

Expressions using Letter-Numbers

Class 7 NCERT Solutions

Step-by-step answers for the 2026-27 NCERT Mathematics book

Chapter 4: Expressions using Letter-Numbers

This PDF solves Class 7 Mathematics (Part 1) Chapter 4 Expressions using Letter-Numbers. It covers formulas, money expressions, calendar patterns, simplification, addition, subtraction and pattern formulas in clear steps.

Also see:

[Chapter 4 Notes](#)

Revise letter-numbers, expressions and formulas.

[Chapter 4 NCERT Book
PDF](#)

Read the official source chapter.

[Chapter 4 Handwritten
Notes](#)

Use notebook-style revision for quick recall.

Chapter 4 Figure it Out Solutions

Q 4.1 Write formulas for the perimeter of: (a) a triangle with all sides equal, (b) a regular pentagon, and (c) a regular hexagon.

SOLUTION

Concept used. For a regular polygon, perimeter equals number of equal sides times the length of each side.

Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. Let the common side length be a units.

Step 2. A triangle with all sides equal has 3 equal sides, so its perimeter is $3a$.

Step 3. A regular pentagon has 5 equal sides, so its perimeter is $5a$.

Step 4. A regular hexagon has 6 equal sides, so its perimeter is $6a$.

Exam tip

Count equal sides first. Then multiply by the side length.

Final Answer: (a) $3a$ units, (b) $5a$ units, (c) $6a$ units.

EXPERT'S SOLUTION : Aarav Sharma, M.Sc Mathematics, IIT Bombay

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. Let the common side length be a units.

Step 2. A triangle with all sides equal has 3 equal sides, so its perimeter is $3a$.

Step 3. A regular pentagon has 5 equal sides, so its perimeter is $5a$.

Step 4. A regular hexagon has 6 equal sides, so its perimeter is $6a$.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a

fixed cost more than once.

Final Answer: (a) $3a$ units, (b) $5a$ units, (c) $6a$ units.

Q 4.2 Munirathna has a 20 m long pipe and joins another pipe of length k m. Give the expression for the combined length.

SOLUTION

Concept used. A total length is found by adding the known length and the unknown length.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. The first pipe is 20 m long.

Step 2. The second pipe has length k m.

Step 3. Combined length means first length plus second length.

Step 4. So the expression is $20 + k$ metres.

 Exam tip

Keep the unit outside the expression: $20 + k$ metres.

Final Answer: $(20 + k)$ metres.

EXPERT'S SOLUTION : Diya Nair, M.Sc Mathematics, ISI Kolkata

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. The first pipe is 20 m long.

Step 2. The second pipe has length k m.

Step 3. Combined length means first length plus second length.

Step 4. So the expression is $20 + k$ metres.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: $(20 + k)$ metres.

Q 4.3 Complete Krithika's money table for notes of Rs. 100, Rs. 20, and Rs. 5.**SOLUTION**

Concept used. Total money equals number of each note multiplied by its value, then all values are added.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. For 3, 5, 6 notes, total = $3 \times 100 + 5 \times 20 + 6 \times 5 = 430$.

Step 2. For 6, 4, 3 notes, total = $6 \times 100 + 4 \times 20 + 3 \times 5 = 695$.

Step 3. For 8, 4, z notes, total = $8 \times 100 + 4 \times 20 + 5z = 880 + 5z$.

Step 4. For x, y, z notes, total = $100x + 20y + 5z$.

 Exam tip

Multiply first, then add the value of all note types.

Final Answer: Rs. 430, Rs. 695, Rs. $(880 + 5z)$, and Rs. $(100x + 20y + 5z)$.

EXPERT'S SOLUTION : Vivaan Patel, M.Sc Applied Mathematics, IIT Kanpur

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. For 3, 5, 6 notes, total = $3 \times 100 + 5 \times 20 + 6 \times 5 = 430$.

Step 2. For 6, 4, 3 notes, total = $6 \times 100 + 4 \times 20 + 3 \times 5 = 695$.

