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INDIAN SCHOOL SOHAR
PERIODIC TEST II (2022-23)
MATHEMATICS(STANDARD-041)

CLASS: X **MAX. MARKS: 80**
DATE: 29.09.2022 **DURATION: 3 Hours**

GENERAL INSTRUCTIONS:

- All questions are compulsory.
- The question paper consists of **39** questions divided into 3 sections A, B, C. Section A comprises of **22** questions of **1 mark** each, section B comprises of **5** questions of **2 marks** each, **4** questions of **3 marks** each and **4** question of **5 marks** each. Section C comprises **4** Case Based questions with two subdivisions of **2 marks** each.
- There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, two questions of 3 marks each and two questions of 5 marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators not permitted.

SECTION A

Q 1-Q 15 are multiple choice questions. Select the most appropriate answer from the given options.

1. Given that HCF (2520, 6600) = 40, LCM (2520, 6600) = 252 × *k* then the value of *k* is
   (a) 1650 b)1600 (c) 165 (d)1625

2. Given that length of each side of an equilateral triangle is rational then its area is always a/an
   (a)Irrational number (b)rational number (c)natural number (d)positive integer

3. The least number which is a perfect square and is divisible by each of 16, 20 and 24 is
   (a) 240 (b)3600 (c) 2400 (d)1600

4. 7 x 11 x 13 x 15 + 15 is
   a) Prime number b) Composite number (c) Neither prime nor composite d) None of these

5. The degree of the polynomial $(x + 1)(x^2 – x – x^4 + 1)$ is:
   (a)2 b)3 (c) 4 (d)5

6. The pair of equations $x + 2y + 5 = 0$ and $–3x – 6y + 1 = 0$ has
   (a) a unique solution (b) exactly two solutions c) infinitely many solutions d) no solution

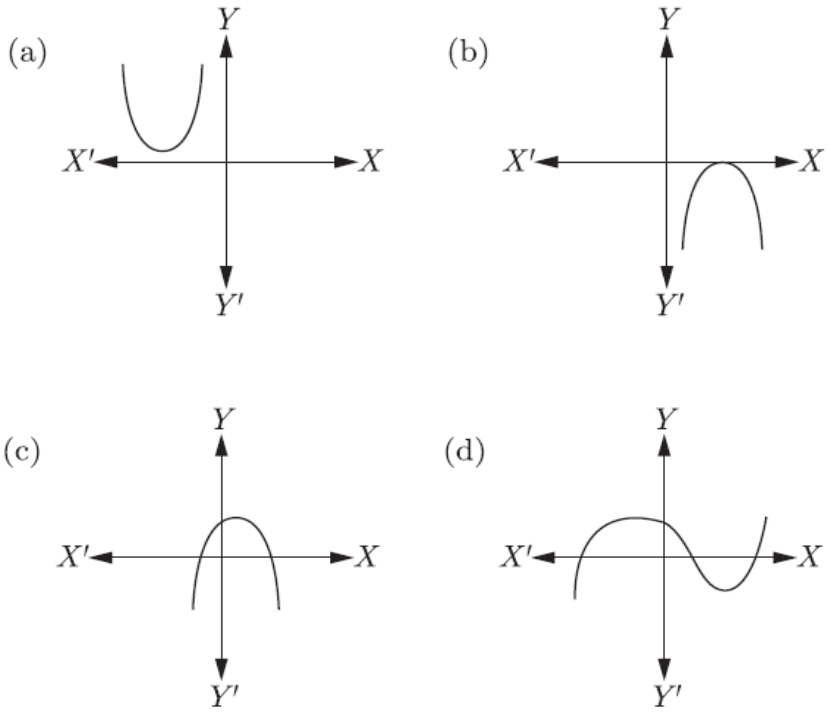
7. The ratio in which the line segment joining the points P(–3, 10) and Q(6, – 8) is divided by O(–1, 6) is
   (a) 1:3 (b) 3:4 (c) 2:7 (d) 2:5

8. The mid-point of the line-segment *AB* is *P*(0, 4), if the coordinates of *B* are (– 2, 3) then the coordinates of *A* are
   (a) (2, 9) (b) (– 2, –5) (c) (2, 5) (d) (– 2, 11)

