Year 8 Expressions and Equations – Challenge

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Answers and worked solutions · 8 questions

A. Think like a mathematician

1. **Both terms must be multiplied by 6x: $6x(x + 9) = 6x^2 + 54x$.**
   Error: the second term was not multiplied by the term outside
   $6x \times x = 6x^2$
   $6x \times 9 = 54x$

2. **Both terms must be multiplied by 5x: $5x(x + 6) = 5x^2 + 30x$.**
   Error: the second term was not multiplied by the term outside
   $5x \times x = 5x^2$
   $5x \times 6 = 30x$

3. **Subtracting 4x from both sides gives 3x, not 11x: $3x + 8 = 26$, so $x = 6$.**
   Error: 4x was added instead of subtracted
   $3x = 18$
   $x = 6$

4. **Yes. $6 \div 2 = 3$ and $a^2 \div a = a$, so the answer is $3a$ (for $a \neq 0$).**
   Test some values
   $6 \div 2 = 3$ and $a^2 \div a = a$, so the answer is $3a$ (for $a \neq 0$).
   Decide

5. **Yes. Expanding gives $3x \times x + 3x \times 1 = 3x^2 + 3x$, e.g. $x = 2$: $3 \times 2 \times 3 = 18$ and $12 + 6 = 18$.**
   Test some values
   Expanding gives $3x \times x + 3x \times 1 = 3x^2 + 3x$, e.g. $x = 2$: $3 \times 2 \times 3 = 18$ and $12 + 6 = 18$.
   Decide

6. **Yes. Subtracting 2x from both sides leaves $5 = 7$, which is never true.**
   Test some values
   Subtracting 2x from both sides leaves $5 = 7$, which is never true.
   Decide

7. **$2(w + w + 3) = 42$; $w = 9$ cm**
   Perimeter: $2(w + w + 3) = 42$
   $4w + 6 = 42$
   $w = 9$

8. **$x + 3x + 12 = 52$; $x = 10$**
   In 6 years: $(x + 6) + (3x + 6) = 52$
   $4x + 12 = 52$
   $x = 10$