Factor, Then Cancel

MV08-V1 · storyboard · MV08 Multiply algebraic fractions. Read each picture with its sentences.

Picture 1

Simplify $\dfrac{2x+4y}{8} \cdot \dfrac{3xy}{x^2+2xy}$.

$$\frac{2(x+2y)}{8} \cdot \frac{3xy}{x(x+2y)}$$ factor first

$$= \frac{6xy\,(x+2y)}{8x\,(x+2y)}$$ cancel x and $(x+2y)$

$$= \boxed{\frac{3y}{4}}$$

1. Simplify (2x + 4y)/8 times 3xy/(x² + 2xy).
2. Factor: 2x + 4y is two times x + 2y, and x² + 2xy is x times x + 2y.
3. Cancel the x, and the whole bracket x + 2y.
4. Six over eight is three over four: the answer is 3y over four.

Picture 2

Trap $\dfrac{2x+3}{2x+5}$

$$\times \frac{3}{5}$$

✓ $\dfrac{2x+3}{2x+5}$ nothing cancels

5. Watch for the trap: cancelling part of a sum.
6. In this fraction nothing cancels: the 2x's are parts of sums, not factors.

Picture 3

Simplify $\dfrac{a+b}{3a} \cdot \dfrac{6a}{2a+2b}$.

$$\frac{6a\,(a+b)}{6a\,(a+b)}$$

factor: $2a + 2b = 2(a+b)$

$$= \boxed{1}$$

7. Now simplify (a + b)/(3a) times 6a/(2a + 2b).
8. Factor the bottom: 2a + 2b is two times a + b.
9. Then multiply.
10. Everything cancels: six a times the bracket, on top and underneath.
11. What is left is 1.

Picture 4

Trap $\dfrac{6a\,(a+b)}{6a\,(a+b)}$

$\times\ 0$

$\checkmark\ 1$

12. Watch for the trap: writing zero.
13. Cancelling divides.
14. What is left is one.