Marking guide | Algebra

Algebra practice test 2

16 questions | 41 marks | 55 minutes

A balanced review of expressions, fractions, equations and formulas.

Equivalent correct methods earn the corresponding marks.

1. Simplify $6p^2 + 4p - 2p^2 + 3p$. [2 marks]

Collect equal powers.

Answer: $4p^2 + 7p$

2. Simplify $5a - (2a - 7)$. [2 marks]

Subtract both bracket terms.

Answer: $3a + 7$

3. Expand $-2x(3x - 4)$. [2 marks]

Distribute $-2x$.

Answer: $-6x^2 + 8x$

4. Factorise $21a^2 + 14a$. [2 marks]

Extract $7a$.

Answer: $7a(3a + 2)$

5. Factorise $-12p + 8$. [2 marks]

Extract -4.

Answer: $-4(3p - 2)$

6. State the restriction and simplify $\frac{6(x+3)}{9(x+3)}$. [2 marks]

Cancel $x+3$ only for allowed values.

Answer: $\frac{2}{3}$, $x \neq -3$

7. Simplify $\frac{a+2}{5} \times \frac{10}{a+2}$. [2 marks]

The product is $\frac{10(a+2)}{5(a+2)}$.

Answer: 2, $a \neq -2$

8. Simplify $\frac{4}{m-2} - \frac{m+1}{m-2}$. [2 marks]

The numerator is $4-(m+1)=3-m$.

Answer: $\frac{3-m}{m-2}$, $m \neq 2$

9. Simplify $\frac{3}{x} + \frac{2}{x-1}$. [3 marks]

The common-denominator numerator is $3(x-1)+2x$.

Answer: $\frac{5x-3}{x(x-1)}$, $x \neq 0, 1$

10. Simplify $\frac{x}{x+2} \div \frac{3x}{x-1}$ and retain every restriction. [3 marks]

The original divisor must be defined and nonzero, then multiply by its reciprocal.

Answer: $\frac{x-1}{3(x+2)}$, $x \neq -2, 1, 0$

11. Solve $\frac{3}{x+2} = \frac{2}{x+5}$. [3 marks]

Restrictions $x \neq -2, -5$; $3(x+5)=2(x+2)$ gives $x=-11$, and both sides equal $-\frac{1}{3}$.

Answer: $x=-11$

12. Make b the subject of $A = \frac{(a+b)h}{2}$. [3 marks]

Multiply by 2, divide by h, subtract a.

Answer: $b = \frac{2A}{h} - a,\ h \neq 0$

13. A shop buys n items for a total of $15n + 60$ dollars. Express the cost per item in simplified form and evaluate it for $n = 12$. [3 marks]

Divide the total by n: $15 + \frac{60}{n}$; then substitute 12.

Answer: $15 + \frac{60}{n}$ dollars; 20 when $n = 12$.

14. Find the real domain of $\frac{\sqrt{7-x}}{x+1}$. [3 marks]

Require $7 - x \geq 0$ and $x + 1 \neq 0$.

Answer: $x \leq 7,\ x \neq -1$

15. State the complete solution set of $\frac{3x-9}{x-3} = 3$. [3 marks]

For $x \neq 3$, the numerator is $3(x-3)$ and the equation is an identity.

Answer: All real x except 3.

16. Dylan claims $\frac{x+4}{x+2} = \frac{4}{2}$ because x cancels. Explain the error and solve when his numerical answer 2 actually matches the fraction. [4 marks]

For $x \neq -2$, solve $x + 4 = 2(x+2)$.

This gives $x = 0$, which is allowed.

Answer: Terms in sums cannot cancel. Equality with 2 holds only at $x = 0$.