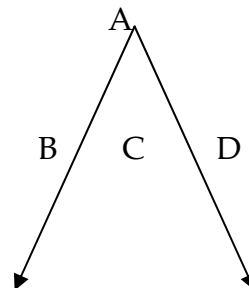


OR

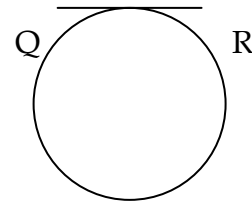
Prove that the lengths of two tangents drawn from an external point to a circle are equal.

Use the above theorem to prove the following:

A circle is touching the side BC of  $\Delta ABC$  at P and touching AB and AC produced at Q and R respectively.



Prove that:  $AQ = \frac{1}{2} (\text{Perimeter of } \triangle ABC)$



27. As observed from the top of a 75m high lighthouse from the sea-level, the angles of depression of two ships are  $30^\circ$  and  $45^\circ$ . If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships.

**OR**

The angle of elevation of a jet plane from a point A on the ground is  $60^\circ$ . After a flight of 15 seconds, the angle of elevation changes to  $30^\circ$ . If the jet plane is flying at a constant height of  $1500\sqrt{3}$  m, find the speed of the jet plane in km/h.

28. The radii of the ends of a frustum of a cone 45cm high are 28cm and 7cm. Find its volume and total surface area.

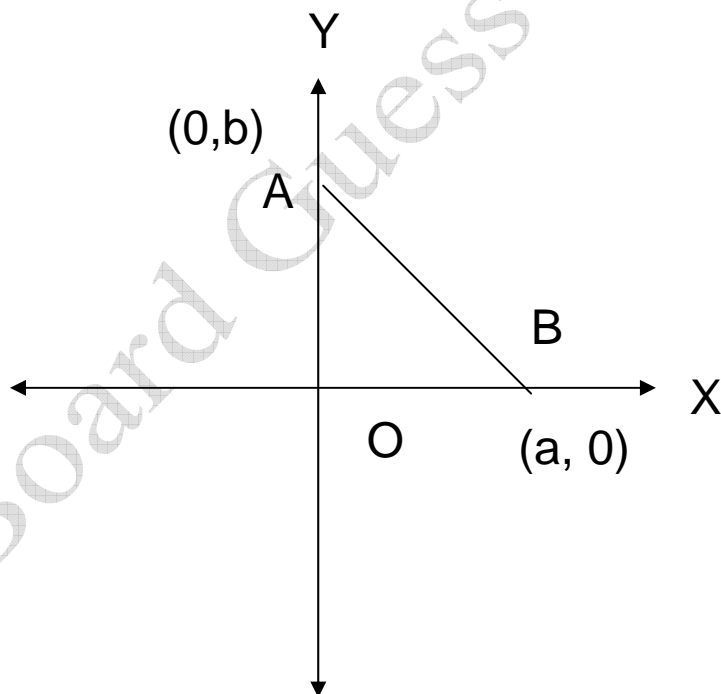
**OR**

Water in a canal, 6m wide and 1.5m deep, is flowing with a speed of 10km/hr. How much area will it irrigate in 30 minutes, if 8cm standing water is needed? The median of the following data is 20.75. Find the missing frequencies  $x$  and  $y$  if the total frequency is 100.

Class Interval	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25	25 – 30	30 – 35	35 – 40
Frequency	7	10	$x$	13	$y$	10	14	9

**SAMPLE PAPER - 2008**  
**CLASS – X**  
**SUBJECT - MATHEMATICS**

1. If 3 is a root of a quadratic equation  $7y^2 - (k+1)y + 3 = 0$ , what will be the value of k?
2. If in an A.P. the common difference is 3, then what will be the value of  $t_6 - t_8$ ?
3. D is a point on BC of triangle ABC such that  $\angle ADC = \angle BAC$ . Prove that  $\frac{CA}{CD} = \frac{CB}{CA}$
4. A point P is 10 cm from the centre of a circle. The length of the tangent drawn from P to the circle is 8 cm. Find the radius of the circle.
5. If  $\frac{\cos^2 20^\circ + \sin^2 70^\circ}{2(\sin^2 59^\circ + \sin^2 31^\circ)} = \frac{2}{k}$ , then what will be the value of k?
6. Perimeter of the sector of a circle is 24cm. If the radius of the circle from which the sector is obtained is 7 cm, find the area of sector.
7. If P ( 2, 3) is the mid point of the line segment AB, find the value of a and b.





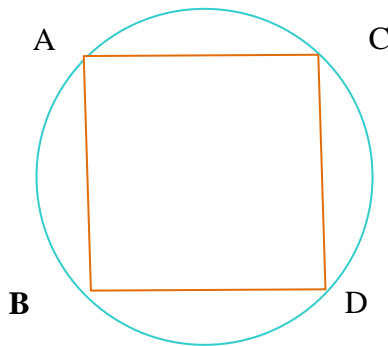
8. H.C.F. of 306 and 657 is 9, find their L.C.M.
9. How many zeros are possible of the polynomial  $P(x) = 2x^3 + 3x^2 - 4x + 5$ , (i) at least (ii) at most.
10. Find the value of  $k$  so that the quadratic equation  $(k + 4)x^2 + 2(k - 4)x + 4 = 0$ , has repeated roots.

**SECTION B**

11. By Euclid's division algorithm, show that the cube of any positive integer is of the form  $9n$  or  $9n+1$  or  $9n+8$ .
12. If each term in an A.P. is doubled. Is the resultant sequence also an A.P.? If so, write its first term, common difference and general term.
13. Out of 400 bulbs, 15 are defective. One bulb is taken out at random from the box. Find the probability that the drawn bulb is not defective.
14. Solve:  $\frac{148}{x} + \frac{231}{y} = \frac{527}{xy}$ ,  $\frac{231}{x} + \frac{148}{y} = \frac{610}{xy}$

**OR,** Sum of two numbers is 35 and their difference is 13. Find the numbers.

15. Find the area of shaded region.. If a square of side 10 cm is inscribed in a circle.



**SECTION C**

16. Draw the graph of the equations  $2x + 3y = 12$  and  $x - y = 1$ . Determine the vertices of the triangle formed by the lines and the y-axis.
17. Prove  $(-1, -1)$ ,  $(2, 3)$  and  $(8, 11)$  are collinear.  
**OR,**  
Find a relation between  $x$  and  $y$  if the points  $(x, y)$ ,  $(1, 2)$  and  $(7, 0)$  are collinear.
18. Find the ratio in which the line joining the points  $(-2, 5)$  and  $(3, 7)$  is divided by y-axis.

19. An army contingent of 616 members is to march behind an array band of 32 members in a parade. The two groups are to march in the same number of columns, what is the maximum number of columns in which they can march?

20. Prove:  $\frac{\tan A + \sec A - 1}{\tan A - \sec A + 1} = \frac{\cos A}{1 - \sin A}$

**OR,**

$$\frac{1}{\cos ec A - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{\cos ec A + \cot A}$$

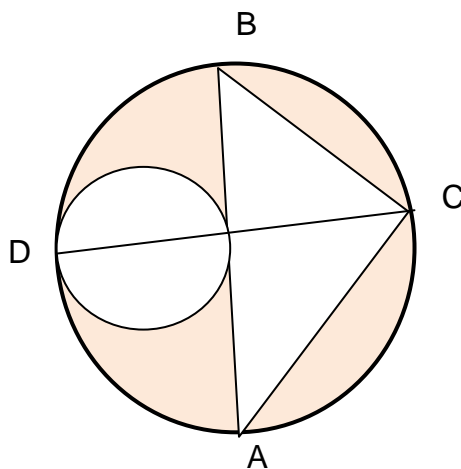
21. Prove that the roots of the quadratic equation  $ax^2 + bx + c = 0$ , are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

**Or,** If  $a_1, a_2, a_3, a_4, \dots, a_n$  is an A.P. Prove the sum of this A.P. is

$$S_n = \frac{n}{2}[2a + (n-1)d]$$

22. Draw a circle of radius 4 cm. mark a point P at a distance of 9 cm from its centre. Draw tangents to the circle from the point P, if the tangents are inclined at an angle  $60^\circ$  with each other.
23. ABCD is a quadrilateral P,Q,R,S are points of trisection of the sides AB,BC, CD and DA respectively. Prove that PQRS is a parallelogram.
24. In the given figure, AB and CD are two diameters of a circle, perpendiculars to each other and OD is the diameter of smaller circle. If  $OA = 7$  cm, find the area of the shaded region.



25. In a cricket match McGrath took one wicket less than twice the number of wickets taken by Bret Lee. If the product of the number of wickets taken by these two is 15, find the number of wickets taken by each.

### SECTION C

26. A solid cone, with height and base radius of 28 cm each, is cut along a plane parallel to its base so that the bottom and top radii of the remaining part are in the ratio 1 : 4. Find its volume. Also find the cost of painting its outer surface @ Re 0.70 per sq.cm.

OR

A wooden toy is conical at the top, cylindrical in the middle and hemispherical at the bottom (see figure). If the height and radius of the cylindrical portion are both equal to 21 cm and the total height of the toy is 70 cm, find the cost of painting it @ Re 0.70 per sq.cm and the amount of wood used to make it.

27. State and prove *Pythagoras Theorem*. Using it, prove that the sum of the squares of the sides of a rhombus is equal to the sum of the squares of its diagonals.
28. A bucket of height 16 cm and made up of metal sheet is in the form of frustum of a right circular cone with radii of its lower and upper ends as 6 cm and 15 cm respectively. Calculate:
- (i) the height of the cone of which the bucket is a part.
  - (ii) The volume of water which can be filled in the bucket.
  - (iii) The slant height of the bucket.
  - (iv) The area of the metal sheet required to make the bucket.

