Algebraic expressions topic test

15 questions | 35 marks | 45 minutes

Progressive practice in expressions, substitution, expansion, common factors and formulas.

Equivalent correct methods earn the corresponding marks.

1. Simplify $8x + 3x$. [1 mark]

Add coefficients: $8 + 3 = 11$.

Answer: $11x$

2. Simplify $9a - 5a + 6$. [1 mark]

Collect $9a - 5a = 4a$ and retain 6.

Answer: $4a + 6$

3. Evaluate $4x + 7$ when $x = -3$. [2 marks]

$4(-3) + 7 = -12 + 7 = -5$.

Answer: -5

4. Simplify $(2p)(7p)$. [2 marks]

$2 \times 7 = 14$ and $p \times p = p^2$.

Answer: $14p^2$

5. Simplify $\frac{30a^2}{6a}$ for $a \neq 0$. [2 marks]

Divide the coefficients and cancel one nonzero factor a.

Answer: $5a$

6. Expand $4(x + 6)$. [2 marks]

Multiply both terms by 4.

Answer: $4x + 24$

7. Expand $-3(2y-5)$. [2 marks]

$(-3)(2y) = -6y$ and $(-3)(-5) = 15$.

Answer: $-6y + 15$

8. Factorise fully $15x + 20$. [2 marks]

The greatest common factor is 5.

Answer: $5(3x + 4)$

9. Factorise fully $10a^2 - 15a$. [3 marks]

Both terms share $5a$.

Dividing gives $2a$ and -3.

Answer: $5a(2a - 3)$

10. Simplify $5(x+3) - 2x$. [3 marks]

Expand to $5x + 15 - 2x$.

Collect to obtain $3x + 15$.

Answer: $3x + 15$

11. Are $8x + 20$ and $4(2x+5)$ equivalent? Explain. [2 marks]

Distributing 4 gives $8x + 20$.

Answer: Yes, for every x.

12. Evaluate $3a - 2b$ when $a = -2$ and $b = \frac{3}{2}$. [3 marks]

$3(-2) - 2(\frac{3}{2}) = -6 - 3 = -9$.

Answer: -9

13. A delivery charge is $C = 5n + 8$ dollars for n parcels. [3 marks]

(a) Make n the subject. [2 marks]

Subtract 8: $C - 8 = 5n$.

Divide by 5.

Answer: $n = \frac{C - 8}{5}$

(b) Find n when $C = 48$. [1 mark]

$\frac{48 - 8}{5} = 8$.

Answer: 8

14. A rectangle has side lengths $(x + 3)$ cm and $(x + 6)$ cm. [4 marks]

(a) Write and simplify its perimeter. [2 marks]

$P = 2(x + 3) + 2(x + 6) = 4x + 18$.

Answer: $P = 4x + 18$ cm

(b) Find the perimeter when $x = 4$. [2 marks]

$P = 4(4) + 18 = 34$.

Answer: 34 cm

15. Ravi writes $3(2x - 5) = 6x - 5$. [3 marks]

(a) Explain the error and give the correct expansion. [2 marks]

The factor 3 must multiply both terms.

$3(-5) = -15$.

Answer: $6x - 15$

(b) Evaluate the original expression at $x = 3$. [1 mark]

$3(6 - 5) = 3$.

Answer: 3