MATHS ANSWER KEY

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First Term Summative Assessment 2026–27 | Standard IX – Mathematics (E-903)

Time: 2½ Hours | **Total Score:** 80 | **Subject:** Mathematics | **Version:** English Answer Key

SECTION A (1 Score Each — Objective Questions)

1. B. √10 centimetres

Explanation: $Area = a^2 = 10 \Rightarrow a = \sqrt{10}\ cm$.

2. C. 9

Explanation: $(x + 3)(y + 3) = xy + 3x + 3y + 9 = xy + 3(x + y) + 9$.

3. D. 6 centimetres

Explanation: Lines are parallel $\Rightarrow AB / BC = PQ / QR \Rightarrow 2 / BC = 3 / 9 = 1 / 3 \Rightarrow BC = 6\ cm$.

4. D. 20

Explanation: Let yellow balls be y, blue balls $= y + 10$. Then $y + (y + 10) = 50 \Rightarrow 2y = 40 \Rightarrow y = 20$.

5. B. (i) and (iii)

Explanation: A triangle has exactly 3 medians, and all three are concurrent at the centroid.

6. A. 1

Explanation: Remainder of product $= (2 \times 3) \bmod 5 = 6 \bmod 5 = 1$.

7. C. Both are true, Statement 2 is the reason for Statement 1.

Explanation: Length of diagonal is $\sqrt{2}$, which is irrational because no fraction squared equals 2.

8. C. Both are true, Statement 2 is the reason for Statement 1.

Explanation: 9 equidistant parallel lines divide an intersecting intercept into 8 equal parts.

SECTION B (3 Scores Each — Short Answer Questions)

9. Geometric Construction:

- Side of equilateral triangle $= 10 / 3 = 3\frac{1}{3}\ cm$.
- Draw a segment of length $10\ cm$ and divide it into 3 equal parts using the parallel-line division method.
- Using one of these parts as the base, construct the equilateral triangle using compass arcs.

10. Solution:

Let the two numbers be x and y $(x > y)$:

$x + y = 33$ ...(1)

$x - y = 15$ ...(2)

Adding (1) & (2): $2x = 48 \Rightarrow x = 24$.

Substituting in (1): $24 + y = 33 \Rightarrow y = 9$.

$\therefore$ **The numbers are 24 and 9.**

11 (A).

(i) By Pythagoras theorem, $Area\ of\ third\ square = 2 + 3 =$ **5 sq units**.

(ii) Perpendicular sides: $\sqrt{2} + \sqrt{3} \approx 1.414 + 1.732 = 3.146\ units$.

Hypotenuse: $\sqrt{5} \approx 2.236\ units$.

Difference: $3.146 - 2.236 \approx$ **0.91 units** (or $0.9\ units$).

OR

11 (B).

(i) In right ΔBDC: $BC = \sqrt{(1^2 + 1^2)} =$ **$\sqrt{2}$ cm**.

(ii) In right ΔADC: $AC = \sqrt{(2^2 + 1^2)} = \sqrt{5}\ cm$.

$AB = AD + BD = 2 + 1 = 3\ cm$.

$Perimeter = AB + BC + AC = 3 + \sqrt{2} + \sqrt{5} \approx 3 + 1.414 + 2.236 =$ **6.65 cm**.

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12. Solution:

Let price of 1 bat = x, price of 1 ball = y.

$3x + 9y = 1110$ ...(1)

$3x + 5y = 950$ ...(2)

Subtracting (2) from (1): $4y = 160 \Rightarrow y =$ **₹40**.

From (2): $3x + 5(40) = 950 \Rightarrow 3x = 750 \Rightarrow x =$ **₹250**.

∴ **Price of a bat = ₹250, Price of a ball = ₹40.**

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13 (A). Let the natural numbers be x and y.

Given: $xy = 1540$ and $x + y = 79$.

Product of the numbers just after each:

$(x + 1)(y + 1) = xy + (x + y) + 1 = 1540 + 79 + 1 =$ **1620**.

OR

13 (B). Let the 4 consecutive natural numbers be $x, x+1, x+2, x+3$.

Product of middle numbers = $(x + 1)(x + 2) = x^2 + 3x + 2$.

Product of end numbers = $x(x + 3) = x^2 + 3x$.

Difference = $(x^2 + 3x + 2) - (x^2 + 3x) = 2$.

Hence proved: the middle product is 2 more than the end product.

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14. Solution:

In trapezium $ABCD$ with $AB \parallel CD$, ΔAPB ~ ΔCPD ⇒ $BP : PD = AP : PC = 3 : 1$.

