Year 8 algebra worksheet

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Name: _____ Date: _____

Question 1

For the expression 5x - 3y + 7 - x:

(a) How many terms are there?

(b) What is the coefficient of y?

(c) What is the constant term?

Answer: _____

Question 2

Evaluate $3a^2 - 2b$ when a = -2 and b = 5.

Answer: _____

Question 3

Simplify 7ab - 3ba + 2a - 5a.

Answer: _____

Question 4

Simplify 4a × 3b × 2a.

Answer: _____

Question 5

Simplify x/4 + x/6.

Answer: _____

Question 6

Simplify 2x/5 × 15/4x.

Answer: _____

Question 7

Expand and simplify 3(2x + 5) - 4x + 7.

Answer: _____

Question 8

Factorise fully $12x^2 - 8x$.

Answer: _____

Question 9

A school canteen sells pies for p dollars each and drinks for d dollars each. On Monday, Aisha buys 3 pies and 2 drinks. On Tuesday, she buys 1 pie and 4 drinks. Write a single simplified expression for her total spending over both days. Then find the total when p = 4 and d = 2.50.

Answer: _____

Question 10

Write an algebraic expression for each of these.

(a) The sum of a and b, divided by 4

(b) 3 less than the product of 5 and m

Answer: _____

Year 8 algebra: answers and worked solutions

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Question 1

Key idea: Terms are separated by + and - signs, and each term carries the sign in front of it.

1. (a) The terms are 5x, -3y, 7 and -x, so there are 4 terms 2. (b) The y term is -3y, so the coefficient is -3 3. (c) The term with no pronumeral is 7

Answer: (a) 4 (b) -3 (c) 7

Question 2

Key idea: Substitute using brackets around negative numbers, then follow the order of operations.

1. $3 \times (-2)^2 - 2 \times 5$ 2. $= 3 \times 4 - 10$ 3. $= 12 - 10 = 2$

Answer: 2

Question 3

Key idea: Like terms have exactly the same pronumerals; ab and ba are like terms.

1. $7ab - 3ba = 7ab - 3ab = 4ab$ 2. $2a - 5a = -3a$ 3. So the expression simplifies to $4ab - 3a$

Answer: $4ab - 3a$

Question 4

Key idea: Multiply the numbers, then multiply the pronumerals, writing repeated factors as powers.

1. Numbers: $4 \times 3 \times 2 = 24$ 2. Pronumerals: $a \times b \times a = a^2b$ 3. Result: $24a^2b$

Answer: $24a^2b$

Question 5

Key idea: Write both fractions with the lowest common denominator, then add the numerators.

1. The LCD of 4 and 6 is 12 2. $3x/12 + 2x/12 = 5x/12$

Answer: $5x/12$

Question 6

Key idea: Cancel common factors between any numerator and any denominator, then multiply.

1. Cancel x, then 15 with 5 (leaving 3 and 1) and 2 with 4 (leaving 1 and 2) 2. 1/1 × 3/2 = 3/2

Answer: 3/2

Question 7

Key idea: Use the distributive law to expand the bracket first, then collect like terms.

1. Expand the bracket: 3(2x + 5) = 6x + 15 2. Rewrite the full expression: 6x + 15 - 4x + 7 3. Collect the x terms: 6x - 4x = 2x 4. Collect the constant terms: 15 + 7 = 22 5. Write the simplified answer: 2x + 22

Answer: 2x + 22

Question 8

Key idea: Find the highest common factor (HCF) of all terms, write it outside the bracket, then divide each term by it.

1. Find the HCF of $12x^2$ and 8x: the HCF of 12 and 8 is 4, and both terms share a factor of x, so HCF = 4x. 2. Divide each term by 4x: $12x^2 \div 4x = 3x$ and $8x \div 4x = 2$. 3. Write the factorised form: 4x(3x - 2). 4. Check by expanding: $4x(3x - 2) = 12x^2 - 8x$ ✓

Answer: 4x(3x - 2)

Question 9

Key idea: Write an expression for each day, add them, collect like terms, then substitute.

1. Monday's cost: 3p + 2d 2. Tuesday's cost: p + 4d 3. Total: (3p + 2d) + (p + 4d) = 3p + p + 2d + 4d 4. Simplify: 4p + 6d 5. Substitute p = 4 and d = 2.50: 4(4) + 6(2.50) = 16 + 15 = 31

Answer: The simplified expression is 4p + 6d; the total is $31.

Question 10

Key idea: Translate the words in order of operations: "sum" means add, "product" means multiply, and "3 less than" means subtract 3 from what follows.

1. (a) The sum is a + b; dividing it by 4 gives (a + b)/(4) 2. (b) The product of 5 and m is 5m; 3 less than it is 5m - 3

Answer: (a) (a + b)/(4) (b) 5m - 3