Real Numbers — Made Easy!

Class 9 · Chapter 1 · Exercise 1.3 · Slow & Simple Notes

Read this first — this exercise is STORY questions

No scary new maths here! Exercise 1.3 takes the roots and rules you already know and hides them inside small stories — numbers, ages, a triangle, a rectangle, temperature, profit, tax and markup. Your job is only to change the story into maths.

THE GOLDEN RULE — 5 steps for every story

- 1) READ the story slowly, twice.
- 2) Choose x for the unknown thing.
- 3) Change the story words into an equation (= is the bridge).
- 4) SOLVE the equation, one small step at a time.
- 5) CHECK your answer back inside the story.

THE 3 FAMILIES IN THIS EXERCISE

- Family 1 — Number & age stories: Q.1 , Q.4 , Q.6 (choose x, make an equation)
- Family 2 — Root geometry: Q.2 , Q.3 (your Ex 1.2 conjugate tool returns!)
- Family 3 — Money & daily life: Q.5 , Q.7 , Q.8 , Q.9 (small formulas, put numbers in)

Slow trick: a story question is just an equation wearing a costume. Undress it!

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Q.1 Three Integers in a Row

Story: The sum of three consecutive integers is 42. Find them.

First, one word: CONSECUTIVE means one after another, like 7, 8, 9 — each next number is just +1.

Step 1 — Choose x: Let the smallest integer be x.

Then the next one is x + 1, and the third one is x + 2. (Just keep adding 1.)

Step 2 — Make the equation: the story says their SUM is 42:

$x + (x + 1) + (x + 2) = 42$

Step 3 — Collect the family: three x's make 3x, and 1 + 2 makes 3:

$3x + 3 = 42$

Step 4 — Solve slowly: take 3 to the other side (it becomes minus):

$3x = 42 - 3 = 39$. Now divide both sides by 3: $x = 39 \div 3 = 13$.

Step 5 — Write all three: $x = 13$, $x + 1 = 14$, $x + 2 = 15$.

Answer: 13 , 14 , 15

CHECK IN THE STORY (Golden Rule step 5)

13 + 14 + 15 = 42. Yes! The story is happy, so the answer is right.

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Q.2 The Triangle — Find the Missing Side

Right angle at A: AC = (√3+√5) cm, Area = (1+√15) cm². Find AB.

Look at the picture in your book: the right angle is at corner A, so the two sides that meet at A — AB and AC — are the two LEGS of the triangle.

Step 1 — Area rule for a right triangle: Area = (leg × leg) ÷ 2

So: (1 + √15) = AB × (√3 + √5) ÷ 2

Step 2 — Bring AB alone: multiply both sides by 2 and divide:

AB = 2(1 + √15) / (√3 + √5)

Step 3 — A root is sitting in the bottom! Use the Ex 1.2 tool: multiply top and bottom by the conjugate (√3 − √5).

Bottom becomes: $(\sqrt{3})^2 - (\sqrt{5})^2 = 3 - 5 = -2$.

Step 4 — Top: expand (1 + √15)(√3 − √5) in four small pieces:

1 × √3 = √3. 1 × (−√5) = −√5. √15 × √3 = √45 = 3√5. √15 × (−√5) = −√75 = −5√3.

(√45 = √(9×5) = 3√5, and √75 = √(25×3) = 5√3 — pull the square out of the root.)

Step 5 — Collect the families: √3 family: √3 − 5√3 = −4√3. √5 family: −√5 + 3√5 = +2√5.

So AB = 2(−4√3 + 2√5) ÷ (−2) = 4√3 − 2√5. (Dividing by −2 flips both signs.)

Answer: AB = (4√3 − 2√5) cm a = 4 , b = −2

Quick sense-check: 4√3 − 2√5 ≈ 6.93 − 4.47 ≈ 2.46 cm — a small positive length. Sensible!

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Q.3 The Rectangle — Area in a + b2 Form

Sides: (2 + √18) m and (5 − 4/√2) m. Find the area as a + b√2.

Step 1 — Clean the LENGTH first: √18 hides a square: √18 = √(9 × 2) = 3√2.

Length l = 2 + 3√2 m.

Step 2 — Clean the BREADTH: 4/√2 has a root in the bottom. Rationalize it — multiply top and bottom by √2:

4/√2 = (4 × √2) / (√2 × √2) = 4√2 / 2 = 2√2. So breadth b = 5 − 2√2 m.

Step 3 — Area = length × breadth: (2 + 3√2) × (5 − 2√2). Multiply in FOUR pieces:

2 × 5 = 10. 2 × (−2√2) = −4√2. 3√2 × 5 = 15√2. 3√2 × (−2√2) = −6 × (√2)² = −6 × 2 = −12.

Step 4 — Collect the families: plain numbers: 10 − 12 = −2. √2 family: −4√2 + 15√2 = +11√2.

Answer: Area = (−2 + 11√2) m² , written (11√2 − 2) m² a = −2 , b = 11

DECIMAL SANITY CHECK — a habit of toppers

Length ≈ 2 + 4.24 = 6.24 m. Breadth ≈ 5 − 2.83 = 2.17 m. Area ≈ 6.24 × 2.17 ≈ 13.56 m². And −2 + 11√2 ≈ −2 + 15.56 = 13.56. Same! Sleep peacefully.

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Q.4 Two Numbers — and Q.5 Temperature

Two short ones. Same golden rule: words first, equation second.

