# BAL BHAVAN INTERNATIONAL SCHOOL
## Sec – 12, Dwarka, New Delhi – 75

### HALF YEARLY EXAMINATIONS [2025-26]
### SET II

**Name:** _____ **Roll No.:** _____

**CLASS X** **Time Allowed: 3 Hours**

**Subject: MATHEMATICS ( 041)** **M.M. 80**

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***General Instructions***

- ***a. This question paper contains five Sections A, B, C, D and E. Each part is compulsory.***
- ***b. Section A has 20 very short answer type (SA1) questions of 1 mark each.***
- ***c. Section B has 5 short answer type (SA2) questions of 2 marks each.***
- ***d. Section C has 6 long answer type (LA) questions of 3 marks each.***
- ***e. Section D has 4 long answer type (LA) questions of 5 marks each.***
- ***f. Section E has 3 long answer type (LA) questions of 4 marks each.***

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## *SECTION A*

**Q.1.** If α, β are zeroes of the polynomial $x^2 + 5x + 5$ , then polynomial whose zeroes are 1/α and 1/β is

(a) $x^2 + 5x—5$ (b) $x^2 +3x+5$ (c) $x^2 +3x+1$ (d) none of these

**Q.2.** The value of k for which the system of equations 2x + ky =12 and x + 3y- 4 = 0 is inconsistent

(a). 21/4 (b) 1/6 (c) 6 (d) 4/21

**Q.3.** The equations ax + by + c = 0 and dx + ey + c = 0 represent the same straight line if

(a) ae = bd (b) ad = be (c) be = ad (d) ab = de

**Q.4.** Find the values of a and b for which the following pair of linear equations has infinitely many solutions:

2x + 3y =7; (a+ b)x + (2a—b)y = 21

(a) a = 0, b =1 (b) a =5, b=1 (c) a = 2, b= 3 (d) none of these

**Q.5.** What is the greatest possible speed at which a girl can walk 95 m and 117 m in an exact number of minutes ?

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

**Q.6.** If $p(x) = ax^2 + bx + c$ and a +b +c = 0, then one zero is

(a)$\frac{c}{a}$ (b) $\frac{-b}{a}$ (c) $\frac{b}{c}$ (d) none of these

**Q.7.** If one of the zeroes of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then it

(a) has no linear term and the constant term is negative.
(b) has no linear term and the constant term is positive.
(c) can have a linear term but the constant term is negative.
(d) can have a linear term but the constant term is positive.

**Q.8.** Which of the following equations has two distinct real roots?

(a) $2x^2 — 3\sqrt{2}x + \frac{9}{4} = 0$ =0 (b) $x^2 + x - 5$=0 (c)$x^2 + 3x + 2\sqrt{2}$=0 (d) $5x^2 - 3x+1$=0

**Q.9.** If the equation $x^2$ - (2 +m)x + (—$m^2$ — 4m — 4) =0 has coincident roots, then
(a) m =0, m=1 (b) m = 2, m = 2 (c) m= -2, m=-2 (d) m= - 6, m = - 2

**Q.10.** An AP consists of 31 terms. If its 16th term is m, then sum of all the terms of this AP is
(a) 16 m (b) 47 m (c) 31 m (d) 52m

**Q.11.** The next term of the AP: $\sqrt{18}$, $\sqrt{50}$, $\sqrt{98}$, ...
(a) $\sqrt{146}$ (b) $\sqrt{128}$ (c) $\sqrt{162}$ (d) $\sqrt{200}$

**Q.12.** If the sum of first n terms of an AP is An + $Bn^2$ where A and B are constants, the common difference of AP will be
(a) A+B (b) A-B (c) 2A (d) 2B

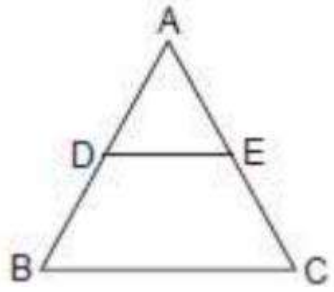
**Q.13.** tanA = ……..

(a) $\frac{cosA}{\sqrt{1-cos^2A}}$ (b) $\frac{tanA}{\sqrt{1-sec^2A}}$ (c) $\frac{tanA}{\sqrt{1+tan^2A}}$ (d) $\frac{sinA}{\sqrt{1-sin^2A}}$

**Q.14.** If $\sin\theta$ — cos $\theta$ = 0, then the value of ($\sin^4\theta$ - $\cos^4\theta$) is
(a) 0 (b) $\frac{3}{4}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$

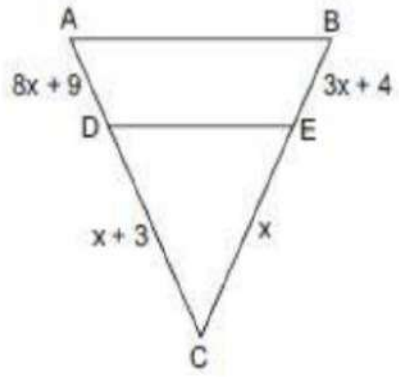
**Q.15.** If ΔABC is right angled at C, then the value of sin (A + B) is
(a)0 (b)1 (c) $\frac{1}{2}$ (d) $\frac{\sqrt{3}}{2}$