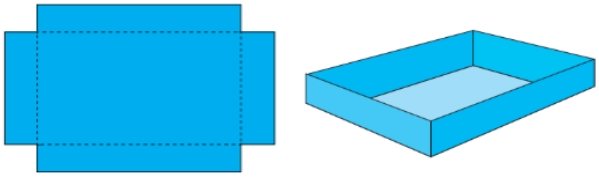
9. If $\tan \theta + \cot \theta = 4$, then find the value of $\tan^4 \theta + \cot^4 \theta$.
   (a) 196 (b)194 (c)16 (d) 14

10. The value of $\sin^2 60^\circ + 2 \tan 45^\circ – \cos^2 30^\circ$ is
    (a) 1 (b)2 (c)4 (d) 0

11. Which of the following is not the graph of a quadratic polynomial?



12. A metalworker makes an overflow pan by cutting equal squares with sides of length x from the corners of a 30 cm by 20 cm piece of aluminium, as shown in the figure. The sides are then folded up and the corners are sealed.



Which of the following polynomial in x represent the volume of the pan?

(a) $4x^3 - 60x^2 + 450x$ (b) $4x^3 - 50x^2 + 600x$

(c) $4x^3 - 100x^2 + 600x$ (d) $4x^3 - 60x^2 + 500x$

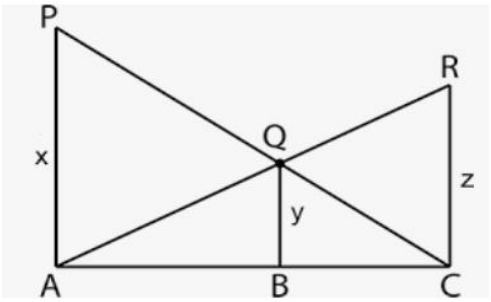
13. If $\sin x + \operatorname{cosec} x = 2$, the value of $\sin^{19} x + \operatorname{cosec}^{20} x$ is

(a) 2^{19} (b) 2 (c) 2^{20} (d) 2^{39}

14. The pair of equations x = 2 and y = 3 graphically represents the lines which are

(a) intersecting at (2, 3) (b) Coincident (c) parallel (d) intersecting at (3, 2)

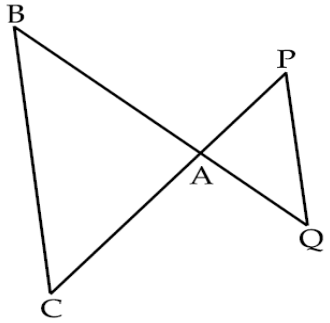
15. In figure, PA, QB and RC are perpendiculars to AC. If x = 8 cm and z = 6 cm, then y is equal to



(a) $\frac{7}{56}cm$ (b) $\frac{56}{7}cm$ (c) $\frac{25}{7}cm$ (d) $\frac{24}{7}cm$

(Q 16-Q 22) Answer the following

16. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$ where a, b being prime numbers then find Least Common Multiple of p and q.
17. If one root of the equation $(K-1)x^2 - 10x + 3 = 0$ is the reciprocal of the other then find the value of k.
18. In given figure, $\triangle ACB \sim \triangle APQ$. If BC = 8 cm, PQ = 4 cm, BA = 6.5 cm, AP = 2.8 cm, find CA and AQ .



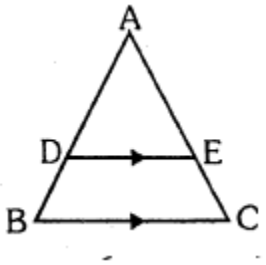
19. If 4 cos x = 11 sin x then find the value of the following

$$\frac{11\cos x - 7\sin x}{11\cos x + 7\sin x}$$

OR

If cos (A + B) = 0 and sin (A – B) = $\frac{1}{2}$, then find the value of A and B, where A and B are acute angles.