Q.4 Sum is 68, difference is 22 — find the two numbers

Step 1 — Let the numbers be x and y. The story gives TWO sentences, so two equations:

(A) x + y = 68 (B) x − y = 22

Step 2 — From (B): x = 22 + y. (The bigger number x is 22 more than y.)

Step 3 — Put this x into (A): (22 + y) + y = 68 22 + 2y = 68 2y = 46 y = 23.

Step 4 — Back into (B): x = 22 + 23 = 45.

Answer: 45 and 23 Check: 45 + 23 = 68 and 45 − 23 = 22 — both sentences happy.

Q.5 Lahore heat: change 48°C into Fahrenheit

The formula is GIVEN in the question — you only put the number in: °F = (9/5) × °C + 32

Step 1: Put °C = 48: °F = (9/5) × 48 + 32.

Step 2: (9/5) × 48 means 9 × 48 ÷ 5. 9 × 48 = 432. 432 ÷ 5 = 86.4.

Step 3: Add the 32: 86.4 + 32 = 118.4.

Answer: 118.4 °F

Memory line for the formula: times 9, divide by 5, add 32.

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Q.6 Father and Son — the Age Story

Father + son = 72 today. Six years ago, father was 2 × son.

Read the last line again — the question asks for the age six years ago, NOT today's age. This is the trap of this question!

Step 1 — Choose letters: son's age TODAY = x, father's age TODAY = y.

Step 2 — First sentence: (A) $x + y = 72$.

Step 3 — Six years ago, BOTH were younger by 6: son was $(x - 6)$, father was $(y - 6)$.

Second sentence: father then = 2 × son then: $y - 6 = 2(x - 6)$.

Open it: $y - 6 = 2x - 12$. Take -6 to the other side (becomes $+6$): $y = 2x - 6$.

Step 4 — Put this y into (A): $x + (2x - 6) = 72 \quad 3x - 6 = 72 \quad 3x = 78 \quad x = 26$.

So the son is 26 TODAY. But the question asked for six years ago:

Answer: 26 − 6 = 20 years

CHECK + THE TRAP

Father today = 72 − 26 = 46. Six years ago: father 40, son 20 — and 40 is exactly 2 × 20 . TRAP: if you answer 26, you answered the wrong question!

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Q.7 Profit % — and Q.8 Income Tax

Money family. Both are one small formula each — learn the formula, the question is finished.

Q.7 Mirha's toy: bought Rs 1500, sold Rs 1520

Names first: money spent = CP (cost price) = 1500. Money received = SP (selling price) = 1520.

Step 1 — Profit = SP − CP = 1520 − 1500 = 20 Rs.

Step 2 — The formula: Profit % = (Profit ÷ CP) × 100. Always divide by CP — the price she PAID.

Step 3 — Put the numbers: (20 ÷ 1500) × 100 = 2000 ÷ 1500 = 1.33 (approximately).

Answer: Profit = 1.33%

Q.8 Tayyab's tax: income Rs 9,60,000, exempt Rs 1,30,000, rate 0.75%

EXEMPT means: that part is free, no tax on it. Tax is paid only on what is LEFT.

Step 1 — Taxable income = 9,60,000 − 1,30,000 = 8,30,000 Rs.

Step 2 — Tax = 0.75% of 8,30,000. Easy way: 1% of 8,30,000 = 8,300 (just divide by 100).

0.75% is three-quarters of 1%: 8,300 × 0.75 = 6,225.

Answer: Tax = Rs 6,225

(Formula way, same answer: Tax = 0.75 ÷ 100 × 8,30,000 = 6,225.)

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Q.9 Compound Markup — then Revision

Last question, then the full-exercise cheat sheet.

Q.9 Markup on Rs 3,75,000 for 1 year at 14%

MARKUP is the bank's profit — like interest. Money kept = Principal P = 3,75,000. Rate r = 14%. Time t = 1 year.

Step 1 — For ONE year the formula is simple: Markup = P × r × t ÷ 100.

Step 2 — Put the numbers: 3,75,000 × 14 × 1 ÷ 100. First 3,75,000 × 14 = 52,50,000.

Step 3 — Divide by 100 (cut two zeros): 52,50,000 ÷ 100 = 52,500.

Answer: Compound Markup = Rs 52,500

Why 'compound' changes nothing here: after 1 year the total amount is 3,75,000 + 52,500 = 4,27,500 — compounding only starts making a difference from the SECOND year.

1-Page Revision — Read Before the Test!

1. Story question? Golden rule: read choose x equation solve check in the story.
2. Consecutive integers: x, x+1, x+2. Sum 42 13, 14, 15.
3. Right triangle area = (leg × leg) ÷ 2. Root in the bottom? Conjugate — Ex 1.2 tool!
4. √18 = 3√2 (pull the square out). 4/√2 = 2√2 (rationalize it). Rectangle area = l × b, multiply in 4 pieces.
5. °F = (9/5) × °C + 32 — times 9, divide by 5, add 32. 48°C = 118.4°F.
6. Ages: 'six years ago' means −6 from BOTH ages. And re-read what the question ASKS (20, not 26!).
7. Profit % = (Profit ÷ CP) × 100. Tax: first subtract the exempt part. Markup for 1 year = P × r × t ÷ 100.

TRY YOURSELF

A) Three consecutive integers add to 51. Find them.

B) Two numbers: sum 50, difference 10. Find them.

C) Change 35°C into Fahrenheit.

D) A bag: CP Rs 800, SP Rs 880. Find the profit %.

Answers: A) 16, 17, 18 B) 30 and 20 C) 95°F D) 10%

Exercise 1.3 — done! Every story is just an equation waiting for its costume to come off.

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