Step 3. For 8, 4, z notes, total = $8 \times 100 + 4 \times 20 + 5z = 880 + 5z$.

Step 4. For x, y, z notes, total = $100x + 20y + 5z$.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: Rs. 430, Rs. 695, Rs. $(880 + 5z)$, and Rs. $(100x + 20y + 5z)$.

Q 4.4 Venkatalakshmi's mill takes 10 seconds to start and 8 seconds for each kg of grain. Which expression gives the time for y kg?

SOLUTION

Concept used. A fixed starting time is added once. The grinding time depends on the number of kilograms.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. The machine takes 10 seconds to start. This is a fixed time.

Step 2. Each kg takes 8 seconds, so y kg takes $8y$ seconds.

Step 3. Total time equals starting time plus grinding time.

Step 4. Therefore, total time = $10 + 8y$.

 Exam tip

Do not multiply the starting time by y because the machine starts only once.

Final Answer: Option (d), $10 + 8y$.

EXPERT'S SOLUTION : Sneha Iyer, Ph.D Mathematics, IIT Delhi

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. The machine takes 10 seconds to start. This is a fixed time.

Step 2. Each kg takes 8 seconds, so y kg takes $8y$ seconds.

Step 3. Total time equals starting time plus grinding time.

Step 4. Therefore, total time = $10 + 8y$.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: Option (d), $10 + 8y$.

Q 4.5 Write algebraic expressions for: (a) 5 more than a number, (b) 4 less than a number, (c) 2 less than 13 times a number, and (d) 13 less than 2 times a number.

SOLUTION

Concept used. Use a letter to stand for the number, then translate each phrase in order.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. Let the number be d .

Step 2. Five more than the number is $d + 5$.

Step 3. Four less than the number is $d - 4$.

Step 4. Two less than 13 times the number is $13d - 2$.

Step 5. Thirteen less than 2 times the number is $2d - 13$.

 Exam tip

The phrase 'less than' reverses the order: subtract the stated amount from the main expression.

Final Answer: (a) $d + 5$, (b) $d - 4$, (c) $13d - 2$, (d) $2d - 13$.

EXPERT'S SOLUTION : Pranav Rao, M.Sc Mathematics, IIT Bombay

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. Let the number be d .

Step 2. Five more than the number is $d + 5$.

Step 3. Four less than the number is $d - 4$.

Step 4. Two less than 13 times the number is $13d - 2$.

Step 5. Thirteen less than 2 times the number is $2d - 13$.

Step 6. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a

fixed cost more than once.

Final Answer: (a) $d + 5$, (b) $d - 4$, (c) $13d - 2$, (d) $2d - 13$.

Q 4.6 Describe situations corresponding to $8x + 3y$ and $15j - 2k$.**SOLUTION**

Concept used. An algebraic expression can describe a real situation when letters stand for quantities.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. For $8x + 3y$, suppose a shop sells one pen for Rs. x and one notebook for Rs. y .

Step 2. If Abha buys 8 pens and 3 notebooks, the total cost is $8x + 3y$.

Step 3. For $15j - 2k$, suppose a factory makes 15 chairs each day for j days.

Step 4. If 2 chairs break each day for k days, the good chairs remaining can be written as $15j - 2k$.

 Exam tip

Many situations are possible. The letter meanings must match the expression.

Final Answer: One valid pair of situations is: cost of 8 pens and 3 notebooks; chairs made minus chairs broken.

EXPERT'S SOLUTION : Aanya Desai, M.Sc Mathematics, ISI Kolkata

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. For $8x + 3y$, suppose a shop sells one pen for Rs. x and one notebook for Rs. y .

Step 2. If Abha buys 8 pens and 3 notebooks, the total cost is $8x + 3y$.

Step 3. For $15j - 2k$, suppose a factory makes 15 chairs each day for j days.

Step 4. If 2 chairs break each day for k days, the good chairs remaining can be written as $15j - 2k$.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: One valid pair of situations is: cost of 8 pens and 3 notebooks; chairs made minus chairs broken.

Q 4.7 In a calendar 2 by 3 grid, the bottom middle cell has date w and the bottom left has $w - 1$. Write expressions for the remaining cells.

