Factor, Then Cancel

EX13-V1 · storyboard · EX13 Simplify an algebraic fraction. Read each picture with its sentences.

Picture 1

Simplify $\dfrac{3x-6}{x^2-2x}$.

$$\frac{3(x-2)}{x(x-2)}$$ factor both

$$= \frac{3\cancel{(x-2)}}{x\cancel{(x-2)}}$$ the bracket is a factor

$$= \boxed{\frac{3}{x}}$$

1. Simplify 3x − 6, over x² − 2x.
2. Factor the top: three times the bracket x − 2.
3. Factor the bottom: x times the same bracket.
4. The bracket is a factor on the top and on the bottom, so it cancels.
5. That leaves three over x.

Picture 2

Simplify $\frac{6x+9}{12}$.

$$\frac{3(2x+3)}{12}$$ factor the top

$$= \boxed{\frac{2x+3}{4}}$$ $12 \div 3 = 4$

6. Now simplify 6x + 9, over twelve.
7. Factor the top: three times the bracket 2x + 3.
8. Three and twelve share three: 2x + 3, over four.

Picture 3

Trap $\dfrac{6x+9}{12}$

$\times \dfrac{x+9}{2}$

✓ $\dfrac{2x+3}{4}$

9. Watch for the trap: cancelling part of a sum.
10. Cancelling the six in six x with the twelve is wrong: the six is only part of the top.
11. Factor first.

Picture 4

Trap $\dfrac{6x+9}{3}$

✗ $2x+9$

✓ $2x+3$

12. And the bar divides every term.
13. 6x + 9, over three, is not 2x + 9.
14. It is 2x + 3.