Year 7 algebra worksheet

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Name: _____ Date: _____

Question 1

Write an algebraic expression for each of the following.

(a) 5 more than x

(b) the product of 4 and m

(c) half of k

Answer: _____

Question 2

If a = 6, evaluate 3a + 7.

Answer: _____

Question 3

Which of these expressions are equivalent to 3x + 6?

A. 3(x + 2) B. 6 + 3x C. 3x + 2 D. x + x + x + 6

Answer: _____

Question 4

Simplify 5a + 3b - 2a + b.

Answer: _____

Question 5

Simplify 4a × 3b.

Answer: _____

Question 6

Expand 3(x + 5).

Answer: _____

Question 7

A shop charges a flat booking fee of $5 plus $12 per ticket. Write an expression for the total cost C in dollars for n tickets, then find the cost of buying 7 tickets.

Answer: _____

Question 8

For the expression 7a - 3b + 2:

(a) how many terms are there?

(b) what is the coefficient of b?

(c) what is the constant term?

Answer: _____

Question 9

If x = 4 and y = 9, evaluate 2xy - 5y.

Answer: _____

Question 10

By substituting a = 5, check that 2a + 3a + a and 6a give the same value.

Answer: _____

Year 7 algebra: answers and worked solutions

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Question 1

Key idea: Translate each phrase into operations: more than means add, product means multiply, half means divide by 2.

1. (a) 5 more than x: x + 5 2. (b) 4 × m is written 4m 3. (c) k ÷ 2 is written k/2

Answer: (a) x + 5 (b) 4m (c) k/2

Question 2

Key idea: Replace the pronumeral with its value, then follow the order of operations.

1. 3a + 7 = 3 × 6 + 7 2. = 18 + 7 = 25

Answer: 25

Question 3

Key idea: Equivalent expressions give the same value for every value of the pronumeral.

1. A: 3(x + 2) = 3 × x + 3 × 2 = 3x + 6 ✓ 2. B: 6 + 3x is 3x + 6 in a different order ✓ 3. C: 3x + 2 has a different constant. For x = 1: 5 compared with 3x + 6 = 9 ✗ 4. D: x + x + x = 3x, so 3x + 6 ✓

Answer: A, B and D

Question 4

Key idea: Like terms have exactly the same pronumerals; only like terms can be added or subtracted.

1. Group like terms: 5a - 2a + 3b + b 2. 5a - 2a = 3a and 3b + b = 4b 3. Result: 3a + 4b

Answer: 3a + 4b

Question 5

Key idea: Multiply the numbers together and write the pronumerals next to each other in alphabetical order.

1. Numbers: 4 × 3 = 12 2. Pronumerals: a × b = ab 3. Result: 12ab

Answer: 12ab

Question 6

Key idea: The distributive law says a(b + c) = ab + ac. Multiply the term outside the brackets by every term inside.

1. Multiply 3 by x: 3 × x = 3x 2. Multiply 3 by 5: 3 × 5 = 15 3. Write the expanded expression: 3x + 15

Answer: 3x + 15

Question 7

Key idea: Identify the fixed part and the part that changes with n, then substitute.

1. The cost is a flat $5 plus $12 for each of the n tickets, so C = 12n + 5. 2. Substitute n = 7: C = 12 × 7 + 5 3. Multiply: C = 84 + 5 4. Add: C = 89

Answer: C = 12n + 5; the cost for 7 tickets is $89.

Question 8

Key idea: Terms are separated by + and - signs. The sign in front belongs to the term.

1. (a) The terms are 7a, -3b and 2, so there are 3 terms 2. (b) The number multiplying b is -3 3. (c) The term with no pronumeral is 2

Answer: (a) 3 (b) -3 (c) 2

Question 9

Key idea: Substitute both values, multiply first, then subtract.

1. 2xy = 2 × 4 × 9 = 72 2. 5y = 5 × 9 = 45 3. 72 - 45 = 27

Answer: 27

Question 10

Key idea: Substituting a value into two expressions is a quick check of whether they could be equivalent.

1. 2a + 3a + a = 10 + 15 + 5 = 30 2. 6a = 6 × 5 = 30 3. Both give 30 (and collecting like terms shows 2a + 3a + a = 6a for every a)

Answer: Both equal 30