

Solving Two-Step Equations: practice solutions, Grade 7 – download the PDF

Written solutions to the chapter problems. Check each step, then correct yourself.

1 Basic two-step equation



Subtract 5 from both sides: $2x = 12$. Divide by 2: $x = 6$.

Check: $2(6) + 5 = 12 + 5 = 17$. The solution is $x = 6$.

2 Subtracting first



Add 4 to both sides: $3x = 15$. Divide by 3: $x = 5$.

Check: $3(5) - 4 = 11$. The solution is $x = 5$.

3 Division inside



Subtract 3: $\frac{x}{4} = 5$. Multiply both sides by 4: $x = 20$.

Check: $\frac{20}{4} + 3 = 5 + 3 = 8$.

4 Larger numbers



Subtract 2: $7x = 49$. Divide by 7: $x = 7$.

Check: $7(7) + 2 = 49 + 2 = 51$.

5 Divide then subtract



Add 2: $\frac{x}{3} = 6$. Multiply by 3: $x = 18$.

Check: $\frac{18}{3} - 2 = 6 - 2 = 4$.

6 Is it a solution?



a. $6(4) - 5 = 24 - 5 = 19$. Both sides are equal, so 4 is a solution.

b. $6(3) - 5 = 18 - 5 = 13$, and $13 \neq 19$. So 3 is not a solution.

7 Two ways to start



Both are right. Mia: $3x = 15$, so $x = 5$.

Dev: divide *every* term by 3 to get $x + 2 = 7$, so $x = 5$.

Both ways give $x = 5$. Check: $3(5) + 6 = 21$.

8 Parentheses first



Divide by 4: $x + 3 = 11$. Subtract 3: $x = 8$.

Check: $4(8 + 3) = 4 \times 11 = 44$.

9 A difference in parentheses



Divide by 3: $x - 5 = 7$. Add 5: $x = 12$.

Check: $3(12 - 5) = 3 \times 7 = 21$.

10 Decimal coefficients



Subtract 1.5: $2.5x = 10$. Divide by 2.5: $x = 4$.

Check: $2.5(4) + 1.5 = 10 + 1.5 = 11.5$.

11 Gym membership



Let m be the number of months: $15m + 20 = 155$.

Subtract 20: $15m = 135$. Divide by 15: $m = 9$.

Lena has been a member for 9 months. Check: $15(9) + 20 = 155$.

12 Taxi ride



Let m be the miles: $2m + 3.5 = 17.5$.

Subtract 3.5: $2m = 14$. Divide by 2: $m = 7$.

The ride was 7 miles long (about 11.3 kilometers). Check: $2(7) + 3.5 = 17.5$.

13 Fraction coefficient



Subtract 4: $\frac{2}{3}x = 6$. Multiply by the reciprocal $\frac{3}{2}$: $x = 6 \times \frac{3}{2} = 9$.

Check: $\frac{2}{3}(9) + 4 = 6 + 4 = 10$.

14 Find the error

The first step is right. The mistake is in the second step: $5x$ means 5 *times* x , so the inverse operation is dividing by 5, not subtracting 5.

Correct: $x = 35 \div 5 = 7$. Check: $5(7) + 10 = 45$.

15 Fractions on both terms

Add $\frac{3}{4}$: $\frac{x}{2} = \frac{5}{4} + \frac{3}{4} = \frac{8}{4} = 2$. Multiply by 2: $x = 4$.

Check: $\frac{4}{2} - \frac{3}{4} = 2 - \frac{3}{4} = \frac{5}{4}$.

16 Fraction times a sum

Multiply by the reciprocal $\frac{4}{3}$: $x - 8 = 9 \times \frac{4}{3} = 12$. Add 8: $x = 20$.

Check: $\frac{3}{4}(20 - 8) = \frac{3}{4} \times 12 = 9$.

17 Temperature conversion

Replace F by 77: $1.8C + 32 = 77$. Subtract 32: $1.8C = 45$. Divide by 1.8: $C = 25$.

The temperature is 25 °C. Check: $1.8(25) + 32 = 45 + 32 = 77$.

18 Notebooks and a pen

Let n be the price of a notebook in dollars: $3n + 4.25 = 13.25$.

Subtract 4.25: $3n = 9$. Divide by 3: $n = 3$.

One notebook costs \$3.00. Check: $3(3) + 4.25 = 13.25$.

19 Arithmetic versus algebra



- a. Undo in reverse: $33 + 9 = 42$, then $42 \div 6 = 7$.
- b. Let x be the number: $6x - 9 = 33$. Add 9: $6x = 42$. Divide by 6: $x = 7$.
- c. Both give 7. The arithmetic steps (add 9, divide by 6) are exactly the inverse operations used in the algebra. Check: $6(7) - 9 = 33$.

20 Perimeter of a rectangle



Divide by 2: $9 + x = 25$. Subtract 9: $x = 16$.

The length is 16 cm. Check: $2(9 + 16) = 50$.

Area: $9 \times 16 = 144$, so the area is 144 cm^2 .

21 Negative coefficients



- a. Subtract 7: $-3x = -18$. Divide by -3 : $x = 6$. Check: $-3(6) + 7 = -18 + 7 = -11$.

- b. Subtract 1: $\frac{x}{-2} = 4$. Multiply by -2 : $x = -8$. Check: $\frac{-8}{-2} + 1 = 4 + 1 = 5$.

22 Create a word problem



Sample answer: a skate park charges \$6 for entry and \$4 per ride. Maya paid \$30 in all. How many rides did she take?

$4x = 24$, so $x = 6$. She took 6 rides. Any sensible context with a fixed amount of 6, a repeating amount of 4 and a total of 30 is correct.



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