Marking guide | Algebra

Algebra - practice test 2

16 questions | 39 marks | 55 minutes

A balanced second paper using signed substitution, equivalent forms and formula rearrangement.

Equivalent correct methods earn the corresponding marks.

1. Simplify $11m - 4m$. [1 mark]

$(11 - 4)m = 7m$.

Answer: $7m$

2. Simplify $2x^2 + 5x - 7x^2 + 3x$. [2 marks]

Collect squared terms separately from first powers.

Answer: $-5x^2 + 8x$

3. Simplify $\frac{24a^3b}{6ab}$ for $a, b \neq 0$. [2 marks]

$24 \div 6 = 4$; $a^{3-1} = a^2$; $\frac{b}{b} = 1$.

Answer: $4a^2$

4. Expand $7(2p - 1)$. [2 marks]

$7(2p) + 7(-1) = 14p - 7$.

Answer: $14p - 7$

5. Simplify $9 - (4x - 6)$. [2 marks]

$9 - 4x + 6 = 15 - 4x$.

Answer: $15 - 4x$

6. Simplify $3(2y - 5) - 2(y + 1)$. [3 marks]

$6y - 15 - 2y - 2 = 4y - 17$.

Answer: $4y - 17$

7. Fully factorise $21a + 14$. [2 marks]

The greatest common factor is 7.

Answer: $7(3a + 2)$

8. Fully factorise $16x^3 + 24x^2$. [2 marks]

Take out $8x^2$.

Answer: $8x^2(2x + 3)$

9. Evaluate $2p^2 + 3q$ for $p = -4$, $q = -2$. [2 marks]

$2(-4)^2 + 3(-2) = 32 - 6 = 26$.

Answer: 26

10. Make u the subject of $v = u + at$. [2 marks]

Subtract at from both sides.

Answer: $u = v - at$

11. Make l the subject of $P = 2l + 2w$. [3 marks]

Subtract $2w$ and divide by 2.

Answer: $l = \frac{P - 2w}{2}$

12. A cost is given by $T = 7 + 4n$ dollars. [3 marks]

(a) Find T when $n = 6$. [1 mark]

$T = 7 + 4(6) = 31$.

Answer: 31

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

Subtract 7, then divide by 4.

Answer: $n = \frac{T - 7}{4}$

13. Are $4(x+3)-x$ and $3x+12$ equivalent? Explain algebraically. [3 marks]

$4x+12-x=3x+12$.

Answer: Yes.

14. A student claims $2x+1$ and $3x$ are equivalent because they agree at $x=1$. Disprove this. [3 marks]

One matching value is not enough.

$2(0)+1=1$ but $3(0)=0$.

Answer: At $x=0$, they give 1 and 0.

15. Three bags each contain n marbles and 4 counters. Write the total number of objects without brackets. [3 marks]

Three copies of $n+4$ give $3(n+4)=3n+12$.

Answer: $3n+12$ objects

16. A triangle has area $A=54$ cm^2 and base $b=12$ cm. Its height is h, and $A=\frac{1}{2}bh$. [4 marks]

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

Multiply by 2, then divide by non-zero b.

Answer: $h=\frac{2A}{b}$

(b) Find the height of this triangle. [2 marks]

$h=2(54)\div 12=9$ cm.

Answer: 9 cm