29. Construct a more than and less than ogive of the following frequency

distribution:

C.I.	10-20	20-30	30-40	40-50	50-60
MARKS	5	6	4	2	3

Also, determine the median from the graph.

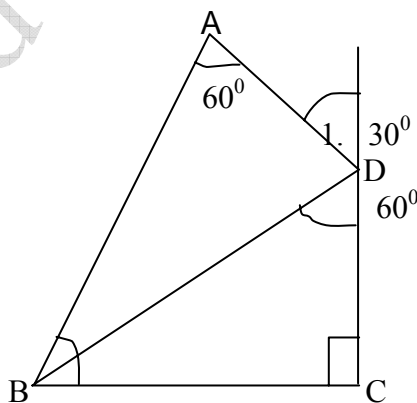
30. Point A is  $45^\circ$ . After going up a distance of 600 meters towards the top of the cliff at an inclination of  $30^\circ$ , it is found that the angle of elevation is  $60^\circ$ . Find the height of the cliff.

**OR,**

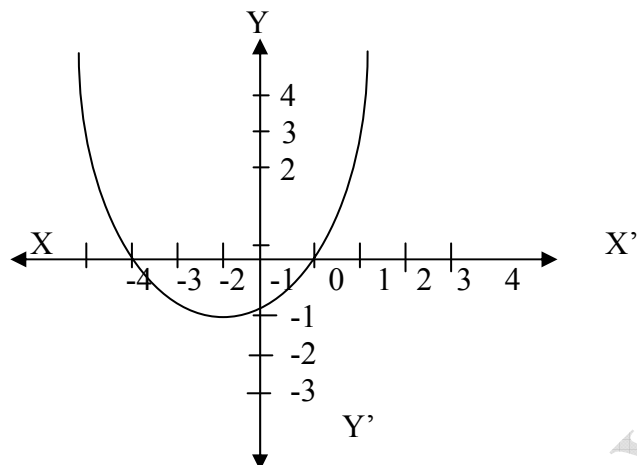
An aeroplane, when 3000 m high, passes vertically above another aeroplane. At an instant when the angles of elevation of the two aeroplanes from the same point on the ground are  $60^\circ$  and  $45^\circ$  respectively. Find the vertical distance between the two aeroplanes.

**Sample Paper - 2008**  
**Class - X**  
**Subject - Mathematics**

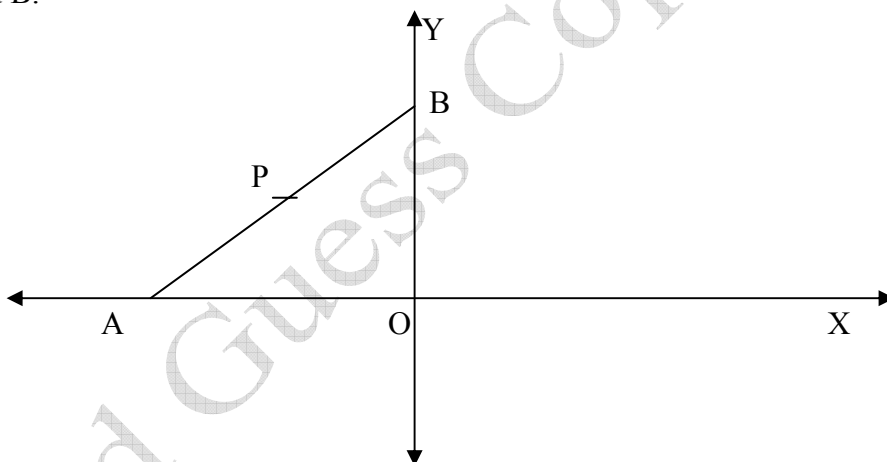
- 1) Explain why  $7 \times 11 \times 13 + 13$  is a composite number?
- 2) What are the x intercepts of the graph of the polynomial:  $p(x) = x^2 - 3x - 4$ .
- 3) Solve  $373x + 627y - 754 = 0$  ;  $627x + 373y - 246 = 0$
- 4) find value of k if quadratic equation  $2kx^2 - 8x + k = 0$  has repeated roots?
- 5) Find the value of k, so that  $8k - 4$ ,  $6k + 2$  and  $2k + 4$  are three consecutive terms of an A.P.
- 6) The areas of two similar triangles ABC and DEF are  $64m^2$  and  $169m^2$  respectively. If  $BC = 4$  cm, find EF.
- 7) Find the centroid of the triangle whose angular points are  $(3, -5)$ ,  $(-7, 4)$  and  $(10, -2)$  respectively.
- 8) If  $\text{Cosec } \theta = \frac{13}{12}$ , find the value of  $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta}$
- 9) The perimeter of a sector of a circle of radius 5.7cm is 27.2cm. Find the area of the sector.
- 10) If the probability of winning a game is 0.37, what is the probability of losing it?
- 11).In fig. AD be a pole. Find the angle of elevation of the top of the pole from the point B.



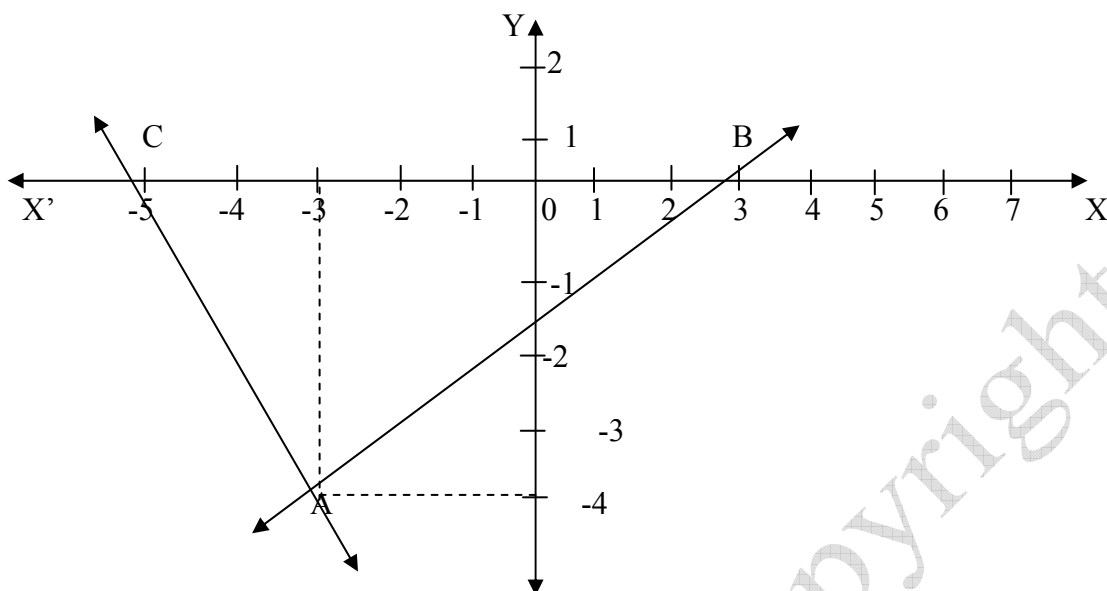
- 12) Find the quadratic polynomial which represents the graph from the fig. given below.



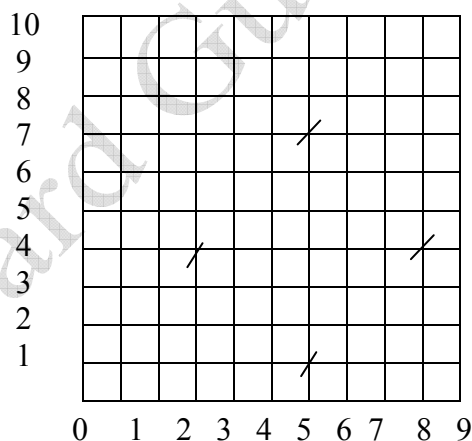
- 13) In fig.  $P(-3, 3)$  is the mid-point of the line segment  $AB$ . Find the coordinates of  $A$  and  $B$ .



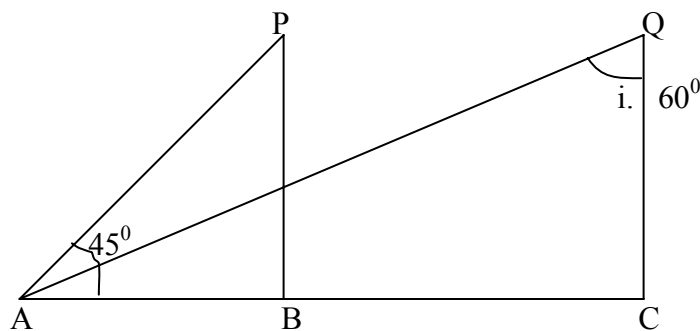
- 14) From the graph given below state whether the triangle  $ABC$  is scalene, isosceles or equilateral. Justify your answer. Also find its area.



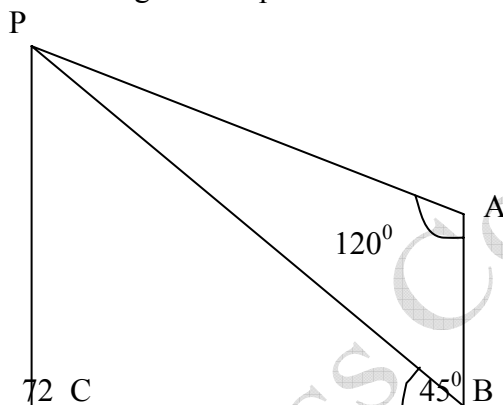
- 15) If  $\alpha$  and  $\beta$  are the zeros of the polynomial  $x^2 - 5x + 7$ , find  $\alpha^3 + \beta^3$ .
- 16) '1' and -3 are the zeros of the polynomials  $x^3 - ax^2 - 13x + b$ , find the values of a and b.
- 17) In a classroom, 4 friends are seated at the points A, B, C and D as shown in fig. Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli, "Don't you think ABCD is a square?" Chameli disagrees. Using distance formula, find which of them is correct.



