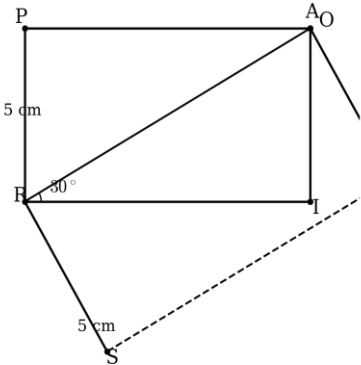


Q.No	Step-by-Step Solution	Marks per Step
SECTION – A (Q1, 12 MCQ sub-parts, 1 mark each)		
1(i)	Smallest three-digit perfect square: try 10^2. $10^2 = 100$ Greatest one-digit perfect cube: try 2^3. $2^3 = 8$ Product = 100×8 $= 800$ Answer: (A) 800	1 mark for the correct option.
1(ii)	Standard form means writing a number as (a number between 1 and 10) $\times$ a power of 10. Move the decimal point in 34,30,000 until only one digit remains before the point: 3.43 Count how many places the decimal point moved: 6 places. $34,30,000 = 3.43 \times 10^6$ Answer: (D) 3.43×10^6	1 mark for the correct option.
1(iii)	Check XL: X before L is a valid subtraction, $XL = 40$. Check IX: I before X is a valid subtraction, $IX = 9$. Check XC: X before C is a valid subtraction, $XC = 90$. Check IC: I may only be placed before V or X, never before C. 100 should correctly be written as C, not IC. Answer: (B) IC	1 mark for the correct option.
1(iv)	$CCXX = C + C + X + X$ $= 100 + 100 + 10 + 10$ $= 220$ Answer: (C) 220	1 mark for the correct option.
1(v)	Count the coil symbols (each worth 100): there are 2. $2 \times 100 = 200$ Count the heel-bone symbols (each worth 10): there are $3 + 3 + 1 = 7$. $7 \times 10 = 70$ Count the single-stroke symbols (each worth 1): there are $3 + 3 = 6$. $\text{Total} = 200 + 70 + 6$ $= 276$ Answer: (B) 276	1 mark for the correct option.
1(vi)	Check (A): a rectangle need not have all sides equal, so it need not be a square — FALSE. Check (B): a rhombus need not have right angles, so it need not be a square — FALSE. Check (D): a parallelogram need not have equal sides, so it need not be a rhombus — FALSE. Check (C): a square always has four right angles, so a square is always a rectangle — TRUE.	1 mark for the correct option.

Q.No	Step-by-Step Solution	Marks per Step
	Answer: (C) Every square is a rectangle	
1(vii)	$24 = 3 \times 8$ 3 and 8 share no common factor (they are co-prime). So checking divisibility by 3 and by 8 together correctly tells us if a number is divisible by 24. (4 and 6 are not co-prime with each other in the needed way — e.g. 12 is divisible by both 4 and 6, but not by 24.) Answer: (c) 3 and 8	1 mark for the correct option.
1(viii)	$99^2 - 1^2$ is a difference of squares: $a^2 - b^2 = (a - b)(a + b)$ Here $a = 99$, $b = 1$. $99^2 - 1^2 = (99 - 1)(99 + 1)$ $= 98 \times 100$ $= 9800$ Answer: (b) 9800	1 mark for the correct option.
1(ix)	$(6x + 1)^2$ uses the identity $(a + b)^2 = a^2 + 2ab + b^2$ Here $a = 6x$, $b = 1$. $(6x)^2 = 36x^2$ $2(6x)(1) = 12x$ $1^2 = 1$ $(6x + 1)^2 = 36x^2 + 12x + 1$ Answer: (a) $36x^2 + 12x + 1$	1 mark for the correct option.
1(x)	$(u + v)^2 = u^2 + 2uv + v^2$ $(u - v)^2 = u^2 - 2uv + v^2$ $(u + v)^2 - (u - v)^2 = (u^2 + 2uv + v^2) - (u^2 - 2uv + v^2)$ $= 4uv$ Answer: (b) $4uv$	1 mark for the correct option.
1(xi)	Two ratios are in proportion if their cross-products are equal. Check (a): $7 \times 7 = 49$ and $12 \times 12 = 144$ — not equal. Check (b): $24 \times 4 = 96$ and $8 \times 9 = 72$ — not equal. Check (c): $12 \times 12 = 144$ and $18 \times 28 = 504$ — not equal. Check (d): $4 \times 21 = 84$ and $7 \times 12 = 84$ — equal! Answer: (d) $4 : 7 :: 12 : 21$	1 mark for the correct option.
1(xii)	The standard formula converting Celsius to Fahrenheit is $F = \frac{9}{5} \times C + 32$. Answer: (c) $F = \frac{9}{5} \times C + 32$	1 mark for the correct option.
SECTION – B (Q2–7, 2 marks each)		
2	Group the digits of the number in pairs, starting from the right. $10684 \rightarrow 10 684$ Check nearby cubes: $21^3 = 9261$ $22^3 = 10648$	1 mark for the grouping method; 1 mark for the final cube root.