Given $BD = 12\ cm$:

$BP = 12 \times (3 / 4) =$ **9 cm**.

$PD = 12 \times (1 / 4) =$ **3 cm**.

SECTION C (4 Scores Each — Descriptive Questions)

15.

(i) Square selected: $[\ [2, 4], [10, 12]\ ]$.

Diagonal products: $4 \times 10 = 40$ and $2 \times 12 = 24$.

Difference = $40 - 24 =$ **16**.

(ii) In general, let the top-left number be x. The four numbers are $x, x+2, x+8, x+10$.

Difference = $(x + 2)(x + 8) - x(x + 10) = (x^2 + 10x + 16) - (x^2 + 10x) = 16$.

Since x cancels out, the difference is always **16**.

16.

(i) $13 = 13 \times 1 = ((13 + 1)/2)^2 - ((13 - 1)/2)^2 = 7^2 - 6^2 =$ **49 – 36**.

(ii) *Construction:* Draw a right triangle with hypotenuse 7 **cm** and one side 6 **cm** (or legs 3 **cm** and 2 **cm**). The perpendicular side is $\sqrt{13}$ **cm**. Construct a square on this side.

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17 (A).

(i) $2(l + b) = 36 \Rightarrow$ **l + b = 18** ...(1)

$2(3l + 5b) = 136 \Rightarrow$ **3l + 5b = 68** ...(2)

(ii) Multiplying (1) by 3: $3l + 3b = 54$. Subtracting from (2): $2b = 14 \Rightarrow b = 7$ **cm**.

From (1): $l = 18 - 7 = 11$ **cm**.

$\therefore$ **Length = 11 cm, Breadth = 7 cm.**

OR

17 (B). Let the fraction be x / y.

From statement 1: $(x + 2) / y = 1 / 2 \Rightarrow y = 2x + 4$ ...(1)

From statement 2: $x / (y - 1) = 1 / 3 \Rightarrow 3x = y - 1$ ...(2)

Substitute (1) in (2): $3x = (2x + 4) - 1 \Rightarrow x = 3$.

Then $y = 2(3) + 4 = 10$.

$\therefore$ **The fraction is $^3/_{10}$.**

18.

(i) By midpoint theorem, $PQ = 2 \times XZ = 2 \times 8 =$ **16 cm**.

(ii) $PR = 2 \times YZ = 2 \times 6 = 12$ **cm**, $QR = 2 \times XY = 2 \times 5 = 10$ **cm**.

Perimeter of $\Delta PQR = 16 + 12 + 10 =$ **38 cm**.

(iii) Linear scale factor from ΔXYZ to ΔABC is 4.

$Area(\Delta ABC) = 4^2 \times Area(\Delta XYZ) =$ **16 times**.

19.

(i) Original perimeter = $2(x + y) = 44$ **cm**.

New perimeter = $2((x - 4) + (y - 4)) = 44 - 16 =$ **28 cm**.

(ii) Given $x + y = 22$ and $xy = 112$.

New Area = $(x - 4)(y - 4) = xy - 4(x + y) + 16 = 112 - 4(22) + 16 =$ **40 sq cm**.

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20 (A). In ΔABC, $PQ \parallel BC \Rightarrow AP / PB = AQ / QC$ ...(1)

In ΔACD, since $QR \parallel AB \parallel CD$, $QR \parallel CD \Rightarrow AR / RD = AQ / QC$ ...(2)

From (1) and (2): **AP / PB = AR / RD**. (Hence proved)

OR

20 (B).

(i) In right ΔABC ($\angle$A = 90°), by midpoint theorem: $PQ \parallel AB$, $PQ = AR = \frac{1}{2}AB$, and $QR \parallel AC$, $QR = AP = \frac{1}{2}AC$.

Opposite sides are parallel/equal, and $\angle$A = 90°. $\therefore$ **ARQP is a rectangle**.

(ii) Let $AB = 2x$, $AC = 2y$.

$Area(\Delta ABC) = \frac{1}{2} \times 2x \times 2y = 2xy$. $Area(Rectangle) = x \times y = xy$.

Fraction = $xy / (2xy) =$ **½ (one-half)**.

SECTION D (5 Scores Each — Long Answer Questions)

21. Geometric Construction:

- Perimeter = $2(l + b) = 20\ cm \Rightarrow l + b = 10\ cm$.
- Ratio $l : b = 4 : 3$. Total parts = $4 + 3 = 7$.
- Draw a segment of $10\ cm$ and divide it into 7 equal parts using parallel line division.
- Take length $l = 4$ parts ($5.71\ cm$) and breadth $b = 3$ parts ($4.29\ cm$) to construct the rectangle with 90° corners.

