ROYAL INTERNATIONAL SCHOOL
AFFILIATEDTOCBSEBOARD
MANAGEDBYDOMBIVLIYUVAKEDUCATIONTRUST
GANDHINAGAR,P&TColony,DOMBIVLI(E)
CONTACT:-8291950505/08
Emailid:royal.international349@gmail.comWebsite:www.royalinternational.co.in

STD: X	ACADEMIC YEAR 2023-24 PERIODIC TEST – 2 SUBJECT- MATHEMATICS STANDARD SUBJECT CODE - 041	DATE : 18/10/2023 TIME : 3HRS MARKS : 80

GENERAL INSTRUCTIONS :

1. This Question paper contains - five sections A, B, C, D and E.
2. Section A has 18 MCQs and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 mark each.
4. Section C has 6 Short Answer (SA)-type questions of 3 mark each.
5. Section D has 4 Long Answer (LA)-type questions of 5 mark each.
6. Section E has 3 case based integrated units of assessment (4 marks each) with sub parts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 Qs of 3 marks and 2 questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.

SECTION A

Q. I Choose the correct answer from the choices given. (1x20=20marks)

1. HCF of 144 and 198 is

   (a) 9 (b) 18 (c) 6 (d) 12 — 1

2. The quadratic polynomial, the sum of whose zeroes is -5 and their product is 6, is

   (a) $X^2 + 5X + 6$ (b) $X^2 - 5X + 6$ (c) $X^2 - 5X - 6$ (d) $-X^2 + 5X + 6$ — 1

3. If $K + 2$, $4K - 6$ and $3K - 2$ are three consecutive terms of an A.P., then the value of K is

   (a) 3 (b) -3 (c) 4 (d) -4 — 1

4. If $\sin\theta - \cos\theta = 0$, then the value of θ is

   (a) $30°$ (b) $45°$ (c) $90°$ (d) $0°$

5. What is the greatest possible speed at which a girl can walk 95 m and 171 m in an exact Number of minutes.

   (a) 17 m/min (b) 19 m/min (c) 23 m/min (d) 13 m/min

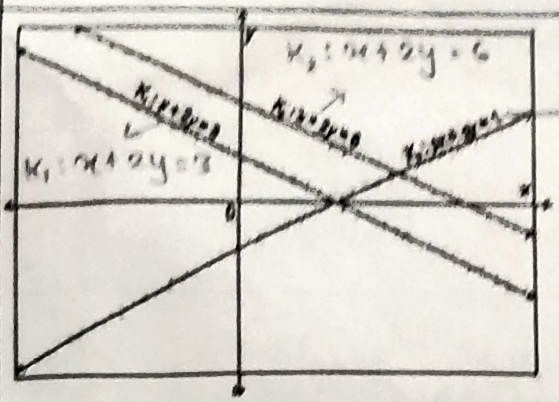
6. Distance of point P(3,4) from X – axis is

   (a) 3 units (b) 4 units (c) 5 units (d) 1 unit

7. Two dice are thrown together. The probability of getting the same number on both dice is.

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{6}$ (d) $\frac{1}{12}$

8.



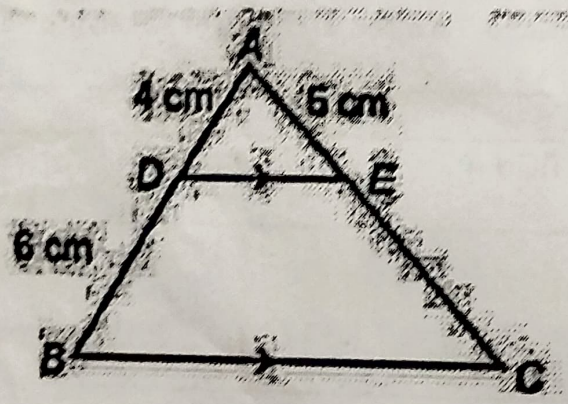
k_1, k_2 $x = 3$, $y = 0$

$x = 4$ $y = 1$

Which of these is the equation of the line k_3?