SOLUTION

Concept used. In a calendar, moving right adds 1 and moving one row up subtracts 7.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. The bottom row is $w - 1$, w , $w + 1$.

Step 2. The top-left cell is 7 days before $w - 1$, so it is $w - 8$.

Step 3. The top-middle cell is 7 days before w , so it is $w - 7$.

Step 4. The top-right cell is 7 days before $w + 1$, so it is $w - 6$.

 Exam tip

A calendar column changes by 7 because the same weekday repeats after seven days.

Final Answer: Top row: $w - 8$, $w - 7$, $w - 6$; bottom row: $w - 1$, w , $w + 1$.

EXPERT'S SOLUTION : *Karan Singh, B.Tech CSE, IIT Roorkee*

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. The bottom row is $w - 1$, w , $w + 1$.

Step 2. The top-left cell is 7 days before $w - 1$, so it is $w - 8$.

Step 3. The top-middle cell is 7 days before w , so it is $w - 7$.

Step 4. The top-right cell is 7 days before $w + 1$, so it is $w - 6$.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: Top row: $w - 8$, $w - 7$, $w - 6$; bottom row: $w - 1$, w , $w + 1$.

Q 4.8 Add the numbers in the three pictures and simplify the expressions.**SOLUTION**

Concept used. Like terms can be grouped and added. Unlike letter terms cannot be combined.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. First picture: $5y + x + x + 5y - 6 + 2 = 10y + 2x - 4$.

Step 2. Second picture: four $2p$ terms give $8p$, four $3q$ terms give $12q$, and constants add to 2.

Step 3. So the second total is $8p + 12q + 2$.

Step 4. Third picture: four $-5g$ terms give $-20g$ and twelve $5k$ terms give $60k$.

 Exam tip

Collect like terms by letter and power. Then add only those groups.

Final Answer: (i) $10y + 2x - 4$, (ii) $8p + 12q + 2$, (iii) $-20g + 60k$.

EXPERT'S SOLUTION : Priya Kapoor, Ph.D Mathematics, IIT Delhi

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. First picture: $5y + x + x + 5y - 6 + 2 = 10y + 2x - 4$.

Step 2. Second picture: four $2p$ terms give $8p$, four $3q$ terms give $12q$, and constants add to 2.

Step 3. So the second total is $8p + 12q + 2$.

Step 4. Third picture: four $-5g$ terms give $-20g$ and twelve $5k$ terms give $60k$.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: (i) $10y + 2x - 4$, (ii) $8p + 12q + 2$, (iii) $-20g + 60k$.

Q 4.9 Simplify: $p + p + p + p$, $p + p + p + q$, $p + q + p - q$, $p - q + p - q$, $p + q - p + q$, $p + q - (p + q)$, $p - q - p - q$, $2d - d - d - d$, $2d - d - d - c$, $2d - d - (d - c)$, $2d - (d - d) - c$, and $2d - d - c - c$.

SOLUTION

Concept used. Simplification means removing brackets carefully and then combining like terms.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. $p + p + p + p = 4p$ and $p + p + p + q = 3p + q$.

Step 2. $p + q + p - q = 2p$ and $p - q + p - q = 2p - 2q$.

Step 3. $p + q - p + q = 2q$, $p + q - (p + q) = 0$, and $p - q - p - q = -2q$.

Step 4. $2d - d - d - d = -d$ and $2d - d - d - c = -c$.

Step 5. $2d - d - (d - c) = c$, $2d - (d - d) - c = 2d - c$, and $2d - d - c - c = d - 2c$.

 Exam tip

A minus sign before brackets changes every sign inside the brackets.

Final Answer: $4p, 3p + q, 2p, 2p - 2q, 2q, 0, -2q, -d, -c, c, 2d - c, d - 2c$.

EXPERT'S SOLUTION : Ishaan Joshi, M.Sc Applied Mathematics, IIT Kanpur

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. $p + p + p + p = 4p$ and $p + p + p + q = 3p + q$.