- 20..In fig. what are the angles of depression from the observation positions P and Q of the object A?



21. In fig. what are the angles of depression of A and B from the observation point P.



22..Given that  $\text{HCF} (306, 1314) = 18$ , find  $\text{LCM} (306, 1314)$ .

23.Find the quadratic polynomial whose zeros are  $5 + \sqrt{3}$  and  $5 - \sqrt{3}$ .

24.Find the positive real root of the equation  $64x^2 - 1 = 0$ .

25.If  $\tan\theta + 1/\tan\theta = 2$ , then find the value of  $\tan^2\theta + 1/\tan^2\theta$ .

26.Find the first 3 terms of the series if the sum of n terms is  $\frac{n(n+1)}{2}$ .

27.A largest sphere is carved out from a solid cube of side 7cm. What will be the radius of the sphere so formed?

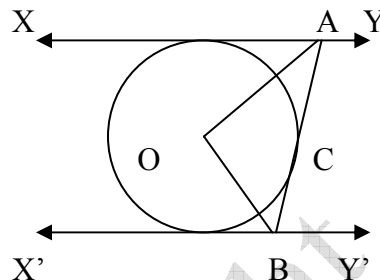
28.A vertical pole of length 6m casts a shadow 4m long on the ground and at the same time a tower casts a shadow 28m long. Find the height of the tower.



29. In fig XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact

C intersecting XY at A and X'Y' at B.

What the measure of LAOB?



30. A single letter is selected from the word "PROBABILITY". Find the probability that it is a vowel.

31. Write the empirical relationship between the three measures of central tendency.

32..State Euclid's Division Lemma

33. Without actual division state whether  $\frac{35}{50}$  will have a terminating or a non terminating decimal representation

34. Form a quadratic polynomial whose zeroes are  $\frac{-1}{4}$  and 1

35. Find a cubic polynomial with the sum, sum of product of its zeroes taken two at a time, and the product of its zeroes as 2, -7, -14 resp.

36. Find the value of k for which the quadratic equation  $kx(x - 2) + 6$  has real roots

37. For what value of n are the nth terms of the two AP's 63, 65, 67 ..... and 10, 17 ..... equal

38. Which term of the AP: 121, 117, 113 ... is first negative

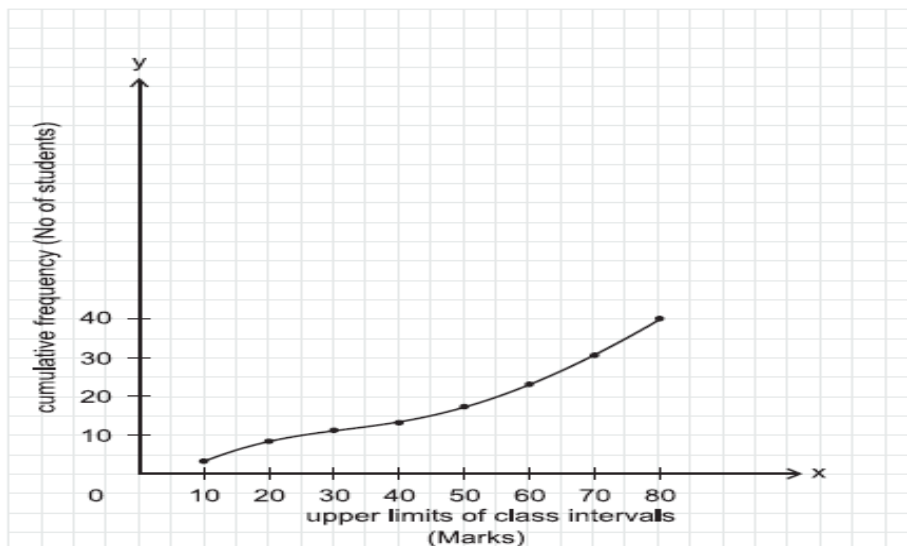
39. E and F are points on the sides PQ and PR of a  $\Delta PQR$  resp. If  $PE=3.9$ ,  $EQ=3$ ,  $PF=3.6$ ,  $PR=6$  State whether  $EF \parallel QR$

40. Express  $\tan A$  in terms of  $\sin A$

41. If  $\tan(A+B) = \sqrt{3}$  and  $\tan(A-B) = \frac{1}{\sqrt{3}}$  Find A and B

42.. Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle, is bisected at the point of contact

43 Find the median from the following graph



44. The probability of an event is greater than or equal to \_\_\_\_\_ and less than or equal to \_\_\_\_\_

45. The radii of two circles are 19cm and 9cm resp. Find the radii of the circle which has circumference equal to the sum of the circumferences of the two circles

46. The LCM and HCF of two numbers are 180 and 6 respectively. If one of the number is 30. Write the relation between LCM, HCF and of two numbers and hence find the other number.  
**Ans:  $L \times H = a \times b$  , 36**

47. If  $\alpha$  and  $\beta$  are the zeroes of the quadratic polynomial  $f(x) = 6x^2 + x - 2$ , find the value of  $\frac{\alpha}{\beta} + \frac{\beta}{\alpha}$  (HOTS)  
**Ans:  $(-25)/12$**

48. Find the values of k for which the equation  $x^2 + Kx + 4$  has equal roots?  
**Ans:  $k = \pm 4$**

49. Express  $\sin A$  in terms of  $\tan A$ . (HOTS)  
**Ans:  $\frac{\tan A}{\sqrt{1 + \tan^2 A}}$**

50. Find the 12<sup>th</sup> term from the end of the A.P. 3, 8, 13, 18, ..... , 98  
**Ans: 43**

51. In a  $\triangle ABC$ , P and Q are point on sides AB and AC respectively, such that  $PQ \parallel BC$ . If  $AP = 2.4$ cm,  $AQ = 2$ cm,  $QC = 3$ cm and  $BC = 6$ cm, find AB and PQ.

**Ans:  $AB = 6$ ,  $PQ = 2.4$**

52. If triangle ABC and triangle DEF are similar such that  $AB = 1.2$ cm and  $DE = 1.4$ cm. Find the ratio of the areas of triangle ABC and DEF.

**Ans: 36:49**

53. Find the area of the sector with radius 7cm if angle of the sector is one-third of right angle  
**Ans:  $51.33 \text{ cm}^2$**

54. A die is thrown once, Find the probability of getting (i) a prime number (ii) a number greater than 5.

55. Find the mean of all prime numbers up to 20. **Ans: 9.625**
56. If the  $n$ th term of an AP is  $(2n + 1)$ , find the sum of first  $n$  terms of the AP.
57. Find the probability that a number selected from the numbers 1 to 25 is not a prime number when each of given number is equally likely to be selected.
58. If  $\tan A = \cot B$ , prove that  $A + B = 90^\circ$
59. Find the HCF of 96 and 404 by the prime factorization method. Hence, find the LCM.
60. Give examples of polynomials  $P(x)$ ,  $G(x)$ ,  $Q(x)$  and  $R(x)$  which satisfy the division algorithm and  $\deg R(x) = 0$ .
61. Find the values of  $k$  for the quadratic equation  $kx(x - 2) + 6 = 0$  have equal roots.
62. Let  $\triangle ABC \sim \triangle DEF$  and their area be respectively  $64 \text{ cm}^2$  and  $121 \text{ cm}^2$ . If  $EF = 15.4 \text{ cm}$ , find  $BC$ .
63. From a point  $Q$ , the length of the tangent to a circle is  $24 \text{ cm}$  and the distance of  $Q$  from the centre is  $25 \text{ cm}$ . Find the radius of the circle.
64. 2 cubes each of volume  $64 \text{ cm}^3$  and joined end to end. Find the surface area of the resulting cuboid.

**Sample Paper – 2008**  
**Class: - X**  
**Subject – Mathematics**

**Time-3hrs**

**MM.-80**

1. What must be added to polynomial  $f(x) = x^4 + 2x^3 - 2x^2 + x - 1$  so that the resulting polynomial is exactly divisible by  $x^2 - 4x + 3$ .
2. Radius of a circle is 8 cm. A point P is 17 cm away from the centre of this circle. What will be the length of the tangent drawn from this point P to the circle.
3. Find the distant of a point (x, y) from the origin of the co-ordinate axis.
4. A pendulum swings through an angle of  $30^\circ$  and describes an arc 8.8 cm in length. Find the length of the pendulum. (Take  $\pi = 22/7$ )
5. Find the sum of n terms of an AP whose  $n^{\text{th}}$  term is given by  $a_n = 5 - 6n$ .
6. Which measure of central tendency is given by the x – coordinate of the point of intersection of the 'more than' ogive and 'less than' ogive?
7. A die is thrown once. What is the probability of getting a number between 3 and 6.
8. The common difference of an A.P. is 4. Find the value of  $a_{60} - a_{55}$
9. The sum and product of the zeroes of a quadratic polynomial are  $-\frac{1}{2}$  and  $-3$  respectively.  
 What is the quadratic polynomial.
10. The lengths of two cylinders are in the ratio 3 : 1 and their diameters are in the ratio 1 : 2. Calculate the ratio of their volumes.
11. Without using trigonometric table, evaluate the following:  

$$\frac{2 \cos 65^\circ}{\sin 25^\circ} - \frac{\tan 20^\circ}{\cot 70^\circ} - \sin 90^\circ + \tan 5^\circ \tan 35^\circ \tan 60^\circ \tan 55^\circ \tan 85^\circ$$

**Or**

 If  $\tan A = \frac{1}{2}$ ,  $\tan B = \frac{1}{3}$  and  $\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$ , Find A+B
12. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of a red ball, find the number of blue balls in the bag.
13. Prove that  $3 + 2\sqrt{3}$  is an irrational number.
14. If the heights of two cones are in the ratio of 1:3 and their diameters are in the ratio of 3:5, find the ratio of their volumes
15. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.
16. A spiral is made up of successive semicircles, with centre alternately at A and B, starting with centre at A, of radii 0.5 cm, 1.0 cm, 1.5 cm, 2.0 cm, . . . . . as shown in fig. What is the total length of such a spiral made up of thirteen consecutive semicircles? (Take  $\pi = 22/7$ )

17. Solve by using Quadratic formula:  $a^2b^2x^2 + b^2x - a^2x - 1 = 0$

**Or**

Solve the equation by the method of completing the square:  $5x^2 - 6x - 2 = 0$

18. Show that the points A (2, -2), B (14, 10), C (11, 13) and D (-1, 1) are the vertices of a rectangle.

**Or**

Determine the ratio in which the points (6, a) divides the join of A (-3, -1) and B (-8, 9). Also find the value of "a".