(a) $x - y = 3$ (b) $x - y = -3$ (c) $x + y = 3$ (d) $x + y = 1$

9 In ΔABC, DE // BC, AD = 4 cm, DB = 6 cm and AE = 5 cm. The length of EC is

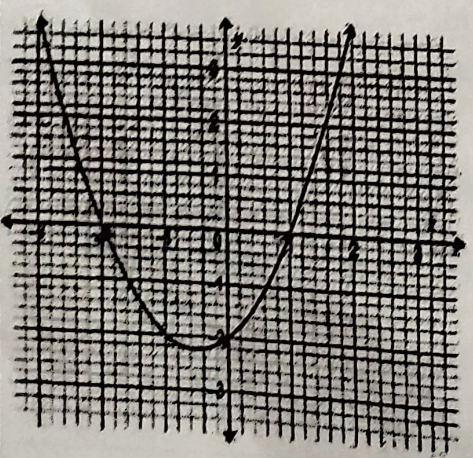


(a) 7 cm (b) 6.5 cm (c) 7.5 cm (d) 8 cm

10 Which of the following could be the graph of the polynomial?

$(x - 1)^2(x + 2)$?

a)



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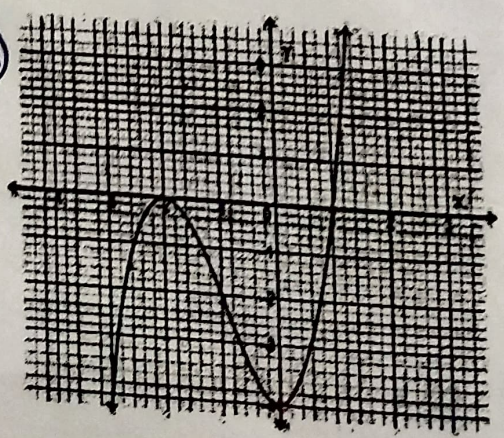
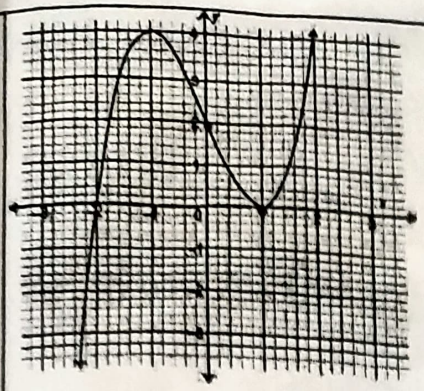
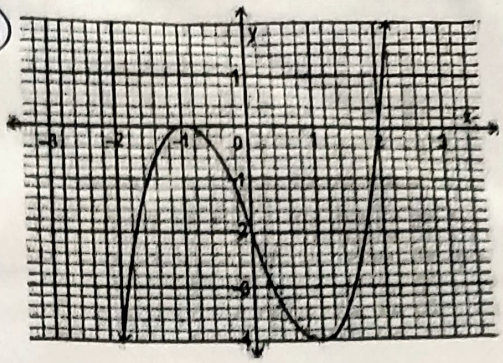


c)



d)



11. In Δ ABC, PQ // BC. If PB = 6 cm, AP = 4 cm, AQ = 8 cm, find the length of AC. 1

(a) 12 cm (b) 20 cm (c) 6 cm (d) 14 cm

12. The coordinates of the point P dividing the line segment joining the points A (1, 3) and B (4,6) in the ratio 2:1 are 1

(a) (2,4) (b) (3, 5) (c) (4,2) (d) (5, 3)

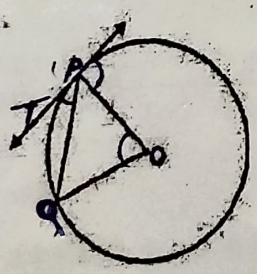
13. Which of the following is not defined? 1

(a) Sec 0° (b) Cosec 90° (c) tan 90° (d) cot 90°

14. $\frac{1}{1+\sin\theta} + \frac{1}{1-\sin\theta}$ can be simplified to get 1

(a) $2\cos^2\theta$ (b) $\frac{1}{2}\sec^2\theta$ (c) $2\sec^2\theta$ (d) $\frac{2}{\sin\theta}$

15. If O is the centre of a circle, PQ is a chord and PT is the tangent at P, if ∠POQ = 70°, then ∠TPQ is equal to



(a) 55° (b) 70° (c) 45° (d) 35°

16. If the radius of a semi-circular protractor is 7 cm, then its perimeter is

(a) 11 cm (b) 14 cm (c) 22 cm (d) 36 cm

17. The probability of getting an even number, when a die is thrown once, is

(a) $\frac{1}{2}$ (b) $\frac{1}{3}$ (c) $\frac{1}{6}$ (d) $\frac{5}{6}$

18. Three alarm clocks ring their alarms at regular intervals of 20 min, 25 min and 30 min Respectively. If they beep together at 12 noon, at what time will they deep again for the first time?

(a) 4 : 00 pm (b) 4 : 30 pm (c) 5 : 00 pm (d) 5 : 30 pm

Questions number 19 and 20 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled as Assertion (A) and the other is labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

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

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

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

19. **Assertion (A) :** A tangent to a circle is perpendicular to the radius through the point of contact.

Reason (R) : The lengths of tangents drawn from an external point to a circle are equal.

20. **Assertion (A) :** a, b, c are in A.P. if and only if $2b = a + c$.