Q.No	Step-by-Step Solution	Marks per Step
	$23^3 = 12167$ <i>As printed, 10684 falls between 22^3 and 23^3, so it is not itself a perfect cube. The intended number is very likely $10648 = 22^3$ (a digit-transposition slip in the source paper).</i> Taking the number as 10648: the last group is 648, and since 8^3 ends in 8, the units digit of the root is 2 (because $2^3 = 8$). The first group is 10; since $2^3 = 8 \leq 10 < 3^3 = 27$, the tens digit of the root is 2. Answer: $\sqrt[3]{10648} = 22$ (assuming the intended number is 10648)	
3	Write out the place value of each digit in 561.093: 5 is in the hundreds place: 5×100 6 is in the tens place: 6×10 1 is in the units place: 1×1 0 is in the tenths place: $0 \times \frac{1}{10}$ 9 is in the hundredths place: $9 \times \frac{1}{100}$ 3 is in the thousandths place: $3 \times \frac{1}{1000}$ Answer: $561.093 = (5 \times 100) + (6 \times 10) + (1 \times 1) + \left(0 \times \frac{1}{10}\right) + \left(9 \times \frac{1}{100}\right) + \left(3 \times \frac{1}{1000}\right)$	2 marks for the fully correct expanded form.
4	In an isosceles trapezium, the two base angles on the same base are equal. Angles on the same leg (between the two parallel sides) add up to 180° . One base angle is given as 100° . Angle on the same leg = $180^\circ - 100^\circ = 80^\circ$ The angle opposite the given 100° (on the same base) is also 100° . The remaining angle is 80° . Answer: the four angles are $100^\circ, 100^\circ, 80^\circ, 80^\circ$	1 mark for the co-interior angle; 1 mark for the remaining two angles.
5	(A) Let the four consecutive natural numbers be $n, n + 1, n + 2, n + 3$. Sum = $n + (n + 1) + (n + 2) + (n + 3)$ $= 4n + 6$ $4n + 6 = 34$ $4n = 28$ $n = 7$ Answer: the numbers are 7, 8, 9, 10 (B) OR A number is a multiple of 9 if its digit sum is a multiple of 9. Digit sum of $31z5$: $3 + 1 + z + 5 = 9 + z$ We need $9 + z$ to be a multiple of 9. Since z is a single digit (0 to 9), try $z = 0$: $9 + 0 = 9 \checkmark$ Try $z = 9$: $9 + 9 = 18 \checkmark$ Answer: $z = 0$ or $z = 9$	(main) 1 mark for setting up the equation; 1 mark for the four numbers. (OR) 1 mark for the divisibility condition; 1 mark for the value(s) of z .