19. Draw a triangle ABC with side BC = 7cm, B = 45°, A = 105°. Then, construct a triangle whose sides are  $\frac{4}{3}$  times the corresponding sides of  $\triangle ABC$ .

20. Prove the identity:  $\frac{\sin A + 1 - \cos A}{\cos A - 1 + \sin A} = \frac{1 + \sin A}{\cos A}$

21. How many terms of the AP: 24, 21, 18, ..... must be taken so that their sum is 78 ?

**Or**

Find the sum of first 24 terms if the  $n^{\text{th}}$  term is given by  $a_n = 9 - 5n$

22. Solve for x and y :  $(a - b)x + (a + b)y = a^2 - 2ab - b^2$  ;  $(a + b)(x + y) = a^2 + b^2$

**Or**

$$6(ax + by) = 3a + 2b ; 6(bx - ay) = 3b - 2a$$

23. A cylindrical container is filled with ice cream, whose radius is 6cm and height 15cm. The whole ice cream is distributed among 10 children in equal cones having hemispherical top. If the height of the conical portion is 4 times the radius of its base. Find the radius of the base of the cone.

24. In fig OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD = 2 cm, find the area of the shaded region. ( use  $\pi = 22/7$  )

25. A shopkeeper buys a certain no. of books for Rs.1200. If he had bought 10 more books for the same amount, each book would have cost him Rs.20 less. Find the original no. Of books he had purchased.

26. From an aero plane vertically above a straight horizontal road, the angles of depression of two consecutive milestones on opposite sides of the aero plane are observed to be  $\alpha$  and  $\beta$ . Show that the height of the aero plane above the road is  $\tan \alpha \cdot \tan \beta / (\tan \alpha + \tan \beta)$ .

**Or**

A vertical tower stands on a horizontal plane and is surmounted by a flagstaff of height h. At a point on the ground, the angle of the elevation of the bottom of the flagstaff is  $\alpha$  and that of the top of the flagstaff is  $\beta$ . Prove that the height of the tower is  $h \tan \alpha / (\tan \beta - \tan \alpha)$ .

27. A cylindrical bucket 32cm high and with radius of base 18cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24cm, find the radius and slant height of the heap.

**Or**

The radii of the ends of a bucket 45cm high are 28cm and 7cm. find its volume and the total surface area.

Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares of the corresponding sides.

28. Show that the ratio of the areas of two similar triangles is equal to the ratio of the squares of their corresponding sides. Two triangles ABC and PQR are similar. If area ( $\triangle ABC$ ) = 4 area ( $\triangle PQR$ ) and BC = 12 cm. Find QR

29. A person on tour has Rs. 360 for his expenses. If he extends his tour for 4 days, he has to cut down his daily expenses by Rs. 3. Find the original duration of the tour.

30. If the mean of the following data is 52, find the missing frequency:

Wages: (In Rs.)	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
No. of Workers	5	3	4	?	2	6	13

Also construct a cumulative frequency curve and find the median from the graph.

Board Guess

**SAMPLE PAPER - 2008**  
**Class - X**  
**SUBJECT - MATHEMATICS**

General Instructions:

- [1] All questions are compulsory.
- [2] This question paper consists of 30 questions divided into four Sections A, B, C and D. Section-A consist of 10 questions of 01 marks each, Section -B consists of 5 questions of 02 marks each, Section - C consist of 10 questions 03 marks each and Section – D consist of 5 questions 06 marks each.
- [3] All questions in section – A are to be answered in one ward, one sentence or as per the exact requirement of the question.
- [4] There is no overall choice. However, internal choice has been provided in one question of Section- B, three questions of Section-C and two questions of Section-D. You have to attempt only one of the alternatives in all such questions.
- [5] In question of construction, drawings should be neat and exactly as per the given measurements.
- [6] Use of calculator is not permitted.

**SECTION A**

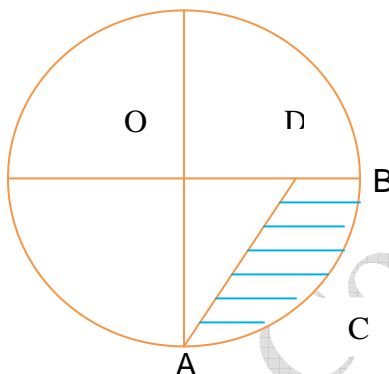
1. Write down at most zeros of a polynomial of degree n.
2. Express 875875 as the product of its prime factors.
3. The sum of two numbers is 8. If their sum is four times their difference, find the numbers.
4. Discuss the nature of roots of the quadratic equation:  $2x^2 + x + 4 = 0$ .
5. How many terms of the A.P. 26, 21, 16, .... are together equal to 80?
6. In a right angled triangle ABC, angle A =  $90^\circ$   $AD \perp BC$ . Prove that  $AD^2 = BD \times CD$ .
7. If  $\sin \alpha = \frac{1}{\sqrt{2}}$  and  $\tan \beta = \frac{1}{\sqrt{3}}$  find the value of  $\sin(\alpha + \beta)$ , where  $\alpha$  and  $\beta$  are the acute angles.
8. Find the perimeter of a circular plot which occupies an area of 154 sq.m.
9. Mean of n observations is 25, if each number is increased by 7, what will be the new mean?
10. A card is drawn at random from a pack of 52 playing cards. Find the probability that the card drawn is neither an ace nor a king.

### SECTION B

11. The arithmetic mean of the following data is 14. Find the value of p.

X:	5	10	15	20	25
F:	7	p	8	4	5

12. In the adjoining figure OACB is a quadrant of a circle with centre O and radius 7cm. If OD = 4cm, find the area of the shaded region



13. Find a point on x-axis which is equidistant from the points (7,6) and (-3,4).

14. If one zero of the polynomial  $P(x) = (a^2 + 4)x^2 + 13x + 4a$  is reciprocal of the other, find the value of a.

15. The  $n^{\text{th}}$  term of an A.P. is given by  $t_n = 4n - 5$ . Find the sum of first 25 terms.

**OR,** The sum of first n terms of an A.P. is given by  $S_n = 2n^2 + 5n$ , find the  $n^{\text{th}}$  term of A.P.

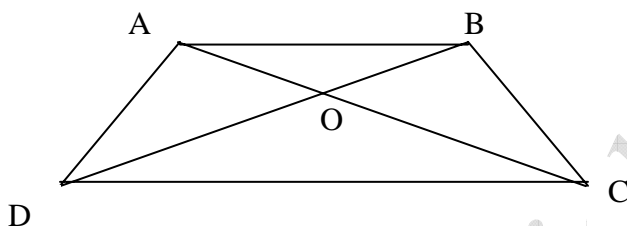
### SECTION C

16. 300 apples are distributed equally among certain number of students. Had there been 10 more students, each would have received one apple less. Find the number of students.

17. The perpendicular AD on the base BC of triangle ABC intersect BC in D, such that  $BD = 3 CD$ . Prove that  $2AB^2 = 2AC^2 + BC^2$ .



**OR,** If in the given figure,  $\frac{AO}{OC} = \frac{BO}{DO} = \frac{1}{2}$  and  $AB = 4$  cm, find the value of  $DC$ .



18. Find the area of quadrilateral ABCD whose vertices are  $(-4, -2)$ ,  $(-3, -5)$ ,  $(3, -2)$  and  $(2, 3)$  respectively.

19. Evaluate:  $2 \frac{\cos^2 20^\circ + \cos^2 70^\circ}{\sin^2 25^\circ + \sin^2 25^\circ} - \tan 45^\circ + \tan 13^\circ \tan 23^\circ \tan 30^\circ \tan 67^\circ \tan 77^\circ$

**OR,** Prove:  $\frac{\cos \theta}{1 - \tan \theta} + \frac{\sin \theta}{1 - \cot \theta} = \sin \theta + \cos \theta$

20. Draw a line segment  $AB = 8$  cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre, draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

21. The area enclosed between the two concentric circles is  $770 \text{ cm}^2$ . If the radius of the

outer circle is 21 cm, calculate the radius of the inner circle.

22. A bag contains 10 white balls, 5 red balls, 8 blue balls and 7 black balls. A ball is drawn at random from the bag. Find the probability that it is:

(i) either white or black (ii) neither white nor red ball.

23. Find the coordinates of the points of trisection of the line segment joining the points

$P(2, -2)$  and  $Q(-7, 4)$ .

OR

Determine the ratio in which the line  $2x + y - 4 = 0$  divides the line segment joining the points  $A(2, -2)$  and  $B(3, 4)$ .

24. Using Euclid's algorithm, find the H.C.F. of 144, 180 and 192.

25. Solve graphically:  $5x - 3y + 30 = 0$  ;  $5x + 4y - 20 = 0$ .

Also, write the vertices of the triangle obtained by these lines and  $x$ -axis.

### SECTION D

26. A man on the top of a tower observes a car moving at a uniform speed coming directly towards the foot of the tower. If it takes 12 seconds for the angle of depression to change from  $30^\circ$  to  $60^\circ$ , how soon after this, will the car reach the tower?

