Collect, Factor, Divide

MV10-V2 · storyboard · MV10 Solve for one letter in terms of the others. Read each picture with its sentences.

Picture 1

Solve $3xy + 4 = 8y - 2x$ for x.

$$3xy + 2x = 8y - 4$$ collect the x terms

$$x(3y + 2) = 8y - 4$$ factor out x

$$\boxed{x = \frac{8y - 4}{3y + 2}}$$ divide by the bracket

1. Solve 3xy + 4 = 8y − 2x for x.
2. Add 2x to both sides and subtract four: the x terms are now on the left.
3. Factor out x: x times 3y + 2.
4. Divide by the bracket: x equals 8y − 4, over 3y + 2.

Picture 2

Trap $3xy + 4 = 8y - 2x$

$$\times \quad x = \frac{8y - 4 - 2x}{3y}$$

$$\checkmark \quad x = \frac{8y - 4}{3y + 2}$$

5. Watch for the trap: leaving x on both sides.
6. That isn't solved yet.
7. Collect the x terms first.

Picture 3

Solve $ax + bc = 3c - 2d^2x$ for x.

$$ax + 2d^2x = 3c - bc \quad \text{collect}$$

$$x(a + 2d^2) = 3c - bc \quad \text{factor}$$

$$\boxed{x = \frac{3c - bc}{a + 2d^2}} \quad \text{divide}$$

8. Now solve ax + bc = 3c − 2d²x for x.
9. Collect: add 2d²x to both sides and subtract bc.
10. Factor out x.
11. Divide by the whole bracket.

Picture 4

Trap $ax + bc = 3c - 2d^2x$

✗ $x(a - 2d^2) = 3c - bc$

✓ $x(a + 2d^2) = 3c - bc$

12. Watch for the trap: keeping the sign when a term moves.
13. Negative $2d^2x$ on the right becomes positive on the left.