Step 2. $p + q + p - q = 2p$ and $p - q + p - q = 2p - 2q$.

Step 3. $p + q - p + q = 2q$, $p + q - (p + q) = 0$, and $p - q - p - q = -2q$.

Step 4. $2d - d - d - d = -d$ and $2d - d - d - c = -c$.

Step 5. $2d - d - (d - c) = c$, $2d - (d - d) - c = 2d - c$, and $2d - d - c - c = d - 2c$.

Step 6. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a

fixed cost more than once.

Final Answer: $4p, 3p + q, 2p, 2p - 2q, 2q, 0, -2q, -d, -c, c, 2d - c, d - 2c$.

Q 4.10 Correct the given wrong simplifications from the 'Mind the Mistake' table.**SOLUTION**

Concept used. A simplest form keeps unlike terms separate, distributes multiplication correctly, and handles bracket signs carefully.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. $3a + 2b$ stays $3a + 2b$ because a and b are unlike terms.

Step 2. $3b - 2b - b = 0$.

Step 3. $6(p + 2) = 6p + 12$.

Step 4. $(4x + 3y) - (3x + 4y) = x - y$.

Step 5. $5 - (2 - 6z) = 3 + 6z$ and $2 + (x + 3) = x + 5$.

Step 6. $2y + (3y - 6) = 5y - 6$ and $7p - p + 5q - 2q = 6p + 3q$.

Step 7. $5(2w + 3x + 4w) = 30w + 15x$.

Step 8. $3j + 6k + 9h + 12 = 3(j + 2k + 3h + 4)$.

Step 9. $4(2r + 3s + 5) = 8r + 12s + 20$.

 Exam tip

Never add unlike terms just because they are next to each other.

Final Answer: $3a + 2b, 0, 6p + 12, x - y, 3 + 6z, x + 5, 5y - 6, 6p + 3q, 30w + 15x, 3(j + 2k + 3h + 4), 8r + 12s + 20$.

EXPERT'S SOLUTION : Tara Reddy, Ph.D Pure Mathematics, IISc Bangalore

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. $3a + 2b$ stays $3a + 2b$ because a and b are unlike terms.

Step 2. $3b - 2b - b = 0$.

Step 3. $6(p + 2) = 6p + 12$.

Step 4. $(4x + 3y) - (3x + 4y) = x - y$.

Step 5. $5 - (2 - 6z) = 3 + 6z$ and $2 + (x + 3) = x + 5$.

Step 6. $2y + (3y - 6) = 5y - 6$ and $7p - p + 5q - 2q = 6p + 3q$.

Step 7. $5(2w + 3x + 4w) = 30w + 15x$.

Step 8. $3j + 6k + 9h + 12 = 3(j + 2k + 3h + 4)$.

Step 9. $4(2r + 3s + 5) = 8r + 12s + 20$.

Step 10. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: $3a + 2b, 0, 6p + 12, x - y, 3 + 6z, x + 5, 5y - 6, 6p + 3q, 30w + 15x, 3(j + 2k + 3h + 4), 8r + 12s + 20$.

Q 4.11 In the corrected simplest forms, what relation do you see between the number of terms and the number of letter-numbers?

SOLUTION

Concept used. A term may contain one letter-number, more than one letter-number, or no letter-number. Constant terms have no letter-number.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. In $3a + 2b$, there are 2 terms and 2 letter-numbers.

Step 2. In $6p + 12$, there are 2 terms but only 1 letter-number because 12 is a constant.

Step 3. In $3j + 6k + 9h + 12$, there are 4 terms and 3 letter-numbers.

Step 4. Across the corrected forms, the number of letter-numbers is not more than the number of terms.

 Exam tip

A constant term counts as a term, but it adds no letter-number.

Final Answer: The number of letter-numbers is less than or equal to the number of terms.

EXPERT'S SOLUTION : Rohit Verma, M.Sc Mathematics, IIT Bombay

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. In $3a + 2b$, there are 2 terms and 2 letter-numbers.

Step 2. In $6p + 12$, there are 2 terms but only 1 letter-number because 12 is a constant.