27. State and prove *Pythagoras Theorem*. Using it, prove that the sum of the squares of

the sides of a rhombus is equal to the sum of the squares of its diagonals.

28. A circus tent is cylindrical to a height of 3 m and conical above it. If its base radius

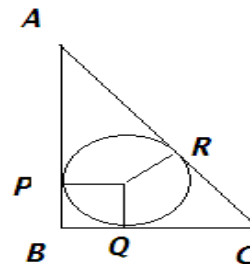
is 52.5 m and the slant height of the conical portion is 53m, find its capacity and the

area of the canvas needed to make the tent. ( use  $\pi = 22/7$  )

**OR**

The diameters of the ends of a frustum of a cone 35 cm high are 42 cm and 14 cm. Find its volume, the curved surface area and the total surface area. ( use  $\pi = 22/7$  )

29. In triangle  $ABC$ ,  $\angle B = 90^\circ$  and



**AB= 6 cm, BC= 8 CM. Find the radius of the**

**incircle.**

30. If the mean of the following data is 57.6. Find the missing frequencies.

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	7	f	12	g	8	5

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**Sample Paper -2008**  
**Class - X**  
**Subject – Mathematics**

*Time allowed: 3 hours]*

*[Maximum Marks: 80*

**General Instructions:**

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into four sections A, B, C and D. Section A contains 10 questions of 1 mark each, Section B is of 5 questions of 2 marks each, Section C contains 10 questions of 3 marks each and Section D is of 5 questions of 6 marks each.
3. There is no overall choice. However, internal choice has been provided in two questions of two marks each, two questions of three marks each and one question of 6 marks each.
4. In question on construction, the drawing should be neat and exactly as per the given measurements.
5. Use of calculator is not permitted.

**SECTION A**

1. Express 0.6 as a rational number in simplest form.
2. Can we have two medians of a data?
3. Can a quadratic polynomial have no zero?
4. On comparing the ratios ' and ' without drawing them, find out whether the lines representing the following pair of linear equations intersect at a point, are parallel or coincide

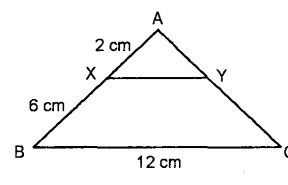
$$5x - 4y + 8 = 0; 7x + 6y - 9 = 0$$

5. Evaluate :  $\frac{\sin 18^\circ}{\cos 72^\circ}$

6. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that OQ = 12 cm. Find the length of PQ.
7. Find the length of the tangent drawn to a circle with radius 7 cm from a point 25 cm away from the centre of the circle.
8. Without using trigonometric tables, evaluate

$$\operatorname{cosec} 89^\circ - \sec 1^\circ.$$

9. In the given figure, XY || BC. Find the length of XY.



10. Prove that:  $\tan A (1 - \sin A) = \sin A \cos A$ .

Section B

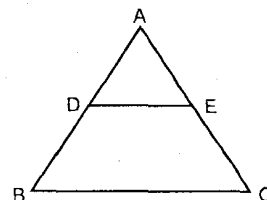
11. The 10<sup>th</sup> term of an AP is 52 and 16<sup>th</sup> term is 82. Find the 32<sup>nd</sup> term and the general term.

12. Two unbiased coins are tossed simultaneously. Find the probability of getting at most one head.

13. In the adjoining figure.

DE  $\parallel$  BC. If  $\frac{AD}{DB} = \frac{3}{5}$  and AC = 4.8 cm.

find AE.



14. Show that the points (1, —1). (5, 2) and (9, 5) are collinear.

15. A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = BC + DA.

Section C

16. Determine graphically the vertices of the triangle whose sides are

$$2x = y - 3, \quad x + y = 3, \quad y = 5$$

OR

Solve the following system of linear equations for x and y.

$$\frac{b}{a}x + \frac{a}{b}y = a^2 + b^2, \quad x + y = 2ab.$$

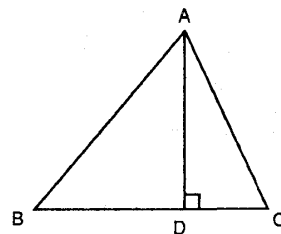
17. If the roots of the equation  $(b - c)x^2 + (c - a)x + a - b = 0$  are equal, prove that  $2b = a + c$ .

18. Divide 32 into four parts which are in AP such that the ratio of the product of extremes to the product of means is 7 : 15.

OR

If the sum of m terms of an AP is the same as that of n terms, show that the sum of (m + n) terms of the AP is 0.

19. In an acute angled triangle ABC,  $AD \perp BC$ . . Prove that  $AC^2 = AB^2 + BC^2 - 2BC \cdot BD$ .



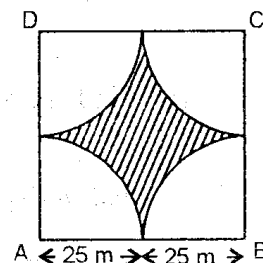
20. Draw a pair of tangents to a circle of radius 5 cm, which are inclined to each other at an angle of  $60^\circ$ .
21. Prove that the sum of the squares of the diagonals of a rhombus is equal to the sum of the squares of its sides.
22. The wheels of a car are of diameter 80 cm each. How many complete revolutions does each wheel make in 10 minutes, when the car is traveling at a speed of 66 km/h?
23. Find the values of  $k$  for which the quadratic equation  $kx(x - 3) + 9 = 0$  has real and equal roots.

OR

Solve for  $x$   $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$ ,  $a+b \neq 0$

24. D is a point on the side BC of  $\triangle ABC$  such that  $\angle ADC = \angle BAC$ . Prove that  $CA^2 = CB \times CD$ .

25. Four cows are tethered at four corners of a square Plot of side 50 in, so that they just can not reach one another. What area will be left ungrazed?



26. Solve the following system of linear equations graphically

$$4x - 5y - 20 = 0; 3x + 5y - 15 = 0$$

Determine the vertices of the triangle formed by the lines representing the above equation and the y-axis.

27. A man standing on the deck of a ship, which is 10 in above water level. He observes the angle of elevation of the top of a hill as  $60^\circ$  and the angle of depression of the base of the hill as  $30^\circ$ . Calculate the distance of the hill from the ship and the height of the hill.

OR

Two poles of equal heights are standing opposite each other on either side of the road, which are 80 in wide. From a point between them on the road, the angles of elevation of the top of the poles are  $60^\circ$  and  $30^\circ$  respectively. Find the height of the poles and the distance of the point from the poles.

28. Calculate the mode of the following frequency distribution.

Marks	above 25	above 35	above 45	above 55	above 65	above 75	above 85
No. of students	52	47	37	17	8	2	0

29. Two trains leave a railways station at the same time. The first train travels due south and the second train due north. The first train travels 5 km/h faster than the second train. If after 2 hours, they are 50 km apart, find the average speed of each train.

OR

The hypotenuse of a right angled triangle is 20 cm. If the difference between the lengths of the other two sides is 4 cm, find the other sides.

30. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. Prove.

**SAMPLE PAPER - 2008**  
**Class - X**  
**SUBJECT - MATHEMATICS**

**Duration: 3 Hours**  
**80**

**Max. Marks:**

General Instructions:

- [1] All questions are compulsory.
- [2] This question paper consists of 30 questions divided into four Sections A, B, C and D. Section-A consist of 10 questions of 01 marks each, Section -B consists of 5 questions of 02 marks each, Section - C consist of 10 questions 03 marks each and Section – D consist of 5 questions 06 marks each.
- [3] All questions in section – A are to be answered in one ward, one sentence or as per the exact requirement of the question.
- [4] There is no overall choice. However, internal choice has been provided in one question of Section- B, three questions of Section-C and two questions of Section-D. You have to attempt only one of the alternatives in all such questions.
- [5] In question of construction, drawings should be neat and exactly as per the given measurements.
- [6] Use of calculator is not permitted.

**SECTION - A**

1. Explain why  $7 \times 11 \times 13 + 13$  is a composite number?
2. What are the x intercepts of the graph of the polynomial:  $p(x) = x^2 - 3x - 4$ .
3. Solve 
$$\begin{aligned} 373x + 627y - 754 &= 0 \\ 627x + 373y - 246 &= 0 \end{aligned}$$
4. For what value of k the quadratic equation  $2kx^2 - 8x + k = 0$  has repeated roots?
5. Find the value of k, so that  $8k - 4$ ,  $6k + 2$  and  $2k + 4$  are three consecutive terms of an A.P.
6. The areas of two similar triangles ABC and DEF are  $64\text{m}^2$  and  $169\text{m}^2$  respectively. If  $BC = 4\text{ cm}$ , find EF.
7. Find the centroid of the triangle whose angular points are  $(3, -5)$ ,  $(-7, 4)$  and  $(10, -2)$  respectively.
8. If  $\text{Cosec } \theta = \frac{13}{12}$ , find the value of  $\frac{2\sin\theta - 3\cos\theta}{4\sin\theta - 9\cos\theta}$



9. The perimeter of a sector of a circle of radius 5.7cm is 27.2cm. Find the area of the sector.

10. If the probability of winning a game is 0.37, what is the probability of losing it?

### SECTION - B

11. If the points  $(-2, -1)$ ,  $(1, 0)$ ,  $(x, 3)$ ,  $(1, y)$  form a parallelogram, find the values of  $x$  and  $y$ .

(OR)

Find the value of  $k$  for which the points with coordinates  $(3, 2)$ ,  $(4, k)$  and  $(5, 3)$  are collinear.

12. ABC is an isosceles triangle right angled at B. Two equilateral triangles are constructed with the sides BC and AC. Find the ratio of the areas of two equilateral triangles.