20. For what value of k the following pair of linear equation has infinitely many solution?
    2x + ky = 8 and kx + 8y = k
21. In the given figure, *DE* II *BC.* if AD = 3 cm, DB = 4 cm and AE = 6 cm, then find the value of A*C.*



22. If the distance between the points A(2, –2) and B(–1, x) is equal to 5, then the find the value of x.

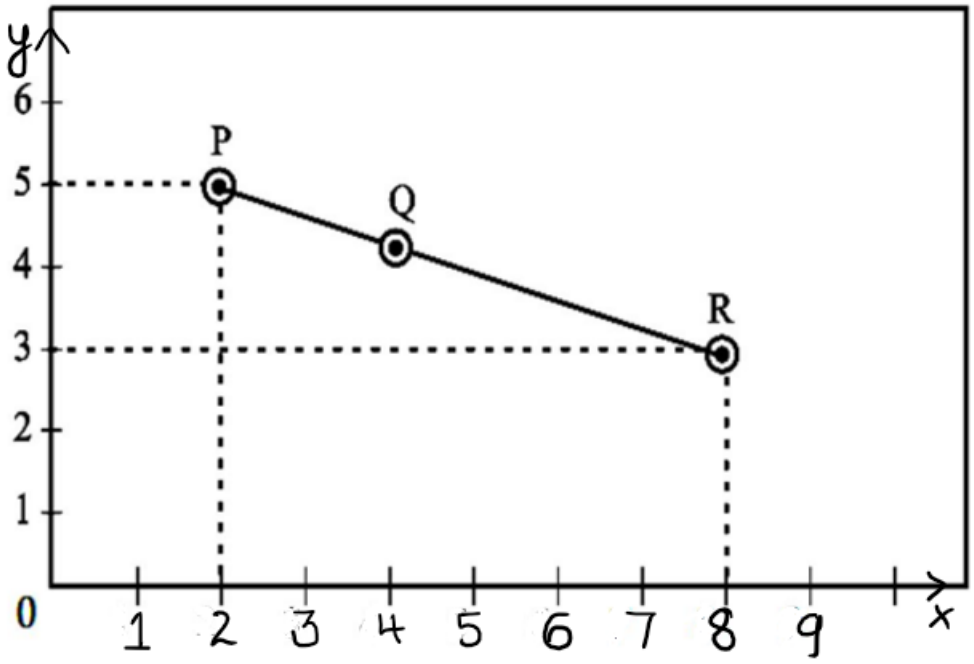
OR

Two vertices of a triangle are the points (1,4), (7,2) and centroid is the point (5,3). Find the coordinates of the third vertex**.**

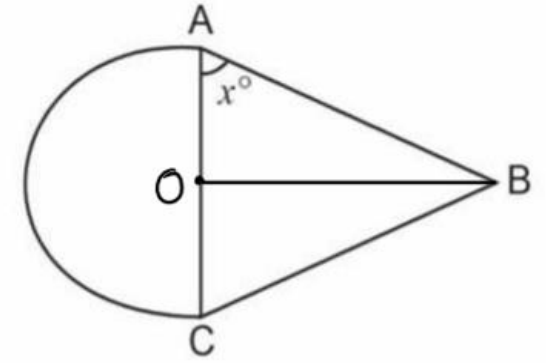
SECTION B

Question numbers 23 to 27 carry 2 marks each.

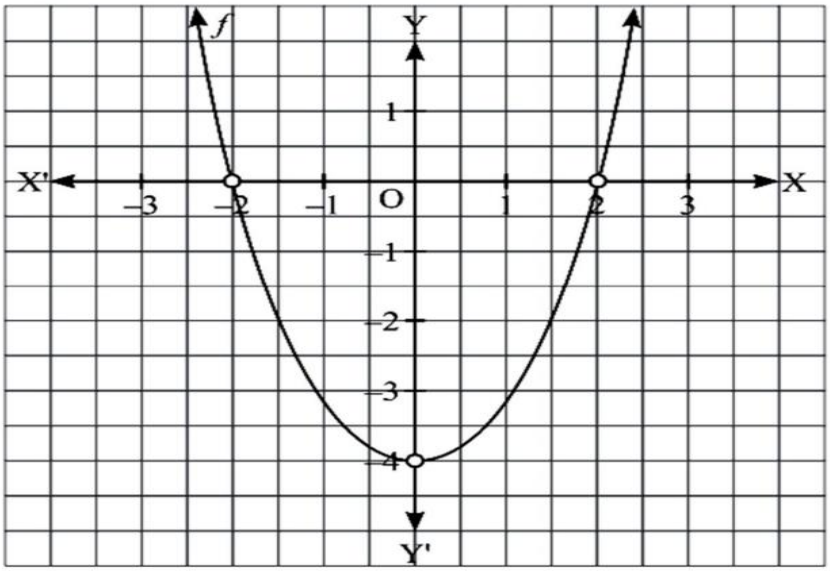
23. A group of Class X students goes to picnic during vacation. There were three different slides and three friends Ajay, Ravi and Shyam are sliding in the three slides and their position are shown in the cartesian plane by P, Q and R respectively in three different slides. Find the coordinates of the point Q which divides the line segment PR in the ratio 1:2 internally.