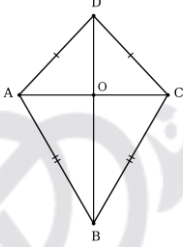
Q.No	Step-by-Step Solution	Marks per Step
6	Let x = number of years from now. Neerja's age in x years = $1 + x$ Her brother's age in x years = $5 + x$ We need $\frac{1+x}{5+x} = \frac{1}{2}$ Cross-multiply: $2(1+x) = 5+x$ $2+2x = 5+x$ $2x-x = 5-2$ $x = 3$ Neerja's age then = $1+3 = 4$ Answer: Neerja will be 4 years old	1 mark for the equation; 1 mark for the final age.
7	A ratio proportional to $4 : 9$ has the form $4k : 9k$, for any whole number k. Take $k = 2$: $4 \times 2 = 8$ and $9 \times 2 = 18$, giving $8 : 18$ Take $k = 3$: $4 \times 3 = 12$ and $9 \times 3 = 27$, giving $12 : 27$ Answer: $8 : 18$ and $12 : 27$ (many other answers are also valid)	1 mark for each valid ratio.
SECTION – C (Q8–10, 3 marks each)		
8	(i) $CCXXXII = C + C + X + X + X + I + I = 232$ (2 hundreds, 3 tens, 2 ones) $CCCCXIII = C + C + C + C + X + I + I + I = 413$ (4 hundreds, 1 ten, 3 ones) Add the hundreds symbols: $2 + 4 = 6$ C's. 6 C's regroup to $D + C$ (since $5C = D$), i.e. DC. Add the tens symbols: $3 + 1 = 4$ X's, which is XL (since $4X = 40 = XL$). Add the ones symbols: $2 + 3 = 5$ I's, which is V (since $5I = V$). Combine: $DC + XL + V = DCXLV$ (ii) $LXXXVII = 87$ (1 L, 3 X's, 1 V, 2 I's) $LXXVIII = 78$ (1 L, 2 X's, 1 V, 3 I's) Add the L's: $1 + 1 = 2$ L's, which regroups to C (since $2L = 100 = C$). Add the X's: $3 + 2 = 5$ X's, which regroups to L. Add the V's: $1 + 1 = 2$ V's, which regroups to X. Add the I's: $2 + 3 = 5$ I's, which regroups to V. Combine: $C + L + X + V = CLXV$ Answer: (i) $DCXLV$ (645) (ii) $CLXV$ (165)	1.5 marks for part (i); 1.5 marks for part (ii).
9	(A) A rhombus is a special parallelogram, so its opposite sides are parallel. Adjacent angles between parallel sides always add up to 180° (co-interior angles). One angle is given as 50°. Adjacent angle = $180^\circ - 50^\circ = 130^\circ$ Opposite angles in a rhombus are equal to each other. So the four angles are $50^\circ, 130^\circ, 50^\circ, 130^\circ$ Property used: adjacent angles of a parallelogram (rhombus) are supplementary; opposite angles are equal. Answer: angles are $50^\circ, 130^\circ, 50^\circ, 130^\circ$ (B) OR	(main) 1 mark for the adjacent angle; 1 mark for the remaining two angles; 1 mark for stating the property. (OR) 3 marks for the angle-chase leading to $\angle IOD$.

Q.No	Step-by-Step Solution	Marks per Step
	 $PAIR$ is a rectangle, so $\angle PRI = 90^\circ$. $RODS$ is a rectangle, so $\angle SRO = 90^\circ$. Point O (of rectangle $RODS$) lies on the diagonal direction from R through A. Since $IA \perp RI$ (corner of rectangle $PAIR$ at I), ray OI is vertical — i.e. 90° from RI. $\angle ORI = 30^\circ$ is given. Side OD is parallel to side RS (opposite sides of rectangle $RODS$). Since $\angle SRO = 90^\circ$ and $\angle ORI = 30^\circ$, angle RS makes with RI is $90^\circ - 30^\circ = 60^\circ$. So OD is also inclined 60° from RI. $\angle IOD = 90^\circ - 60^\circ$ $\angle IOD = 30^\circ$ Answer: $\angle IOD = 30^\circ$	
10	(i) Expand $(p + pq - 3q^2)(4 + q)$ term by term. $p \times (4 + q) = 4p + pq$ $pq \times (4 + q) = 4pq + pq^2$ $-3q^2 \times (4 + q) = -12q^2 - 3q^3$ Add all the terms: $4p + pq + 4pq + pq^2 - 12q^2 - 3q^3$ Combine like terms ($pq + 4pq = 5pq$): $4p + 5pq + pq^2 - 12q^2 - 3q^3$ (ii) Expand $(5 + z)(y + 9)$ term by term. $5 \times y = 5y$ $5 \times 9 = 45$ $z \times y = zy$ $z \times 9 = 9z$ Add all the terms: $5y + 45 + zy + 9z$ Answer: (i) $4p + 5pq + pq^2 - 12q^2 - 3q^3$ (ii) $5y + 45 + zy + 9z$	1.5 marks for part (i); 1.5 marks for part (ii).
SECTION – D (Q11–13, 5 marks each)		
11	<u>(i)</u> Find the prime factors of 9408. $9408 = 2^6 \times 3 \times 7^2$ Check: $2^6 = 64$, and $64 \times 3 = 192$, and $192 \times 49 = 9408$ ✓ For a perfect square, every prime's power must be even. 2^6 has an even power ✓ 3^1 has an odd power — needs one more factor of 3. 7^2 has an even power ✓	(i) 1 mark for the multiplier; 2 marks for the square root. (ii) 2 marks for the side length.

