

CLASS 7

MATHS

NCERT SOLUTIONS

NCERT Solutions for Class 7 Maths Chapter 4: Expressions Using Letter-Numbers – Ganita Prakash

Complete NCERT Solutions for Class 7 Maths Chapter 4 "Expressions Using Letter-Numbers" from the Ganita Prakash textbook, covering algebraic expressions, simplification, and pattern-based problems, with step-by-step working for every question.

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4.1 The Notion of Letter-Numbers

In-Text Examples

Shabnam is 3 years older than Aftab. If Aftab’s age is 18 years, Shabnam’s age = $18 + 3 = 21$ years. Using the expression “Aftab’s age = Shabnam’s age – 3”, if Shabnam’s age is 20, Aftab’s age = $20 - 3 = 17$ years.

Coconuts and jaggery: 8 coconuts at Rs. 35 each and 9 kg jaggery at Rs. 60/kg: $8 \times 35 = \text{Rs. } 280$; $9 \times 60 = \text{Rs. } 540$; Total = Rs. 280 + Rs. 540 = **Rs. 820**. Using the general expression $c \times 35 + j \times 60$ for $c=7$ coconuts, $j=4$ kg jaggery: $7 \times 35 + 4 \times 60 = 245 + 240 = \text{Rs. } 485$.

Perimeter of a square with side 7 cm = $4 \times 7 = 28$ cm.

Figure It Out (Page 84-85)

Q1. Perimeter formulas for regular polygons with side a : (a) Triangle = **$3a$** (b) Pentagon = **$5a$** (c) Hexagon = **$6a$** .

Q2. Munirathna has a 20 m pipe and buys k more metres. Total length = **$(20 + k)$ m**.

Q3. This question depends on a table image in the textbook and cannot be reproduced without the figure.

Q4. A flour mill charges a fixed cost of Rs. 10 plus Rs. 8 per kg (y kg): total charge = **$10 + 8y$** .

Q5. Let n be the number. (a) 5 more than $n = \mathbf{n + 5}$ (b) 4 less than $n = \mathbf{n - 4}$ (c) 2 less than 13 times $n = \mathbf{13n - 2}$ (d) 13 less than twice $n = \mathbf{2n - 13}$.

Q6. Open-ended descriptive expression-writing exercise (answers vary based on the story chosen).

Q7. This question is based on a calendar grid image and cannot be reproduced without the figure.

4.2 Revisiting Arithmetic Expressions

Evaluate the following (using BODMAS/order of operations):

$$23 - 10 \times 2 = 23 - 20 = \mathbf{3}$$

$$83 + 28 - 13 + 32 = 111 - 13 + 32 = \mathbf{130}$$

$$34 - 14 + 20 = 20 + 20 = \mathbf{40}$$

$$42 + 15 - (8 - 7) = 57 - 1 = \mathbf{56}$$

$$68 - (18 + 13) = 68 - 31 = \mathbf{37}$$

$$7 \times 4 + 9 \times 6 = 28 + 54 = \mathbf{82}$$

$$20 + 8 \times (16 - 6) = 20 + 80 = \mathbf{100}$$

Mind the Mistake, Mend the Mistake (Page 87)

Each statement below is checked by substituting the given value; the corrected value is shown where the original was wrong:

$$a = -4: 10 - a = 10 - (-4) = \mathbf{14} \text{ (not 6)}$$

$$d = 6: 3d = 3 \times 6 = \mathbf{18} \text{ (not 36)}$$

$$s = 7: 3s - 2 = 21 - 2 = \mathbf{19} \text{ (not 15)}$$

$$r = 8: 2r + 1 = 16 + 1 = \mathbf{17} \text{ (not 29)}$$

$$j = 5: 2j = 2 \times 5 = \mathbf{10} \text{ — correct as given}$$

$$m = -6: 3(m+1) = 3 \times (-5) = \mathbf{-15} \text{ (not 19)}$$

$$f = 3, g = 1: 2f - 2g = 6 - 2 = \mathbf{4} \text{ (not 2)}$$

$$t = 4, b = 3: 2t + b = 8 + 3 = \mathbf{11} \text{ (not 24)}$$

$$h = 5, n = 6: h - (3 - n) = 5 - (-3) = \mathbf{8} \text{ (not 4)}$$

4.4 Simplification of Algebraic Expressions

Pencils and erasers example: pencils sold over 3 days = 5, 3, 10 (total 18); cost per pencil = c. Total pencil sales = 18c. Checking c = Rs. 50: $5c + 3c + 10c = 250 + 150 + 500 = \mathbf{Rs. 900}$; and $18c = 18 \times 50 = 900$. Both methods match, confirming $5c + 3c + 10c = 18c$.

Combining like terms: $(40x + 75y) + (-6x - 10y) = (40x + 75y) - (6x + 10y) = \mathbf{34x + 65y}$.

Charu's game scores ($p=4, q=1$): Round 2 = $8p - 4q = 32 - 4 = \mathbf{28}$; Round 3 = $6p - 2q = 24 - 2 = \mathbf{22}$.
Charu's total = $7p - 3q + 8p - 4q + 6p - 2q = 21p - 9q$.

Krishita's total needs to equal $23p - 7q$. Example: $8p - 4q + 9p - 2q + 6p - q = 23p - 7q$ [?]. The difference between Krishita's and Charu's totals: $(23p - 7q) - (21p - 9q) = 2p + 2q = 2(p+q)$.

4.5 Pick Patterns and Reveal Relationships

Calendar diagonal sums (centre value a): $a-8 + a = \dots$ general relation verified as $\mathbf{2a + 8}$ for one diagonal pair.

Plus-shaped 5-cell sums (centre value a): sum of the 5 cells ($a-7$, $a-1$, a , $a+1$, $a+7$) = $5a$. Verified with centre=15: $8+14+15+16+22 = 75 = 15 \times 5$ [?]. Centre=20: $13+19+20+21+27 = 100 = 20 \times 5$ [?]. Centre=12: $5+11+12+13+19 = 60 = 12 \times 5$ [?].

Matchstick pattern: at step y , horizontal sticks = y , diagonal sticks = $y+1$, so total = $y + (y+1) = 2y + 1$.

Figure It Out (Pages 102-105)

Q1. Jowar roti costs Rs. 30/plate, pulao costs Rs. 20/plate. For x plates of roti and y plates of pulao, total bill = **$30x + 20y$** .

Q2. With p customers choosing only Champak flags, q choosing only Marigold, and r choosing both (getting 1 flag each regardless), total flags handed out = **$p + q + r$** .

Q3. A snail climbs u cm during the day and slips d cm at night. (a) Net distance covered in 10 days = **$10(u - d)$ cm**. (b) If $d > u$, the snail's net progress each day-night cycle is negative, so **the snail will never reach the top**.

Q4. Radha cycles 5 km/day in week 1, increasing by z km/day each subsequent week. Week 1 total = $5 \times 7 = 35$ km. Week 2 total = $(5+z) \times 7 = 35+7z$ km. Week 3 total = $(5+2z) \times 7 = 35+14z$ km. Grand total = $35 + (35+7z) + (35+14z) = 105 + 21z$ km.

Q5. This number-machine path question is based on a diagram and cannot be reproduced without the figure.

Q6. A train makes 3 stops; t minutes between each stop, 2 minutes at each stop. (a) For $t=4$: travel time = $4 \times 4 = 16$ min, stoppage time = $3 \times 2 = 6$ min, total = **22 minutes**. (b) General expression: **$4t + 6$** .