24. In the figure ABC is an isosceles triangle, with AB = BC. A semicircle of the area equal to that of the triangle ABC is combined with it. Find the value of tan x^{o}.

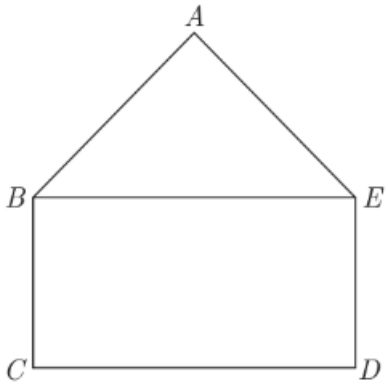


25. Puja tied a rope between two poles for drying clothes in her garden. She was very happy that the rope is working fine but One day due to heavy storm the rope bent as shown in the below figure. The bent shape followed a mathematical shape parabola



What will be the expression of the polynomial made by the rope due to heavy storm. Also find the value of the polynomial at x = 3.

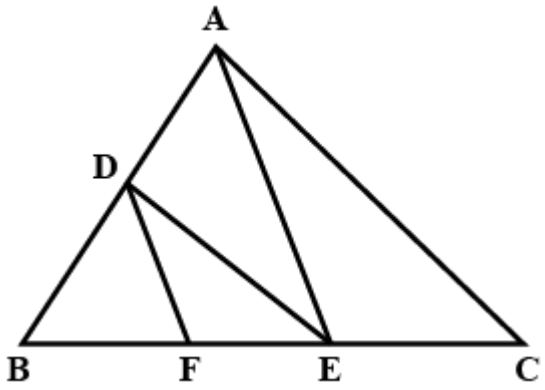
26. In the figure, BE II CD and BC II DE. BC is perpendicular to CD. AB = 5 cm, AE = 5 cm, BE = 7 cm, BC= x – y and CD = x + y. If the perimeter of ABCDE is 27cm then find the value of x and y.



OR

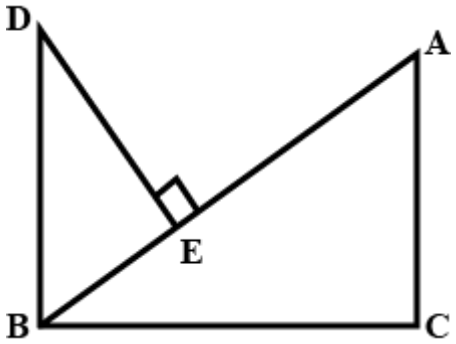
The angles of a cyclic quadrilateral taken in order are $(3y - 5)^{o}$, $(4y + 20)^{o}$, $(7x + 5)^{o}$ and $4x^{o}$. Find the value of $4x^{o}$.

27. In the Figure, DE || AC and DF || AE. Prove that $\frac{\mathbf{BF}}{\mathbf{FE}} = \frac{\mathbf{BE}}{\mathbf{EC}}$.



OR

In the given figure DB ⊥ BC, DE ⊥ AB and AC ⊥ BC. Prove that $\frac{\mathbf{BE}}{\mathbf{DE}} = \frac{\mathbf{AC}}{\mathbf{BC}}$.



Question numbers 28 to 31 carry 3 marks each.