**Q.16.** In the given figure, $\frac{AD}{BD} = \frac{AE}{EC}$ and $\angle ADE = 70°$ and ∠BAC = 50°, then angle $\angle BCA =$



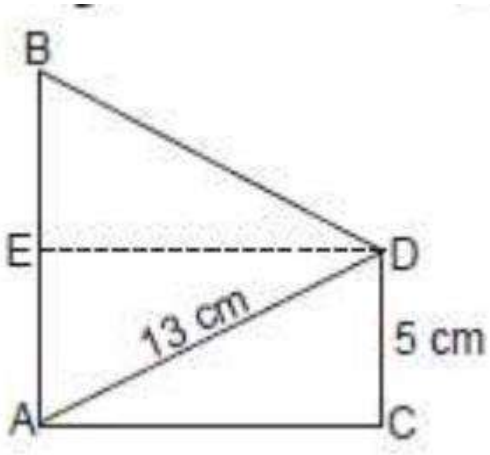

(a) 70° (b) 50° (c) 80° (d) 60°

**Q.17.** What value(s) of x will make DE || AB in the given figure?




(a) 0 (b) 2 (c) 3 (d) 1

**Q.18.** In the given figure, if AB = 14 cm, then the value of sin B is:




(a) , $\frac{4}{3}$ (b) $\frac{14}{3}$ (c) $\frac{5}{3}$ (d) $\frac{4}{5}$

**DIRECTION FOR Q19 and Q20.** In the question number 11 and 12, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice.

1) **Both A and B are true and R is the correct explanation of A.**
2) **Both A and B are true and R is not the correct explanation of A.**
3) **A is true and B is false**
4) **A is false and B is true.**

**Q.19.** **Assertion (A):** For $0^0 < A < 90^0$, sec A+ tan A and sec A - tan A are reciprocal of each other
**Reason : (R) :** $\sec^2 A + \tan^2 A = 1$

**Q.20.** **Assertion (A):** $3x^2 - 6x + 3 = 0$ has repeated roots.
**Reason : (R)** The quadratic equation $ax^2 + bx + c = 0$ have repeated roots if discriminant D = 0.

## ***SECTION B***

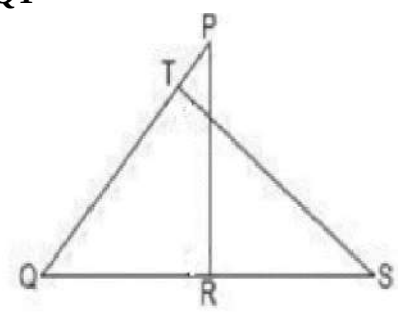
**Q.21.** Find the smallest number which is divisible by both 644 and 462.

**Q.22.** The sum of n terms of an AP is $2n^2 + 5n$ the find 3rd term of the AP.

**Q.23.** If $\boldsymbol{sin(A+B) = cos(A-B) = \frac{\sqrt{3}}{2}}$ *where* $0^0 < A + B < 90^0$ *and* $A > B$ , then find the values of A and B**.**

**Q.24.** Solve for x : $\boldsymbol{x + 2 + \frac{1}{x+2} = \frac{65}{8}}$**.**

**Q.25.** In the figure, PQR and QST are two right triangles, right angled at R and T respectively.
Prove that **QR x QS = QP x QT**



## SECTION C

**Q.26.** Prove that $\frac{1}{\sqrt{5}}$ is irrational.

**Q.27.** **If $x\sin^3\theta + y\cos^3\theta = \sin\theta\cos\theta$ and $x\sin\theta = y\cos\theta$, Prove that : $x^2 + y^2 = 1$**

**OR**

Prove that : **$2(\sin^6\theta + \cos^6\theta) - 3(\sin^4\theta + \cos^4\theta) + 1 = 0$**

**Q.28.** Solve for x and y: **$ax - by = a^2 - b^2$ ; $bx + ay = 2ab$**

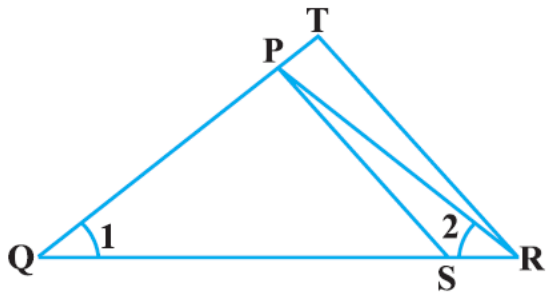
**Q.29.** If $\alpha$ *and* $\beta$ are the zeroes of the polynomial, $3x^2 - 5x - 9$ then find the value of $\alpha - \beta$ and $\alpha^2\beta + \beta^2\alpha$

**OR**

Find the zeroes of the polynomial: $p(x^2 + 1) - x(p^2 + 1)$ and verify the relationship between the zeroes and the coefficient of the terms.