Q.No	Step-by-Step Solution	Marks per Step
	So the smallest number to multiply by is 3. Product = $9408 \times 3 = 28224$ $\sqrt{28224} = \sqrt{2^6 \times 3^2 \times 7^2}$ $= 2^3 \times 3 \times 7$ $= 8 \times 3 \times 7 = 168$ Answer: smallest multiplier = 3; $\sqrt{28224} = 168$ (ii) Area of the square = 441 m^2. Side = $\sqrt{441}$ Side = 21 m Answer: 21 m	
12	(A) We are given $15^2 = 225$. (i) $1.5 = \frac{15}{10}$, so $(1.5)^2 = \frac{15^2}{10^2} = \frac{225}{100} = 2.25$ (ii) $0.15 = \frac{15}{100}$, so $(0.15)^2 = \frac{225}{10000} = 0.0225$ (iii) $0.015 = \frac{15}{1000}$, so $(0.015)^2 = \frac{225}{1000000} = 0.000225$ (iv) $150 = 10 \times 15$, so $(150)^2 = 100 \times 225 = 22500$ (v) $1500 = 100 \times 15$, so $(1500)^2 = 10000 \times 225 = 2250000$ Answer: (i) 2.25 (ii) 0.0225 (iii) 0.000225 (iv) 22500 (v) 2250000 (B) OR (i) When multiplying powers with the same base, add the exponents: $10^{-2} \times 10^{-5} = 10^{-2+(-5)} = 10^{-7}$ (ii) When dividing powers with the same base, subtract the exponents: $5^7 \div 5^4 = 5^{7-4} = 5^3 = 125$ (iii) $9^{-7} \div 9^4 = 9^{-7-4} = 9^{-11}$ (iv) When raising a power to a power, multiply the exponents: $(13^{-2})^{-3} = 13^{(-2) \times (-3)} = 13^6$ (v) $(mn)^9 = m^9 n^9$ $m^5 n^{12} \times m^9 n^9 = m^{5+9} n^{12+9} = m^{14} n^{21}$ Answer: (i) 10^{-7} (ii) 125 (iii) 9^{-11} (iv) 13^6 (v) $m^{14} n^{21}$	(main) 1 mark for each of the five values. (OR) 1 mark for each of the five simplifications.
13	(i) $UT \times 3 = PUT$: write $UT = 10U + T$. $3(10U + T) = 100P + 10U + T$ $30U + 3T = 100P + 10U + T$ $20U + 2T = 100P$ $10U + T = 50P$, i.e. $UT = 50P$ Since UT is a 2-digit number, $P = 1$ works: $UT = 50$. Check: $U = 5, T = 0$: $50 \times 3 = 150$, and $PUT = 150$ with $P = 1, U = 5, T = 0$ ✓ (ii) $PP \times QQ = PRP$: try $PP = 22$ (so $P = 2$), $QQ = 11$ (so $Q = 1$). $22 \times 11 = 242$ Check: $PRP = 242$ matches with $P = 2, R = 4$ ✓	1 mark for each correctly solved cryptarithm.

Q.No	Step-by-Step Solution	Marks per Step
	(iii) $L2N \times 2 = 2NP$: try $L = 1$. $100(1) + 20 + N = \text{tens/hundreds part}$; solving $200(1) + 40 + 2N = 200 + 10N + P$ gives $8N + P = 40$ Try $N = 5$, $P = 0$: $125 \times 2 = 250$, matches $2NP = 250$ ✓ (iv) $EF \times F = GGG$: reading the multiplier as the tens digit ($EF \times E$) gives a clean solution. Try $E = 3$, $F = 7$: $37 \times 3 = 111$ Check: $GGG = 111$ with $G = 1$ ✓ (v) $WOW \times 5 = MEOW$: solve digit by digit, starting from the units place. Units: $W \times 5$ must end in W; this works when $W = 5$ (since $5 \times 5 = 25$, ending in 5). Carry forward and solve the remaining digits: $O = 7$, $E = 8$, $M = 2$. Check: $575 \times 5 = 2875$, matches $MEOW = 2875$ ✓ Answer: (i) $50 \times 3 = 150$ (ii) $22 \times 11 = 242$ (iii) $125 \times 2 = 250$ (iv) $37 \times 3 = 111$ (v) $575 \times 5 = 2875$	

SECTION – E (Q14–16, case-based, 4 marks each)