Step 3. In $3j + 6k + 9h + 12$, there are 4 terms and 3 letter-numbers.

Step 4. Across the corrected forms, the number of letter-numbers is not more than the number of terms.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: The number of letter-numbers is less than or equal to the number of terms.

Q 4.12 One plate of Jowar roti costs Rs. 30 and one plate of Pulao costs Rs. 20. If x roti plates and y pulao plates are ordered, which expression gives the total amount?

SOLUTION

Concept used. Total earning equals price per item multiplied by number of items, added across item types.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. Cost of x plates of Jowar roti is $30x$.

Step 2. Cost of y plates of Pulao is $20y$.

Step 3. Total amount is $30x + 20y$.

Step 4. The other options mix the prices and variables incorrectly.

 Exam tip

Match each price with its own quantity.

Final Answer: Option (a), $30x + 20y$.

EXPERT'S SOLUTION : Kavya Bhat, M.Sc Mathematics, ISI Kolkata

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. Cost of x plates of Jowar roti is $30x$.

Step 2. Cost of y plates of Pulao is $20y$.

Step 3. Total amount is $30x + 20y$.

Step 4. The other options mix the prices and variables incorrectly.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: Option (a), $30x + 20y$.

Q 4.13 Pushpita gave a tiny national flag to every customer. If p customers bought only champak, q only marigold, and r both, how many flags did she give?

SOLUTION

Concept used. The total number of customers is found by adding the three non-overlapping groups.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. The group p has customers who bought only champak.

Step 2. The group q has customers who bought only marigold.

Step 3. The group r has customers who bought both, but each such person is still one customer.

Step 4. So the number of flags is $p + q + r$.

 Exam tip

Do not count the 'both' group twice when the question asks for customers.

Final Answer: Option (a), $p + q + r$.

EXPERT'S SOLUTION : Aditya Kumar, M.Tech CS, IIT Madras

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. The group p has customers who bought only champak.

Step 2. The group q has customers who bought only marigold.

Step 3. The group r has customers who bought both, but each such person is still one customer.

Step 4. So the number of flags is $p + q + r$.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: Option (a), $p + q + r$.

Q 4.14 A snail climbs up u cm by day and slips down d cm by night for 10 days and 10 nights. Write the expression for its final position. What if $d > u$?

SOLUTION

Concept used. One full day-night cycle changes the position by $u - d$ cm.

Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. In one day and night, the snail gains u cm and loses d cm.

Step 2. Net movement in one cycle is $u - d$ cm.

Step 3. For 10 cycles, the movement is $10(u - d)$ cm.

Step 4. If $d > u$, then $u - d$ is negative, so the snail moves below its starting position.

Exam tip

Compare the net movement per cycle before multiplying by 10.

Final Answer: (a) $10(u - d)$ cm. (b) If $d > u$, the snail slips down more than it climbs.

EXPERT'S SOLUTION : Neha Banerjee, Ph.D Mathematics, IIT Delhi

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. In one day and night, the snail gains u cm and loses d cm.

Step 2. Net movement in one cycle is $u - d$ cm.

Step 3. For 10 cycles, the movement is $10(u - d)$ cm.

Step 4. If $d > u$, then $u - d$ is negative, so the snail moves below its starting position.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: (a) $10(u - d)$ cm. (b) If $d > u$, the snail slips down more than it climbs.

Q 4.15 Radha cycles 5 km every day in the first week and increases the daily distance by z km each week. How many kilometres will she cycle after 3 weeks?

SOLUTION

Concept used. Weekly distance equals daily distance multiplied by 7 days.

 Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. Week 1 daily distance is 5 km, so week 1 total is $7 \times 5 = 35$ km.

Step 2. Week 2 daily distance is $5 + z$ km, so week 2 total is $7(5 + z)$.

Step 3. Week 3 daily distance is $5 + 2z$ km, so week 3 total is $7(5 + 2z)$.

Step 4. Add: $35 + 7(5 + z) + 7(5 + 2z) = 105 + 21z$.

 Exam tip

The increase is in daily distance, so multiply each week's daily distance by 7.

