

Grade 8 - Solving Linear Equations in One Variable - Answer Key

Common Core 8.EE.C.7a, 8.EE.C.7b · maths-pdf.fr/en/

This answer key gives a full worked solution for each of the 20 problems on the linear equations worksheet (Common Core 8.EE.C.7a and 8.EE.C.7b). Compare each step with your own work, not only the final answer, and note any step where your method differed.

Grade 8 · Common Core State Standards: **8.EE.C.7a, 8.EE.C.7b**

Exercise 1 - Two-step equation

Subtract 5: $3x = 15$.

Divide by 3: $x = 5$.

$$x = 5$$

Exercise 2 - Fractional coefficient

Add 4: $\frac{2}{3}x = 12$.

Multiply by $\frac{3}{2}$: $x = 18$.

$$x = 18$$

Exercise 3 - Combine like terms

Combine: $5x - 4 = 21$, so $5x = 25$.

$$x = 5$$

Exercise 4 - Variables on both sides

Subtract $2x$: $3x - 7 = 11$.

Add 7: $3x = 18$, so $x = 6$.

$$x=6$$

Exercise 5 - Distribute

$$6x+6=4x+20, \text{ so } 2x=14.$$

$$x=7$$

Exercise 6 - Distribute on both sides

$$6x+3=5x+10.$$

$$\text{Subtract } 5x: x+3=10, \text{ so } x=7.$$

$$x=7$$

Exercise 7 - No solution

$$6x+2=6x+12. \text{ Subtract } 6x: 2=12, \text{ which is false.}$$

No solution

Exercise 8 - Infinitely many

$$3x+12=3x+12. \text{ Subtract } 3x: 12=12, \text{ which is always true.}$$

Infinitely many solutions

Exercise 9 - Fractions on both sides

$$\text{Multiply every term by 6: } 4x-6=x+24.$$

$$\text{Then } 3x=30.$$

$$x=10$$

Exercise 10 - Decimals

$$\text{Multiply by 4: } 2x+10=x+16.$$

$$x = 6.$$

$$x = 6$$

Exercise 11 - Negative sign distribution

$$7 - 2x + 2 = 3x - 6, \text{ so } 9 - 2x = 3x - 6.$$

Add $2x$ and 6: $15 = 5x$.

$$x = 3$$

Exercise 12 - Classify

- a. $1 = -3$ is false: **no solution**.
- b. $4x + 2 = 4x + 2$ is true: **infinitely many**.
- c. $x = 5$: **one solution**.

Exercise 13 - Find the constant

The variable terms match, so the equation is $7 = c$.

Infinitely many if $c = 7$; no solution if $c \neq 7$

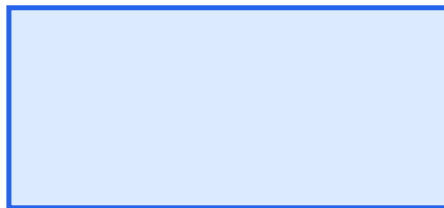
Exercise 14 - Number puzzle

$$3x - 4 = x + 10, \text{ so } 2x = 14.$$

$$7$$

Exercise 15 - Rectangle perimeter

$$x + 5 = 13$$



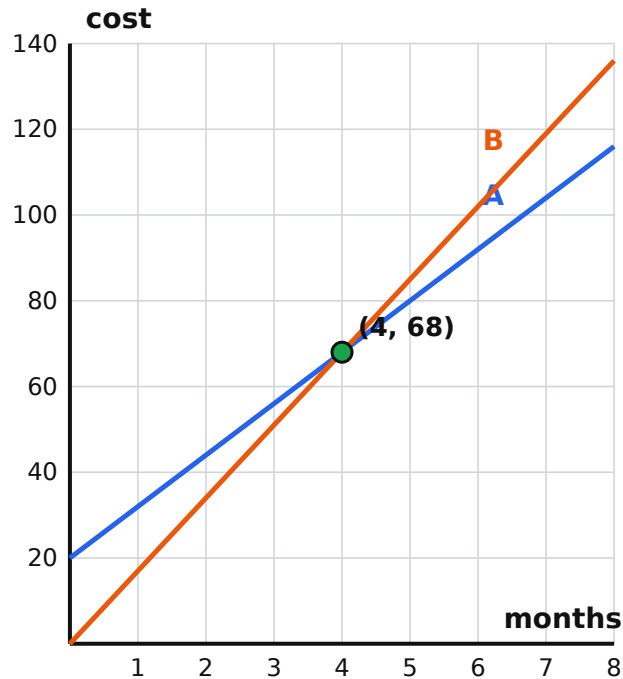
$$x - 1 = 7$$

Length 13 ft, width 7 ft.

$$2(x+5)+2(x-1)=40, \text{ so } 4x+8=40 \text{ and } x=8.$$

$x=8$; **13 ft by 7 ft**

Exercise 16 - Gym plans



The lines cross at 4 months.

$$12x+20=17x, \text{ so } 20=5x \text{ and } x=4.$$

$$\text{Cost: } 17 \cdot 4 = 68.$$

4 months, at \\$68 each

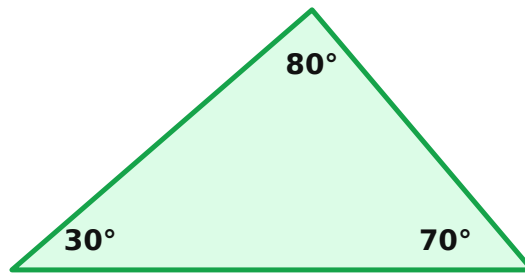
Exercise 17 - Saving up

$$45+8x=15+13x, \text{ so } 30=5x \text{ and } x=6.$$

$$\text{Amount: } 45+8 \cdot 6 = 93.$$

After 6 weeks, \\$93 each

Exercise 18 - Triangle angles



Angles 30, 70 and 80 degrees.

$$x + (2x + 10) + (3x - 10) = 180, \text{ so } 6x = 180 \text{ and } x = 30.$$

30°, 70° and 80°

Exercise 19 - Phone plan

$$25 + 0.10x = 40, \text{ so } 0.10x = 15.$$

150 minutes

Exercise 20 - Explain no solution

No. Subtracting $2x$ from both sides gives a false statement, which means no value of x works. The equation has no solution.

Liam made no error