13. Find the roots of the quadratic equation  $x^2 - (\sqrt{2} + 1)x + \sqrt{2} = 0$  by the method of completing the square.

14. Find the sum of all integers between 50 and 500 which are divisible by 7.

(OR)

Find the first negative term of the sequence 2000, 1995, 1990, 1985, .....

15. Tickets are numbered from 3 to 103. They are well shuffled and then a ticket is drawn at

random. What is the probability that the drawn ticket has

- (i) a number 7 or multiple of 7
- (ii) a number which is cube?

### SECTION - C

16. Using Euclid's division algorithm, find the HCF of 56, 96 and 404.

(OR)

Prove  $5 + \sqrt{6}$  is an irrational number.

17. Solve graphically:  $2y - x = 8$ ,  $5y - x = 14$ ,  $y - 2x = 1$ . Obtain the vertices of the triangle so obtained by the graphs of the equations.

18. Show that the square of any positive integer is of the form  $3m$  or  $3m + 1$  for some integer  $m$ .

(OR)

Find all the zeros of the polynomial  $2x^4 - 3x^3 - 3x^2 + 6x - 2$ , if it is given that two of its zeros

are  $\sqrt{2}$  and  $-\sqrt{2}$

19. Prove  $\frac{\sin \theta}{1 + \cos \theta} + \frac{1 + \cos \theta}{\sin \theta} = 2 \operatorname{cosec} \theta$

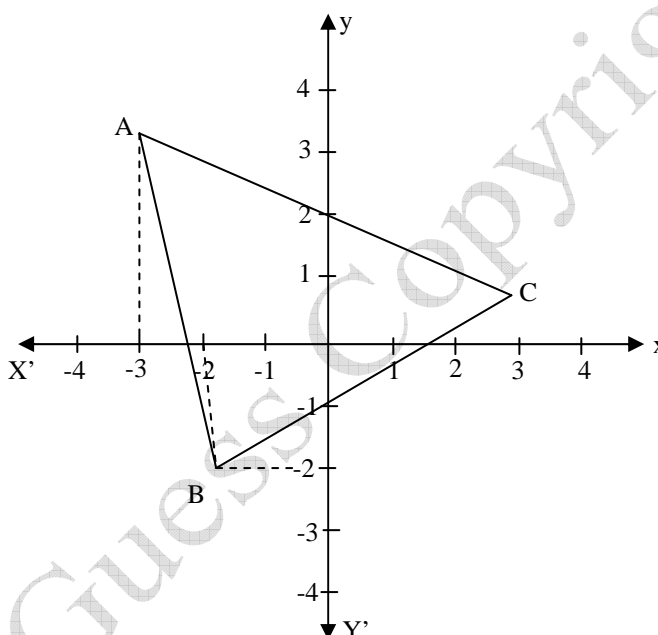
(OR)

Prove  $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = 2\sec\theta$

**20.** Construct a  $\triangle ABC$  in which  $AC = 7\text{cm}$ ,  $AB = 6\text{cm}$  and  $\angle BAC = 60^\circ$ , then construct a triangle

similar to the given triangle whose sides are  $\frac{3}{4}$  of the corresponding sides of the  $\triangle ABC$ .

**21.** From the figure below, find the area of  $\triangle ABC$ .



**22.** If PQ and RS are two parallel tangents to a circle with centre O and another tangent XY,

with point of contact C intersects PQ at A and RS at B. Prove that  $\angle AOB = 90^\circ$ .

**23.** A square field and an equilateral triangular park have equal perimeters. If the cost of plugging

the field at rate of Rs. 10 per  $\text{m}^2$  is Rs. 1440, find the cost of maintaining the park at the rate of Rs. 25 per  $\text{m}^2$ .

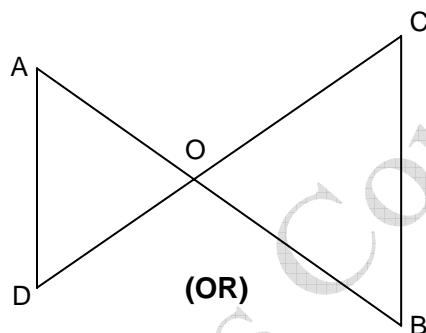
**24.** If  $(x_1, y_1)$ ,  $(x_2, y_2)$  and  $(x_3, y_3)$  are the vertices of a triangle, prove that its centroid is

$$\left( \frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right)$$

25. Ragini scored 40 marks in a test, getting 3 marks for each right answer and losing 1 mark for each wrong answer. Had 4 marks been awarded for each correct answer and 2 marks been deducted for each incorrect answer, then Ragini would have scored 50 marks. How many questions were there in the test?

### SECTION – D

26. If one angle of triangle is equal to one angle of the other triangle and the sides including these angles are proportional, then the two triangles are similar. Prove using this, from the given figure. Show that  $\angle A = \angle C$  and  $\angle B = \angle D$ . If  $OA \times OB = OC \times OD$



Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that  $\angle PTQ = 2 \angle OPQ$ .

PQ is a chord of length 8cm of a circle of radius 5cm. The tangents at P and Q intersect at a point T. Find the length of TP.

27. A right triangle, whose sides are 3cm, 4cm and 5cm, is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed.

(OR)

A wooden toy rocket is in the shape of a cone mounted on a cylinder. The height of the entire rocket is 26cm, while the height of the conical part is 6cm. The base of the conical portion has a diameter of 5cm, while the base diameter of the cylindrical portion is 3cm. If the conical portion is to be painted orange and the cylindrical portion yellow. Find the area of the rocket painted with each of these colours.

28. A 1.2m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2m

from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant

is  $60^\circ$ . After 20 seconds, the angle of elevation reduces to  $30^\circ$ , find the distance traveled by the balloon and also find its speed.

29. 4 men and 4 boys can do a piece of work in 3 days, while 2 men and 5 boys can finish it in 4

days. How long would it take 1 boy to do it? How long would it take 1 man to do it?



<http://www.boardguess.com>

**30.** The median of the following data is 525. Find the values of  $x$  and  $y$ , if the total frequency is 100.

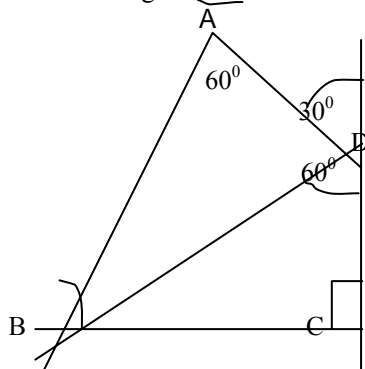
Class interval	0 - 100	100 - 200	200 - 300	300 - 400	400 - 500	500 - 600	600 - 700	700 - 800	800 - 900	900 - 1000
f	2	5	X	12	17	20	Y	9	7	4

.....

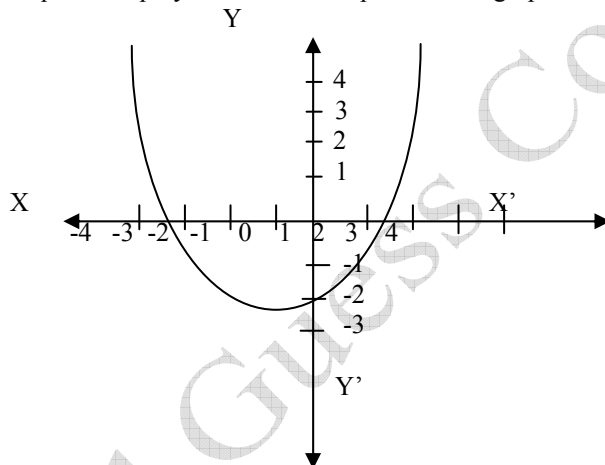
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**Sample Paper - 2008**  
**Class - X**  
**Subject - Mathematics**

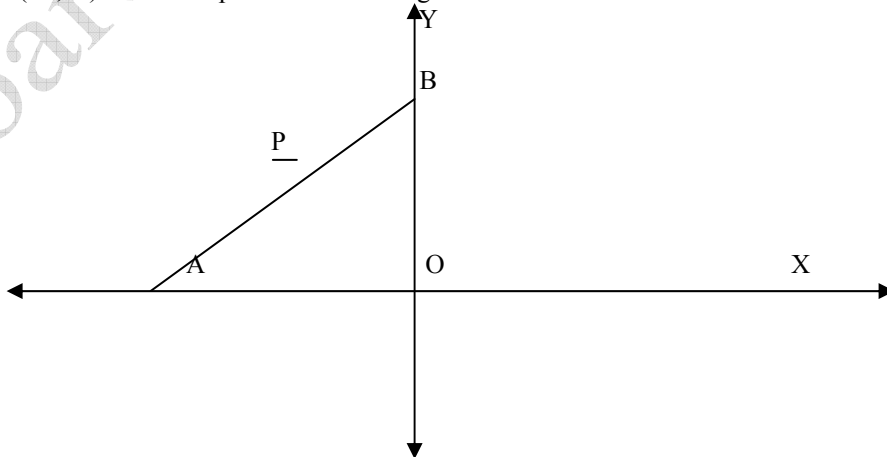
1. In fig. AD be a pole. Find the angle of elevation of the top of the pole from the point B.