28. Shaila is very innovative teacher and always plan new games to make her students learn concepts. Today she has planned a prime number game. She announces the number 2 in her

class and asked the first student to multiply it by a prime number and then pass it to second student. Second student also multiplied it by a prime number and passed it to third student. In this way by multiplying to a prime number the last student got 173250. He told this number to Shaila in class. Now she asked some questions to the students as given below.

(i) How many students are there in the class?

(ii) What is the highest prime number used by student?

(iii) Which prime number has been used maximum number of times?

29. If α and β are zeroes of the quadratic polynomial $4x^2 + 4x + 1$, then find quadratic polynomial whose zeroes are 2α and 2β. Also find value of $\alpha^2 + \beta^2$.

OR

If **α, β,** γ are the zeroes of the polynomial $6x^3 + 3x^2 - 5x + 1$ then find the value of **α β + β γ + γ α** and $\boldsymbol{\alpha^{-1} + \beta^{-1} + \gamma^{-1}}$.

30. Show that –1, 3 and 6 are zeroes of the polynomial $p(x) = x^3 - 8x^2 + 9x + 18$. Also verify the relationship between the zeroes and the coefficients of p(x).

31. Evaluate the following:

$$\frac{\tan^2 60^\circ + 4\sin^2 45^\circ + 3\sec^2 30^\circ + 5\cos^2 90^\circ}{\text{cosec } 30^\circ + \sec 60^\circ - \cot^2 30^\circ}$$

OR

If $\cos\theta + \sin\theta = \sqrt{2}\cos\theta$, show that $\cos\theta - \sin\theta = \sqrt{2}\sin\theta$.

Question numbers 32 to 35 carry 5 marks each.

32. Solve the following pair of linear equations graphically:

$x + 3y = 6;\ 2x - 3y = 12$

Also find the area of the triangle formed by the lines representing the given equations with y -axis.

OR

It is common that Government revise travel fares from time to time on different types of vehicles like auto, Rickshaws, taxis, Radio cab etc. The auto charges in a city comprise of a fixed charge together with the charge for the distance covered. Study the following situations

Name of the city	Distance travelled (Km)	Amount paid (Rs.)
CITY A	10	75
	15	110
CITY B	8	91
	14	145

(i) For city A, what will a person have to pay for travelling a distance of 25 km?

(ii) For city B, Find the fixed charge and charge per kilometer.

33. State and prove Basic Proportionality Theorem.

34. If $cot\ \theta + tan\ \theta = x\ and\ sec\ \theta - cos\ \theta = y$,

$$\text{prove that } (x^2y)^{\frac{2}{3}} - (xy^2)^{\frac{2}{3}} = 1$$

OR

If $a \sec\theta + b \tan\theta + c = 0$ and $p \sec\theta + q \tan\theta + r = 0$, prove that $(br - qc)^2 - (pc - ar)^2 = (aq - bp)^2$.

35. Find the centre of a circle passing through the points (6, –6), (3, – 7) and (3, 3).

SECTION C

Question numbers 36 to 39 carry 4 marks each

36. Travelling by a Bike on a highway gives lots of fun. On morning two friends who are living at a distance of 150 km apart decided to meet at another place. So, they drive their Bikes from point A and point B at the same time and meet after 15 hours on a highway.

In another incident they decide to meet in a hurry. So, they drive their Bike in the opposite direction and meet in one hour.

(i) Using the speed of Bike at A, x km/h and the speed of Bike at B, y km/h form the linear equation in two variables and state whether it is consistent or inconsistent.