14	 (i) The kite has two pairs of adjacent equal sides: $DA = DC$ and $BA = BC$ (shown by tick marks). We are given $AD = 5$ cm. Since $AD = CD$ (kite property), $CD = 5$ cm too. Answer: $CD = 5$ cm (ii)(a) Compare $\triangle ABD$ and $\triangle CBD$. $AB = CB$ (given). $AD = CD$ (given). $BD = BD$ (common side). All three pairs of sides match, so by SSS congruence, $\triangle ABD \cong \triangle CBD$. Since the triangles are congruent, their matching angles are equal: $\angle ABD = \angle CBD$. This means BD bisects $\angle ABC$. Also, $\angle ADB = \angle CDB$. This means BD also bisects $\angle ADC$. (ii)(b) OR From $\triangle ABD \cong \triangle CBD$ (SSS, as in part ii(a)), matching angles give $\angle ABO = \angle CBO$. Now compare $\triangle ABO$ and $\triangle CBO$. $AB = CB$ (given).	(i) 1 mark. (ii)(a)/(ii)(b) 2 marks. (iii) 1 mark.
----	--	--

Q.No	Step-by-Step Solution	Marks per Step
	$\angle ABO = \angle CBO$ (just shown). $BO = BO$ (common side). By SAS congruence, $\triangle ABO \cong \triangle CBO$. Since the triangles are congruent, $AO = CO$. This means diagonal BD bisects diagonal AC . (iii) We are told the diagonals intersect at right angles. Answer: $\angle DOC = 90^\circ$	
15	(i) Use identity (A): $(a + b)^2 = a^2 + 2ab + b^2$ Write $65 = 60 + 5$, so $a = 60$, $b = 5$. $60^2 = 3600$ $2(60)(5) = 600$ $5^2 = 25$ $(65)^2 = 3600 + 600 + 25 = 4225$ Answer: 4225 (ii) Use identity (C): $a^2 - b^2 = (a + b)(a - b)$ Write $98 = 100 - 2$ and $102 = 100 + 2$. $98 \times 102 = (100 - 2)(100 + 2)$ $= 100^2 - 2^2$ $= 10000 - 4$ $= 9996$ Answer: 9996 (iii)(a) Expand $(m + n)^2$ using identity (A): $(m + n)^2 = m^2 + 2mn + n^2$ Expand $(n - m)^2$ using identity (B): $(n - m)^2 = n^2 - 2mn + m^2$ Subtract: $(m + n)^2 - (n - m)^2 = (m^2 + 2mn + n^2) - (n^2 - 2mn + m^2)$ $= 2mn - (-2mn)$ $= 4mn$ Hence, $(m + n)^2 - (n - m)^2 = 4mn$, proved. (iii)(b) OR Use the identity $a^2 = (a + b)(a - b) + b^2$. Let $a = 197$, and choose $b = 3$ (to make $a + b$ a round number). $a + b = 197 + 3 = 200$ $a - b = 197 - 3 = 194$ $197^2 = (200)(194) + 3^2$ $= 38800 + 9$ $= 38809$ Answer: $197^2 = 38809$	(i) 1 mark. (ii) 1 mark. (iii)(a)/(iii)(b) 2 marks.

Q.No	Step-by-Step Solution	Marks per Step
16	(i) Investments: Prashanti = 75000, Bhuvan = 50000, Rohan = 25000. Divide each by their common factor, 25000. $75000 \div 25000 = 3$ $50000 \div 25000 = 2$ $25000 \div 25000 = 1$ Answer: ratio = 3 : 2 : 1 (ii) Total parts = $3 + 2 + 1 = 6$ Bhuvan's share = $\frac{2}{6} \times 40000$ $= \frac{40000}{3}$ $= 13333.33$ Answer: Rs. 13,333.33 (i.e. Rs. $13,333\frac{1}{3}$) (iii)(a) Prashanti's share = $\frac{3}{6} \times 40000 = 20000$ Rohan's share = $\frac{1}{6} \times 40000 = 6666.67$ Difference = $20000 - 6666.67$ $= 13333.33$ Answer: Rs. 13,333.33 (iii)(b) OR Simplify 18 : 24 first: divide both by 6. $18 : 24 = 3 : 4$ For 3 : ? proportional to 3 : 4: since the first term is already 3, the missing term is just 4. $3 : 4$ For 20 : ? proportional to 3 : 4: $\frac{20}{?} = \frac{3}{4}$ $? = \frac{20 \times 4}{3}$ $? = \frac{80}{3} = 26.67$ Answer: 3 : 4 and 20 : 26.67 (i.e. $20 : 26\frac{2}{3}$)	(i) 1 mark. (ii) 1 mark. (iii)(a)/(iii)(b) 2 marks.

To get more sample papers , practice papers ,study material for Maths (only for CBSE VI-VII) join my whatsapp group at link shared below

<https://chat.whatsapp.com/H6Ho8HCH7imJh4Z6HV9bos>