Reason (R) : The sum of first n odd natural numbers is n^2.

SECTION B

This section comprises of very short answer type-questions (VSA) of 2 marks each. (2x5 =10

21. Which of the following pairs of linear equations are consistent/inconsistent

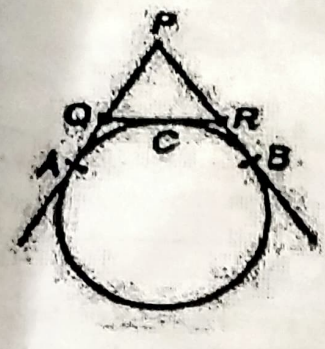
(i) $x + y = 5, \quad 2x + 2y = 10$ (ii) $x - y = 8, \quad 3x - 3y = 16$

22. If $\cot A = \frac{15}{8}$ then evaluate $\frac{(2+2\sin A)(1-\sin A)}{(1+\cos A)(2-2\cos A)}$ (Ask me written by Sir)

OR

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

In the fig. perimeter of ΔPQR is 20 cm. Find the length of tangent PA.



2

4. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find:
(i) the length of the arc (ii) area of the sector formed by the arc

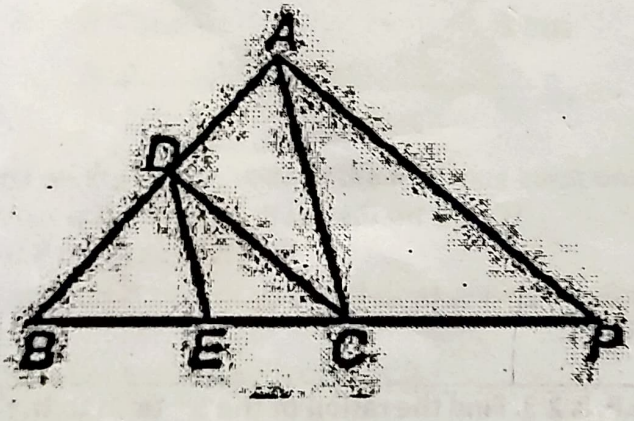
2

5. E is a point on the side AD produced of parallelogram ABCD and BE intersects CD at F.

Show that ΔABE ~ Δ CFB

OR

In fig DE // AC and DC // AP. Prove that $\frac{BE}{EC} = \frac{BC}{CP}$



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SECTION C

(This section comprises of short answer type questions (SA) of 3 marks each) (3x6 = 18 marks)

26. . An army contingent or 612 members is to march behind an army band of 48 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?

OR

Show that $5 + 2\sqrt{3}$ is an irrational number.

3

27. Find the value of K such that the polynomial $X2 - (K+6)X + 2(2k-1)$ has sum of its zeros equal to half of their product.

28. Three consecutive positive integers are such that the sum of the square of the first and product of the oth two is 46, find the integers.

OR

The difference of squares of two numbers is 88. If the larger number is 5 less than twice the smaller numb then find the two numbers.

29. Prove that $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$

30. Prove that the angle between the two tangents drawn from an external point to a circle is supplementary the angle subtended by the line segment joining the points ot contact at the centre.

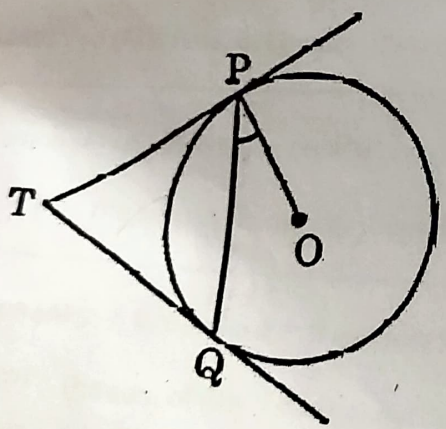
31. A box cotains 80 discs which are numbered from 1 to 80. If oone disc is drawn at random from the box. Fin the probability that it bears a perfect square number.

SECTION D

(This section comprises of long answer-type questions (LA) of 5 marks each) (5x4=2

32. Two tangents TP and TQ are drawn to a circle with centre O from an external point T.

Prove that $\angle PTQ = 2\angle OPQ$.



33. The ratio of the 11^{th} term to the 18^{th} term of an A.P. is 2:3. Find the ration of the 5^{th} term to the 21^{st} term . Also, find the ratio of the sum of first 5 terms to the sum of first 21 terms.

OR

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

60 apples of a box were weighed and the distribution of masses of the apples is given in the following table

ass (in grams)	80 – 100	100 – 120	120 – 140	140 – 160	160 – 180
mber of apples	20	60	70	X	60

nd the value of x and the mean mass of the apples

d the modal mass of the apples.