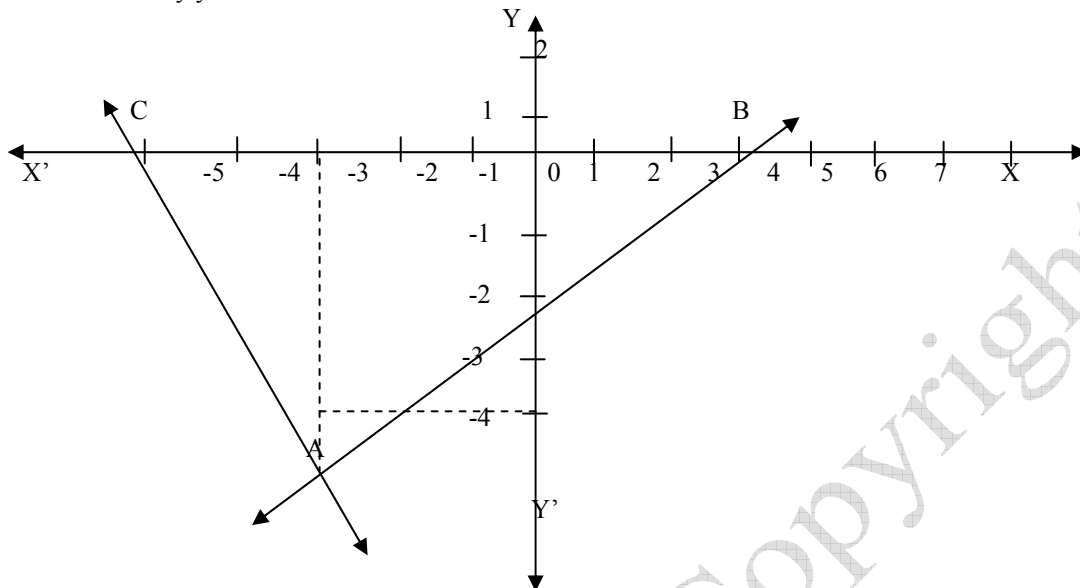
2. Find the quadratic polynomial which represents the graph from the fig. given below.



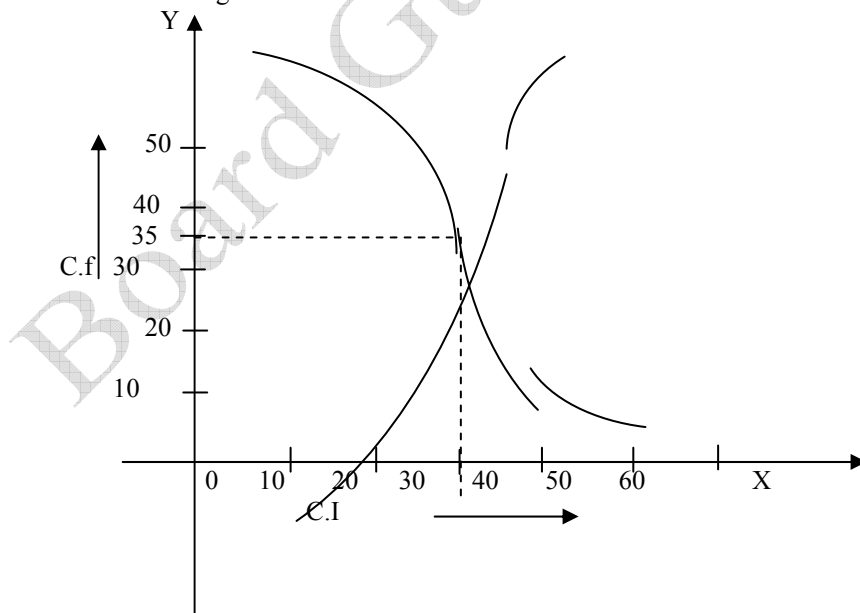
3. In fig. P (-3, 3) is the mid-point of the line segment AB. Find the coordinates of A and B.



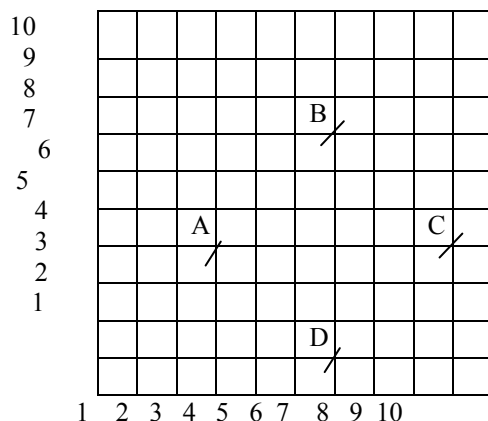
4. From the graph given below state whether the triangle ABC is scalene, isosceles or equilateral. Justify your answer. Also find its area.



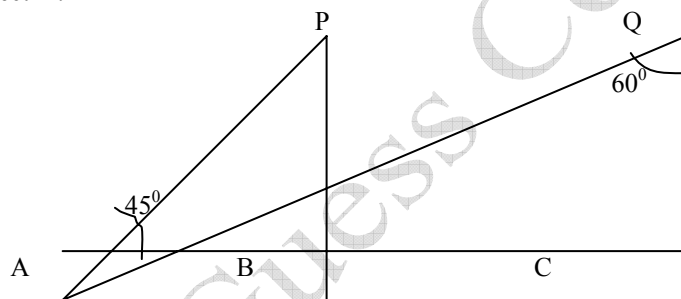
5. What is the value of the median of the data using the graph given below of less than ogive and more than ogive.



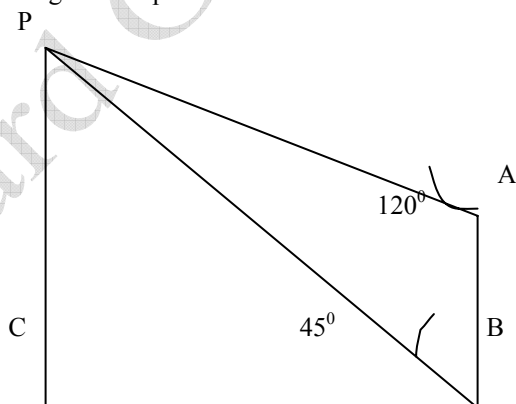
6. In a classroom, 4 friends are seated at the points A, B, C and D as shown in fig. Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli, “Don’t you think ABCD is a square?” Chameli disagrees. Using distance formula, find which of them is correct.



7. In fig. what are the angles of depression from the observation positions P and Q of the object A?



8. In fig. what are the angles of depression of A and B from the observation point P.



9. If  $\alpha$  and  $\beta$  are the zeros of the polynomial  $x^2 - 5x + 7$ , find  $\alpha^3 + \beta^3$ .
10. ‘1’ and  $-3$  are the zeros of the polynomials  $x^3 - ax^2 - 13x + b$ , find the values of  $a$  and  $b$ .

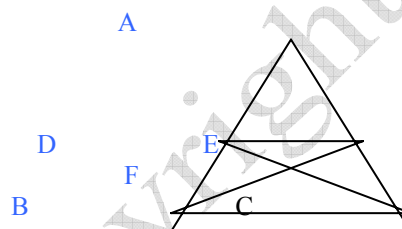
11. If  $x = k \sin A \cos B$ ,  $y = k \sin A \sin B$  and  $z = K \cos A$ , then prove that  
 $x^2 + y^2 + z^2 = k^2$

12. Solve the equation  $1 + 6 + 11 + 16 + \dots + x = 148$ .

13. Which term of the sequence  $20, 19 \frac{1}{4}, 18 \frac{1}{2}, 17 \frac{3}{4}, \dots$  is the first negative term.

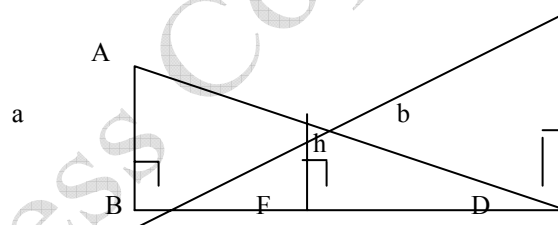
14. If  $m$  times the  $m^{\text{th}}$  term of an A.P is equal to  $n$  times its  $n^{\text{th}}$  term, then show that its  
 $(m + n)^{\text{th}}$  term is zero.

15. In fig.  $DE \parallel BC$  and  $AD : DB = 5 : 4$ . Find  $\frac{\text{ar}(\triangle DFE)}{\text{ar}(\triangle CFB)}$

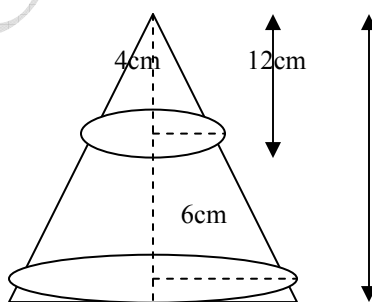


16. Two poles of height 'a' and 'b' are 'c' metres apart. Prove that the height 'h' metres of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is ab.

C

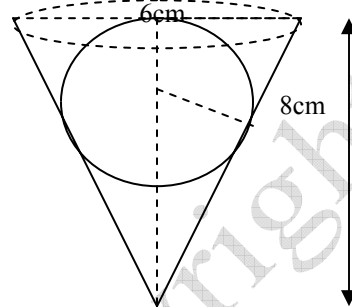


17. A solid cone of height 12 cm and base radius 6 cm has top 4 cm removed as shown in the fig. Find the whole surface area of the remaining solid cone





18. A conical vessel of radius 6 cm and height 8 cm is completely filled with water. A sphere is lowered into the water and its size is such that when it touches the sides, it is just immersed. What fraction of water overflows?