Q7. Simplify:

$$3a+9b-6+8a-4b-7a+16 = 4a + 5b + 10$$

$$3(3a-3b)-8a-4b-16 = 9a-9b-8a-4b-16 = a - 13b - 16$$

$$2(2x-3)+8x+12 = 4x-6+8x+12 = 12x + 6$$

$$8x-(2x-3)+12 = 8x-2x+3+12 = 6x + 15$$

$$8h-(5+7h)+9 = h+4 = h + 4$$

$$23+4(6m-3n)-8n-3m-18 = 23+24m-12n-8n-3m-18 = 21m - 20n + 5$$

Q8. Add:

$$(4d-7c+9) + (8c-11+9d) = 13d + c - 2$$

$$(-6f+19-8s) + (-23+13f+12s) = 7f + 4s - 4$$

$$(8d-14c+9) + (16c-11-9d) = 2c - d - 2$$

$$(6f-20+8s) + (23-13f-12s) = -7f - 4s + 3$$

$$(13m-12n) + (12n-13m) = 0$$

$$(-26m+24n) + (26m-24n) = 0$$

Q9. Subtract (second expression from first):

$$(6a+9b-18) - (9a-6b+14) = -3a + 15b - 32$$

$$(7y-10+3x) - (-15x+13-9y) = 16y + 18x - 23$$

$$(11-10g+3h) - (17g+9-7h) = 10h - 27g + 2$$

$$(6a-9b-18) - (9a-6b+14) = -3a - 3b - 32$$

$$(-3y+8-3x) - (10x+2+10y) = -13y - 13x + 6$$

$$(7h-8g+20) - (8g+4h-10) = 3h - 16g + 30$$

Q10. Open-ended word problems built around the expressions $8x+3y$ (notebooks and pens) and $15x-2x$ (rotten apples removed from a basket) — answers vary based on the story context chosen.

Q11. A rope is folded repeatedly: with 0 folds there are 2 pieces (after 1 cut), and each additional fold adds 1 more piece. For r folds, number of pieces = $r + 2$. For 10 folds: $10+2 = 12$ pieces.

Q12. A matchstick pattern of squares: Step 1 = 4 sticks, Step 2 = 7 sticks, Step 3 = 10 sticks (each new square adds 3 sticks after the first). General formula for w squares = $4 + 3(w-1) = 3w + 1$. For $w=10$: $3 \times 10 + 1 = 31$ matchsticks.

Q13. A traffic signal cycles: red on positions of the form $4n-3$ (1,5,9,...), green on $4n-1$ (3,7,11,...), yellow on all even-numbered positions. Position 90 (even) = **yellow**. Position 190 (even) = **yellow**. Position 343: $343 = 4(86)-1$, matching the green pattern, so position 343 = **green**.

Q14. A growing square pattern: Step 1 = 5 sticks, Step 2 = 9, Step 3 = 13, Step 4 = 17 (each step adds 4). General formula = $4n + 1$. Step 10: $4 \times 10 + 1 = 41$. Step 50: $4 \times 50 + 1 = 201$.

Q15. A 4-column number grid filled row-wise starting at 1: (a) General formula for row r , column c : $4(r-1) + c$. (b) Row/column of specific numbers: $124 \rightarrow$ row 31, column 4; $147 \rightarrow$ row 37, column 3; $201 \rightarrow$ row 51, column 1. (c) Formula confirmed: $4(r-1)+c$. (d) Patterns observed: every fourth number is a multiple of 4; columns 2 and 4 contain even numbers, columns 1 and 3 contain odd numbers; the sum of each row increases by 16 as you move down (Row 1 sum = $1+2+3+4 = 10$, Row 2 sum = $5+6+7+8 = 26$, Row 3 sum = $9+10+11+12 = 42$).

Note: A small number of Figure It Out questions in this chapter (Page 84 Q3 and Q7, Page 93 Q1, the Page 94-95 Mind the Mistake set, and Page 102 Q5) depend entirely on textbook figures/tables with no

extractable text, so they have been noted rather than guessed at above.

Extra Questions: [Class 7 Maths Chapter 4](#)

Revision Notes: [Class 7 Maths Chapter 4](#)

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