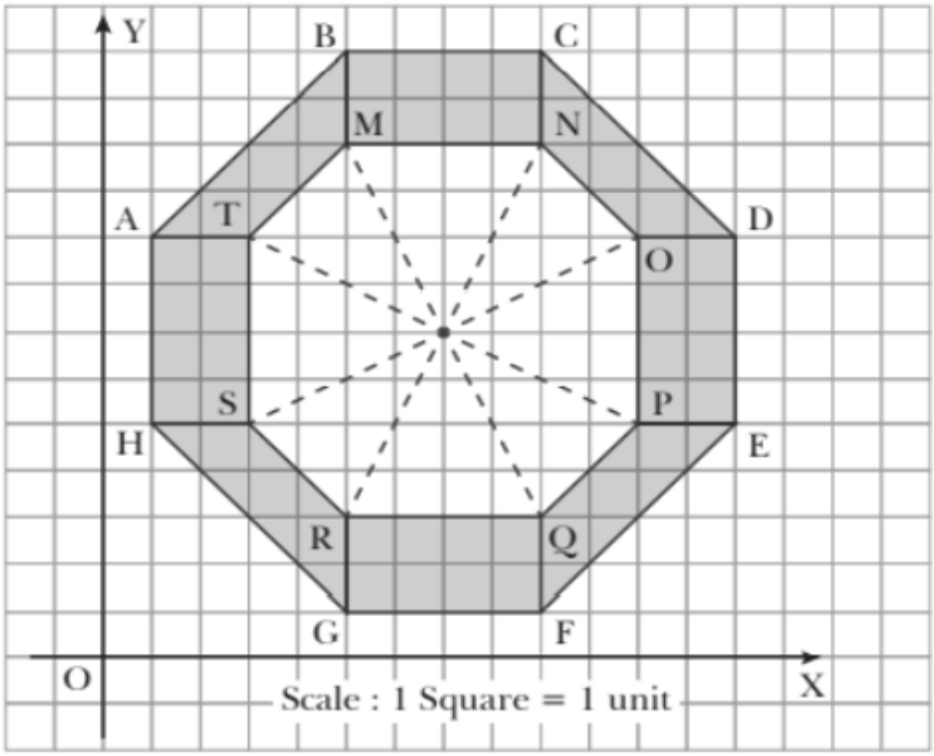
(ii)find the speeds of Bike at A and Bike at B

37. Pranav works as a librarian in Shining Star School. He ordered for books on English, Hindi and Mathematics. He received 60 English books, 84 Hindi Books and 108 Mathematics books. He wishes to arrange these books in stacks such that each stack consists of the books on only one subject and the number of books in each stack is the same. He also wishes to keep the number of stacks minimum.

(i) Find the total number of stacks formed.

(ii)How many stacks of Mathematics books will be formed?

38. The top of a table is shown in the figure given below:



(i) Find the distance between the points A and B.

(ii) If G is taken as the origin, and x, y axis put along GF and GB, then find the coordinates of the mid-point of line segment joining points M and Q.

39. Class teacher draw the shape of quadrilateral on board. Ankit observed the shape and explored on his notebook in different ways as shown below.

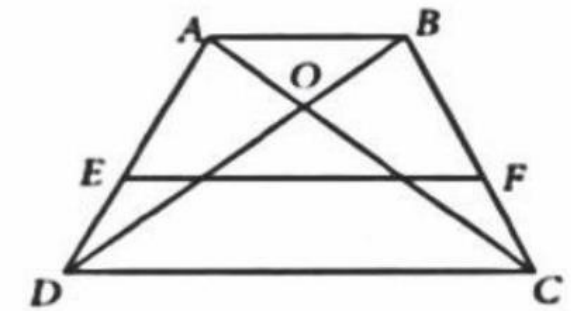


Fig. 1

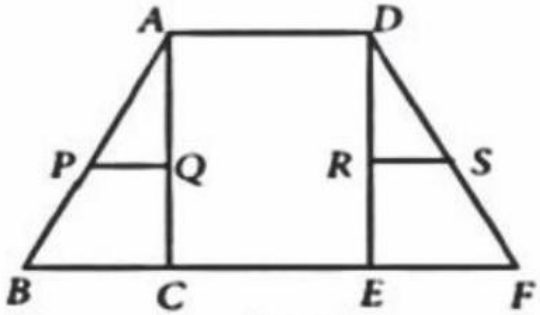


Fig. 2

Based on the above information, answer the following questions.

(i) In figure 1, if ABCD is a trapezium with AB || CD, E and F are points on non-parallel sides AD and BC respectively such that EF || AB, then prove that $\frac{AE}{ED} = \frac{BF}{FC}$.

(ii) In figure 2, for Δ DEF, if RS || EF, DR = 4x – 3, DS = 8x – 7, ER = 3x–1 and FS = 5x – 3, then find the value of x.

********** THE END**********