35. A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 5 m long rope. Find the area of that part of the field in which the horse can graze. Also, find the increase in grazing area if length of rope is increased to 10 m. (Use = 3·14) 5

OR

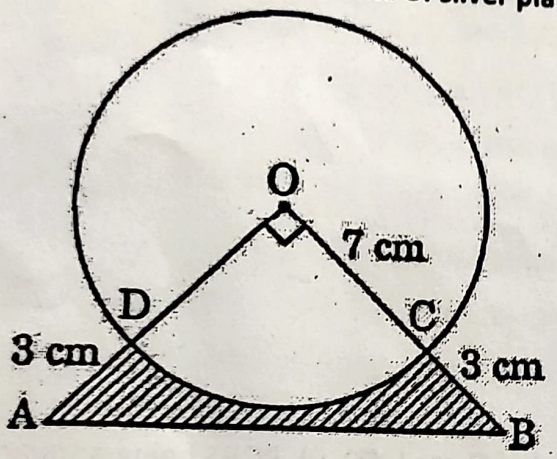
35 A solid is in the shape of a right – circular cone surmounted on a hemisphere, the radius of each of them being 7 cm and the height of the cone id equal to its diameter. Find the volume of the solid.

SECTIONE

V. Solve the following.

36. **Answer the questions based on the given information.** (4x3=12 marks)

In an annual day function of a school, the organizers wanted to give a cash prize along with a memento to their best students. Each memento is made as shown in the figure and its base ABCD is shown from the front side. The rate of silver plating is Rs. 20 per cm^2.



Based on the above, answer the following questions:

(i) What is the area of the quadrant ODCO? 1

(ii) Find the area of Δ AOB 1

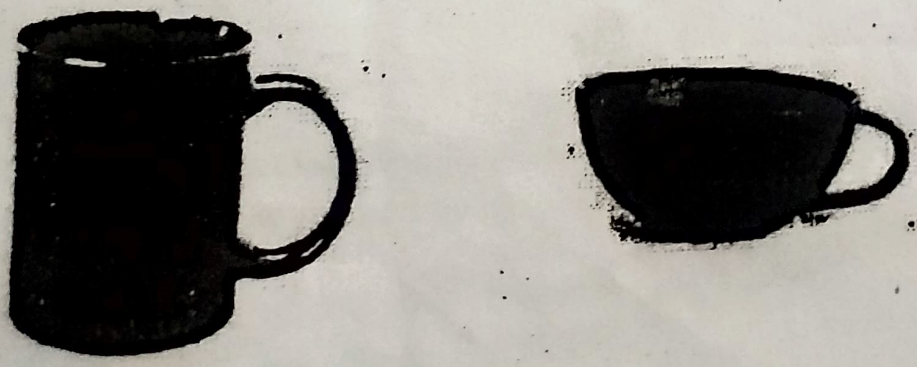
(iii) (a) What is the total cost of silver plating the shaded part ABCD ? 2

OR

(iii) (b) What is the length of arc CD ? 2

37. **Answer the questions based on the given information.**

In a coffee shop, coffee is served in two types of cups. One is cylindrical in shape with diameter 7 cm and height 14 cm and the other is hemispherical with diameter 21 cm.



Based on the above, answer the following questions :

(i) Find the area of the base of the cylindrical cup.

(ii) (a) What is the capacity of the hemispherical cup ?

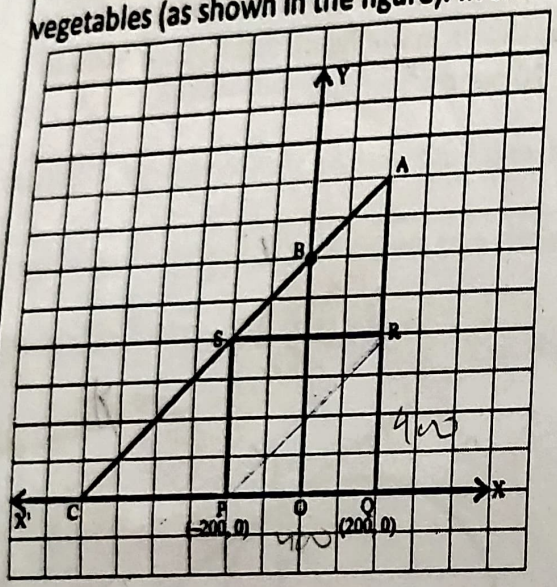
OR

(ii) (b) Find the capacity of the cylindrical cup.

(iii) What is the curved surface area of the cylindrical cup ?

38. **Answer the questions based on the given information.**

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



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

(ii) (a) What is the area of square PQRS ?

OR

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

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

$$(5) = \frac{mx_2 + nx_1}{m+n}$$