**Q.30.** Sides AB and BC and median AD of a triangle ABC are respectively proportional to sides PQ and QR and median PM of triangle PQR). Show that ΔABC ~ ΔPQR.

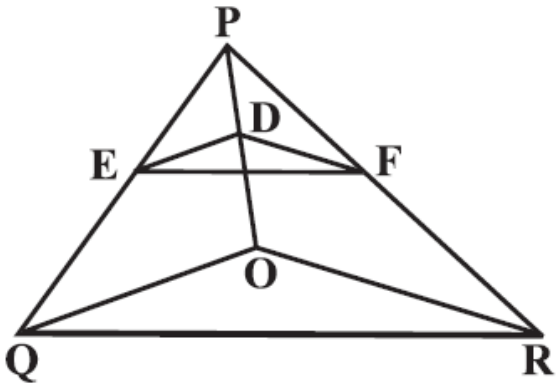
**Q.31.** In the given figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$, then prove that Δ PQS ~ Δ TQR




## SECTION D

**Q.32.** If a line divides two sides of a triangle proportionally then prove that the line is parallel to the third Side. Now using this theorem, do the following :

In the given Figure, DE || OQ and DF || OR. Show that EF || QR.




**Q.33.** A train travels at a certain speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the journey, what was the first speed?

**Q.34.** Find the sum of all 3-digit numbers which when divided by 8 always leave a remainder of 5.

**.OR**

If m times the mth term of an AP is same as n times the nth term, show that (m+n)th term is zero.

**Q.35.** **Prove that :** $\frac{cos^4x - sin^4x}{1 - tanx} = \frac{cotx + 1}{secxcosecx}$

**OR**

If sec $\theta = x + \frac{1}{4x}$, prove that sec $\theta$ + tan $\theta = 2x$ or $\frac{1}{2x}$.

## ***SECTION E***

**Q.36.** **Treasure Hunt** is an exciting and adventurous game where participants follow a series of clues/numbers/maps to discover hidden treasures. Players engage in a thrilling quest, solving puzzles and riddles to unveil the location of the coveted prize. While playing a treasure hunt game, some clues (numbers) are hidden in various spots collectively forming an AP. If the number on the nth spot is 4n + 35 then answer the following questions to help the players in spotting the clues:

**Based on the above information answer the following questions: (1+2+1)**

**(i)** Which number is on first spot?

**(ii)** (a) Which spot is numbered as 1071

**OR**

(b) What is the sum of all the numbers on the first 15 spots?

**(iii)** Which number is on the (n - 5)th spot?

**Q.37.** Essel World is one of India's largest amusement parks that offers a diverse range of thrilling rides, water attractions and entertainment options for visitors of all ages. The park is known for its iconic "Water Kingdom" section, making it a popular destination for family outings and fun-filled adventure. The ticket charges for the park are 150 per child and 250 per adult. On a day, the cashier of the park found that 300 tickets were sold and an amount of ₹55,000 was collected

. **Based on the above information, answer the following questions:**

**(i)** If the number of children visited is y and the number of adults visited is x, then write the given situation algebraically

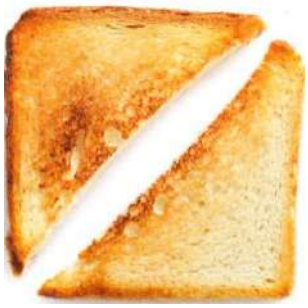
**(ii)** (a) How many children visited the amusement park that day?

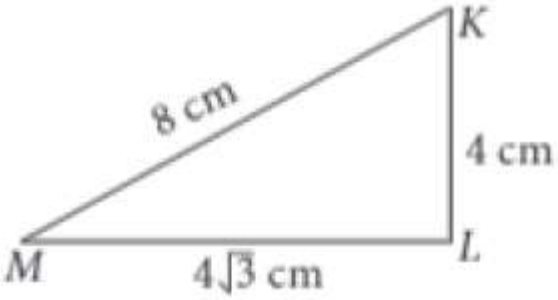
**OR**

(b) How many adults visited the amusement park that day?

**(iii)** How much amount will be collected if 250 children and 100 adults visit the amusement park?

**Q.38.** Ananya is feeling so hungry and so thought to eat something. She looked into the fridge and found a bread pieces. She decided to make a sandwich. She cut the piece of bread diagonally and found it forms a right-angled triangle, with sides 4 cm, $4\sqrt{3}$ cm and 8 cm.






**(i) The value of ∠M is**

(a). 30° (b) 60° (c) 45° (d)None of these

**(ii) The value of ∠K is**

(a). 45° (b) 30° (c) 60° (d)None of these

**(iii) Find the value of tan*M*.**

(a). $\sqrt{3}$ (b) $1/\sqrt{3}$ (c) 1 (d)None of these

**(iv) $\sec^2 M - 1$ = ?**

(a) tanM (b) $\tan^2 M$ (c) tan2M (d)None of these