19. An oil funnel made of tin sheet consists of a cylindrical portion 10cm, long attached to a frustum of a cone. If the total height is 22cm, diameter of the cylindrical portion is 8cm, and the diameter of the top of the funnel is 18cm, find the area of the tin sheet required to make the funnel.
20. A right triangle whose sides are 15cm and 20cm is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed.
21. The angle of elevation of the top of the tower from a point on the same level as the foot of tower is  $\alpha$ , on advancing P metres towards the foot of the tower, the angle of elevation becomes  $\beta$ . Show that the height h of the tower is given by  $h = \frac{P \tan \beta \tan \alpha}{\tan \beta - \tan \alpha}$ .  
Also determine the height of the tower when  $P = 150\text{m}$ ,  $\alpha = 30^\circ$  and  $\beta = 60^\circ$ .
22. From the top of a light house, the angles of depression of two ships on the opposite sides of it are observed to be  $\alpha$  and  $\beta$ . If the height of the light house be h metres and the line joining the ships passes through the foot of the light house, show that the distance between the ships is  $\frac{h (\tan \alpha + \tan \beta)}{\tan \alpha \tan \beta}$  metres.
23. A round balloon of radius 'a' subtends an angle  $\theta$  at the eye of the observer while the angle of elevation of its centre is  $\phi$ . Prove that the height of the centre of the balloon is  $a \sin \phi \operatorname{cosec} \frac{\theta}{2}$ .
24. Two trains leave a railway station at the same time. The first train travels due west and the second due north. The first train travels 5km/hr faster than the second train. If after two hours, they are 50km apart, find the average speed of each train.

**Sample Paper – 2008**  
**Class – X**  
**Subject – Mathematics**

TIME: 3 HOURS  
80

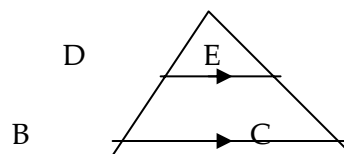
MAX MARKS:

**GENERAL INSTRUCTIONS:**

1. All questions are compulsory.
2. The question paper consists of thirty questions divided into four sections A, B, C & D. Section A comprises of ten questions of 01 marks each, Section B comprises of five questions of 02 marks each, Section C comprises of ten questions of 03 marks each and section D comprises of five questions of 06 marks each.
3. All questions in section A are to be answered in one word, one sentence or as per the exact requirement of the question.
4. There is no overall choice. However internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 06 mark each. You have to attempt only one of the alternatives in all such questions.
5. In question on construction, drawings should be neat and exactly as per the given measurements.
6. Use of calculators is not permitted.

**SECTION - A**

1. If the H C F of 309 and 657 is 9, find their L C M.
2. If  $\alpha$  and  $\beta$  are the zeros of the polynomial  $3x^2 - 5x + 7$ , find the value of  $\frac{1}{\alpha} + \frac{1}{\beta}$ .
3. The system of equations  $3x - 4y + 7 = 0$ ,  $kx + 3y - 5 = 0$  is inconsistent. Find the value of  $k$ .
4. Find the coordinate of the point at which the line  $3x + 2y = 12$  intersects the  $x$ -axis.
5. Find the 10<sup>th</sup> term of the A.P.  $\sqrt{2}$ ,  $\sqrt{8}$ ,  $\sqrt{18}$ ,  $\sqrt{32}$ , .....
6. If  $3 \sin^2 \theta = 2 \frac{1}{4}$ , find the value of  $\theta$ .
7. Find the distance between the points  $(a \cos 35^\circ, 0)$  and  $(0, a \cos 65^\circ)$  A
8. In  $\Delta ABC$ ,  $DE \parallel BC$ , so that  $AD = 2.4$  cm,  $DB = 3.2$  cm, and  $AC = 9.6$  cm, then find  $EC$ ? D
9. Find the perimeter of a sector of a circle of radius 14 cm and central angle  $60^\circ$ .
10. In a throw of a pair of dice, what is the probability of getting a sum more than 7.



**SECTION – B**

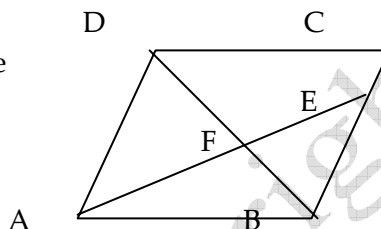
11. Find the 12<sup>th</sup> term from the end of the A.P. 3, 8, 13, ....., 253  
 12. If  $3 \cos \theta - 4 \sin \theta = 2 \cos \theta + \sin \theta$ , find  $\tan \theta$ .

**OR**

If  $\sqrt{3} \tan 2x = \cos 60^\circ + \sin 45^\circ \cos 45^\circ$ , find the value of  $x$ .

13. The diagonal BD of a parallelogram ABCD intersects the segment AE at the point F, where E is any point on the side BC.

Prove that:  $DF \times EF = FB \times FA$



14. Find the value of  $k$ , if the point P (0, 2) is equidistant from (3,  $k$ ) and ( $k$ , 5).  
 15. From a pack of 52 playing cards jacks, queens, kings and aces of red colour are removed. The remaining cards are shuffled and one card is taken at random. Find the probability that the card drawn is (i) a face card (ii) neither queen nor king.

**SECTION – C**

16. In a morning walk three persons step off together, their steps measure 80 cm, 85 cm and 90 cm respectively. What is the minimum distance each should walk so that they can cover the distance in complete steps?

17. Solve:  $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$

**OR**

If  $-5$  is a root of the quadratic equation  $2x^2 + px - 15 = 0$  and the quadratic equation  $p(x^2 + x) + k = 0$  has equal roots, find the value of  $k$ .

18. If  $\alpha$  and  $\beta$  are the zeros of the polynomial  $f(x) = 3x^2 - 6x + 4$ , find a quadratic polynomial whose zeros are  $(\alpha + \beta)$  and  $(\alpha - \beta)$ .  
 19. Prove that:  $(\sin \theta + \sec \theta)^2 + (\cos \theta + \operatorname{cosec} \theta)^2 = (1 + \sec \theta \operatorname{cosec} \theta)^2$

**OR**

If  $x = r \sin A \cos C$ ,  $y = r \sin A \sin C$  and  $z = r \cos A$ , prove that  $r^2 = x^2 + y^2 + z^2$ .

20. The sum of the third and the seventh terms of an A.P. is 6 and their product is 8. Find the sum of first 16 terms of the A.P.  
 21. The vertices of a  $\Delta ABC$  are (1, 2), (3, 1) and (2, 5). Point D divides AB in the ratio 2 : 1 and P is the mid-point of CD. Find the coordinates of the point P.

**OR**

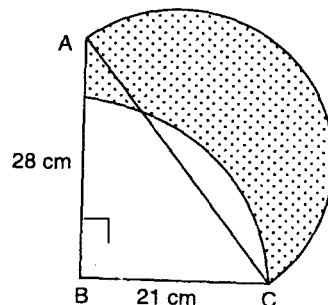
The line joining the points (2, 1) and (5,  $-8$ ) is trisected at the points P and Q. If the point P lies on the line  $2x - y + k = 0$ , find the value of  $k$ .

22. The area of a triangle is 5. Two of its vertices are (2, 1) and (3, -2). The third vertex lies on  $y = x + 3$ . Find the third vertex.

Page 2 of 4

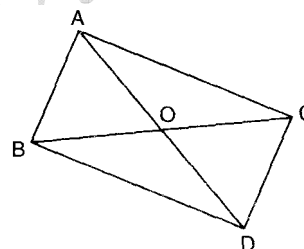
23. Let ABC be a right triangle in which  $AB = 7$  cm and  $\angle B = 90^\circ$  and  $BC = 5$  cm. BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct tangents from A to this circle.

24. In the adjoining figure ABC is a right angled triangle,  $\angle B = 90^\circ$ ,  $AB = 28$  cm and  $BC = 21$  cm. With AC as diameter a semicircle is drawn and as BC as radius a quadrant is drawn. Find the area of the shaded region.



25. In figure, ABC and DBC are two triangles on the same base BC. If AD intersect BC at O.

Prove that:  $\frac{\text{ar. } \triangle ABC}{\text{ar. } \triangle DBC} = \frac{AO}{DO}$



### SECTION - D

26. Determine graphically the vertices of the triangle, the equations of whose sides are given below:

$$2x - y + 1 = 0; \quad x - 5y + 14 = 0; \quad x - 2y + 8 = 0$$

27. State and prove the Pythagoras theorem.

Using the above theorem prove the following:

In an isosceles triangle ABC with  $AB = AC$ , BD is perpendicular from B to the AC.

Prove that:  $BD^2 - CD^2 = 2 CD \cdot AD$

28. A boy is standing on the ground and flying a kite with a string of 150 m, at an angle of elevation of  $30^\circ$ . Another boy is standing on the top of a 25 m tall building and is flying his kite at an elevation of  $45^\circ$ . Both the boys are opposite sides of both the kites. Find the length of the string in metres, correct to two decimal places that the second boy must have so that the two kites meet.

OR

Two pillars of equal height stand on either side of a roadway which is 150 m wide.

From a point on the roadway between the pillars the elevations of the top of the pillars are  $60^\circ$  and  $30^\circ$ . Find the height of the pillars and the position of the point.

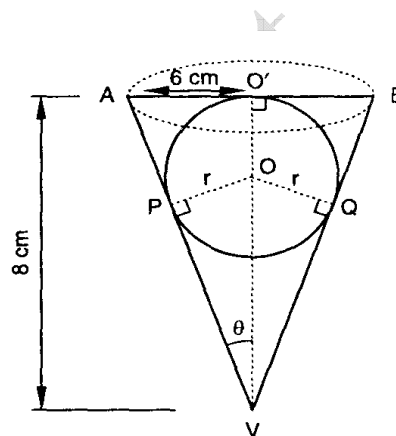
29. A right triangle, whose sides are 15 cm and 20 cm, is made to revolve about its hypotenuse. Find the volume and surface area of the double cone so formed. (Use  $\pi = 3.14$ )

OR

A conical vessel of radius 6 cm and height 8 cm is completely filled with water. A

Page 3 of 4

sphere is lowered into the water and its size is such that when it touches the sides, it is just immersed as shown in the figure. What fraction of water overflows?



30. Compute the missing frequencies  $f_1$  and  $f_2$  in the following data if the mean is  $166\frac{9}{26}$  and the sum of the observations is 52.

Classes	Frequency
140 – 150	5
150 – 160	$f_1$
160 - 170	20
170 – 180	$f_2$
180 – 190	6
190 – 200	2
Total	52