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22 (A).

(i) In equilateral ΔABC, altitude CD bisects AB $\Rightarrow AD = 1\ cm$.

$CD = \sqrt{(2^2 - 1^2)} = \sqrt{3}\ cm \approx 1.732\ cm$.

(ii) $Perimeter(\Delta ACD) = AC + CD + AD = 2 + 1.732 + 1 =$ **4.73 cm (or 4.7 cm)**.

(iii) $Perimeter(\Delta ABC) = 3 \times 2 = 6\ cm$.

Difference = $6 - 4.732 =$ **1.27 cm**.

OR

22 (B).

(i) Hypotenuse of 1st triangle = $\sqrt{(1^2 + 1^2)} = \sqrt{2}$ **cm**.

(ii) Sides of 2nd triangle: $\sqrt{2}, 1, \sqrt{3}$.

$Perimeter = \sqrt{2} + 1 + \sqrt{3} \approx 1.414 + 1 + 1.732 =$ **4.15 cm (or 4.1 cm)**.

(iii) For the n^{th} triangle, sides are $\sqrt{n}, 1, \sqrt{(n+1)}$.

For the 10th triangle: **$\sqrt{10}$ cm, 1 cm, $\sqrt{11}$ cm**.

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23. Solution:

Let larger number = x and smaller number = y.

$(x + 1)(y - 1) = 390 \Rightarrow xy - (x - y) - 1 = 390 \Rightarrow xy - (x - y) = 391$ ...(1)

$(x - 1)(y + 1) = 408 \Rightarrow xy + (x - y) - 1 = 408 \Rightarrow xy + (x - y) = 409$ ...(2)

Adding (1) & (2): $2xy = 800 \Rightarrow$ **xy = 400 (Product)**.

Subtracting (1) from (2): $2(x - y) = 18 \Rightarrow$ **x – y = 9 (Difference)**.

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24 (A). In ΔABC, P and Q are midpoints of AB and $AC \Rightarrow PQ \parallel BC$ and $PQ = \frac{1}{2}BC$.

Since R is the midpoint of BC, $BR = \frac{1}{2}BC$. $\therefore PQ = BR$ and $PQ \parallel BR$.

A quadrilateral with one pair of opposite sides equal and parallel is a parallelogram $\Rightarrow PQRB$ is a parallelogram.

The diagonals of a parallelogram bisect each other $\Rightarrow$ **BQ bisects PR (PS = SR)**.

OR

24 (B).

(i) Since $QP \parallel AC \Rightarrow BP : PC = BQ : QA = 6 : 4 =$ **3 : 2**.

(ii) $BP = 15 \times (3 / 5) =$ **9 cm**, $PC = 15 \times (2 / 5) =$ **6 cm**.

(iii) In ΔABP, since $QR \parallel AP \Rightarrow BR : RP = BQ : QA =$ **3 : 2**.

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25. Solution:

Let price of a bag = x, price of an umbrella = y.

(i) Equations:

$7x + 3y = 3690$ ...(1)

$3x + 7y = 3010$ ...(2)

(ii) Adding (1) + (2): $10x + 10y = 6700 \Rightarrow x + y = 670$ ...(3)

Subtracting (1) – (2): $4x - 4y = 680 \Rightarrow x - y = 170$ ...(4)

Adding (3) + (4): $2x = 840 \Rightarrow$ **x = ₹420 (Price of a bag)**.

From (3): $y = 670 - 420 =$ **₹250 (Price of an umbrella)**.

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26 (A). Let the two numbers be x and y.

$(x + 2)(y + 2) = 1053 \Rightarrow xy + 2(x + y) + 4 = 1053$ ...(1)

$(x - 2)(y - 2) = 805 \Rightarrow xy - 2(x + y) + 4 = 805$ ...(2)

Adding (1) & (2): $2xy + 8 = 1858 \Rightarrow 2xy = 1850 \Rightarrow$ **xy = 925 (Product)**.

Subtracting (2) from (1): $4(x + y) = 248 \Rightarrow$ **x + y = 62 (Sum)**.

OR

26 (B). Let original length = x, original breadth = y.

(i) $(x - 1)(y + 1) = xy + 16 \Rightarrow xy + x - y - 1 = xy + 16 \Rightarrow$ **x – y = 17 m**.

(ii) When length is increased by 1 and breadth decreased by 1:

$New\ Area = (x + 1)(y - 1) = xy - (x - y) - 1 = xy - 17 - 1 = xy - 18$.

$\therefore$ **Area decreases by 18 square metres.**