Final Answer: $105 + 21z$ km.

EXPERT'S SOLUTION : Yash Pillai, M.Sc Applied Mathematics, IIT Kanpur

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. Week 1 daily distance is 5 km, so week 1 total is $7 \times 5 = 35$ km.

Step 2. Week 2 daily distance is $5 + z$ km, so week 2 total is $7(5 + z)$.

Step 3. Week 3 daily distance is $5 + 2z$ km, so week 3 total is $7(5 + 2z)$.

Step 4. Add: $35 + 7(5 + z) + 7(5 + 2z) = 105 + 21z$.

Step 5. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: $105 + 21z$ km.

Q 4.16 Simplify, add, subtract, and write pattern formulas from the final mixed exercise.

SOLUTION

Concept used. Long expression questions use the same rules: distribute, remove brackets, collect like terms, and identify the pattern.

Source anchor

NCERT Class 7 Mathematics (Part 1), Chapter 4, Expressions using Letter-Numbers, Reprint 2026-27.

Step 1. Simplifying gives: $4a + 5b + 10$, $a - 13b - 16$, $12x + 6$, $6x + 15$, $h + 4$, and $5 + 21m - 20n$.

Step 2. Adding pairs gives: $13d + c - 2$, $7f + 4s - 4$, $2c - d - 2$, $-7f - 4s + 3$, 0, and 0.

Step 3. Subtracting as asked gives: $-3a + 15b - 32$, $16y + 18x - 23$, $10h - 27g + 2$, $-(3a + 3b + 32)$, $-13y - 13x + 6$, and $3h - 16g + 30$.

Step 4. Rope pieces after r folds and one cut: $r + 2$.

Step 5. For w joined squares, matchsticks = $4 + 3(w - 1)$.

Step 6. Traffic signal positions: red at $4n - 3$, green at $4n - 1$, yellow at $2n$.

Step 7. Square-pattern formula: squares = $4n + 1$ and vertices = $16n + 4$.

Step 8. In a four-column grid, the number in row r , column c is $4(r - 1) + c$.

Exam tip

Break a long mixed exercise into small rule-based parts.

Final Answer: See the simplified list above: it matches the NCERT answer key for Q7 to Q15.

EXPERT'S SOLUTION : Sanya Chatterjee, Ph.D Pure Mathematics, IISc Bangalore

Concept used. First translate the words or diagram into operations, then simplify only like terms.

Step 1. Simplifying gives: $4a + 5b + 10$, $a - 13b - 16$, $12x + 6$, $6x + 15$, $h + 4$, and $5 + 21m - 20n$.

Step 2. Adding pairs gives: $13d + c - 2$, $7f + 4s - 4$, $2c - d - 2$, $-7f - 4s + 3$, 0, and 0.

Step 3. Subtracting as asked gives: $-3a + 15b - 32$, $16y + 18x - 23$, $10h - 27g + 2$,
 $-(3a + 3b + 32)$, $-13y - 13x + 6$, and $3h - 16g + 30$.

Step 4. Rope pieces after r folds and one cut: $r + 2$.

Step 5. For w joined squares, matchsticks = $4 + 3(w - 1)$.

Step 6. Traffic signal positions: red at $4n - 3$, green at $4n - 1$, yellow at $2n$.

Step 7. Square-pattern formula: squares = $4n + 1$ and vertices = $16n + 4$.

Step 8. In a four-column grid, the number in row r , column c is $4(r - 1) + c$.

Step 9. The same rule works for similar Class 7 expression questions.

This expert route keeps the starting quantity, operation and final expression separate. That prevents the common Class 7 mistake of adding unlike terms or multiplying a fixed cost more than once.

Final Answer: See the simplified list above: it matches the NCERT answer key for Q7 to Q15.

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Key Takeaways

- Letter-numbers help us write general formulas.
- Like terms can be added or subtracted; unlike terms stay separate.
- Brackets with a minus sign need careful sign changes.
- Pattern questions become easier after naming the step number with a letter.

End of Chapter 4 Solutions