Checking equivalent expressions

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. Are $4x + 7x$ and $11x$ equivalent? Explain. [2 marks]

$4x + 7x = (4 + 7)x = 11x$ for all x.

Answer: Yes.

2. Are $3(x + 2)$ and $3x + 2$ equivalent? Give a counterexample if not. [2 marks]

$3(0 + 2) = 6$ but $3(0) + 2 = 2$.

Answer: No; $x = 0$ gives 6 and 2.

3. Show $5a - 2(a - 3)$ is equivalent to $3a + 6$. [2 marks]

$5a - 2(a - 3) = 5a - 2a + 6 = 3a + 6$.

Answer: Both simplify to $3a + 6$.

4. Are $6x + 9$ and $3(2x + 3)$ equivalent? Explain. [2 marks]

Expanding the second expression gives $6x + 9$.

Answer: Yes.

5. Two expressions agree at $x = 2$. Explain why this does not prove equivalence, using your own pair. [3 marks]

At $x = 2$ both give 4.

At $x = 0$ the values are 2 and 0, so they are not equivalent.

Answer: For example, $x + 2$ and $2x$ agree at 2 but differ at 0.

6. Show $\frac{8x}{4}$ and $2x$ are equivalent. Is $x = 0$ allowed? [3 marks]

$\frac{8x}{4} = 2x$ because 4 is non-zero.

The denominator does not contain x.

Answer: They are equivalent, including at $x = 0$.