

Equations and Inequalities: practice solutions, Grade 6 – download the PDF

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

1 Is it a solution?



- a. $8 + 6 = 14$, not 15. Not a solution.
- b. $3 \times 7 = 21$. Solution.
- c. $14 - 5 = 9$. Solution.
- d. $12 \div 4 = 3$. Solution.

2 Adding and subtracting



- a. Subtract 7: $x = 19 - 7 = 12$.
- b. Subtract 2.5: $y = 6 - 2.5 = 3.5$.
- c. Subtract 9: $m = 14 - 9 = 5$.

Check: $12 + 7 = 19$, $3.5 + 2.5 = 6$, $5 + 9 = 14$.

3 Multiplying and dividing



- a. Add 8: $n = 19$.
- b. Divide by 6: $p = 9$.
- c. Multiply by 5: $k = 35$.
- d. Divide by 0.5: $w = 12$.

Check: $19 - 8 = 11$; $6 \times 9 = 54$; $35 \div 5 = 7$; $0.5 \times 12 = 6$.

4 Choose the inverse operation



- a. Subtract 12: $x = 18$.
- b. Add 3: $x = 13$.
- c. Divide by 8: $x = 5$.
- d. Multiply by 6: $x = 12$.

5 From words to equations



- a. $n - 7 = 20$, so $n = 27$.
- b. $3n = 36$, so $n = 12$.
- c. $\frac{n}{4} = 9$, so $n = 36$.
- d. $n + 12 = 31$, so $n = 19$.

6 Reading a number line



- a. The circle is open at 5 and the ray goes right: $x > 5$.
- b. 6 and 9 are solutions. 4 is too small, and 5 is not included because the circle is open.

7 Test the numbers



a. Only numbers strictly greater than 6: **9 and 12**.

b. Numbers less than or equal to 6: **3 and 6**.

Notice that 6 is a solution of (b) but not of (a).

8 Stickers



Let s be the number of stickers at first. Equation: $s + 17 = 45$. Subtract 17: $s = 28$.

Check: $28 + 17 = 45$. Maya had 28 stickers.

9 Concert tickets



Equation: $6t = 45$. Divide both sides by 6: $t = 7.5$.

Check: $6 \times 7.5 = 45$. One ticket costs \$7.50.

10 A weekend hike



Equation: $d + 3.5 = 9.2$. Subtract 3.5: $d = 5.7$.

Check: $5.7 + 3.5 = 9.2$. Leo hiked 5.7 miles on Saturday (about 9.2 km).

11 Fractions and decimals



a. Subtract $\frac{1}{4}$: $x = \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$.

b. Add $\frac{2}{3}$: $y = \frac{1}{3} + \frac{2}{3} = 1$.

c. Divide by 0.4: $x = 2.8 \div 0.4 = 7$.

12 Find the mistake



Sam **added** 9 to 21, but the equation already adds 9 to x . He must use the inverse operation, subtraction.

Correct work: $x = 21 - 9 = 12$. Check: $12 + 9 = 21$.

13 Solve the inequalities

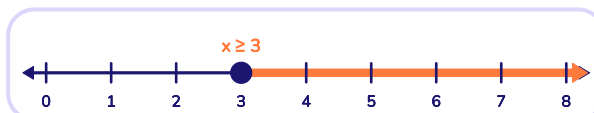


- a. Subtract 5: $x > 7$.
- b. Add 3: $y \leq 12$.
- c. Divide by 4: $n < 7$.
- d. Multiply by 3: $m \geq 18$.

14 Graph an inequality



The symbol $\geq$ includes 3, so the circle is **closed**. The ray goes to the right.



15 The elevator



Total weight must be at most 1,200: $640 + w \leq 1200$. Subtract 640: $w \leq 560$.

They can add at most 560 pounds (about 254 kg).

16 Counting solutions



Whole numbers start at 0. The whole numbers less than 5 are 0, 1, 2, 3 and 4: that is **five** solutions, so Tom is wrong. (Numbers like 4.9 are solutions too, but they are not whole numbers.)

17 The garden rectangle



a. Area = length times width: $7l = 91$. Divide by 7: $l = 13$ cm.

b. Perimeter = $2 \times (13 + 7) = 2 \times 20 = 40$ cm.

Check: $7 \times 13 = 91$.

18 Sharing a bill



a. $9x = 135$.

b. Divide by 9: $x = 15$. Each pays \$15.

c. With 8 friends: $8y = 135$, so $y = 16.875$, about \$16.88. That is about \$1.88 more each ($\$16.875 - 15 = 1.875$).

19 Tall enough to ride



a. $44.5 + g \geq 48$. Subtract 44.5: $g \geq 3.5$.

b. No: $3 < 3.5$, so she would be 47.5 inches, still too short.

20 Two conditions at once



First: subtract 4, so $x < 7$. Second: divide by 3, so $x > 4$.

Whole numbers greater than 4 and less than 7: **5 and 6**. Check 6: $6 + 4 = 10 < 11$ and $18 > 12$.

21 Saving for a bike



a. $64 + s \geq 150$, so $s \geq 86$.

b. $9w \geq 86$, so $w \geq \frac{86}{9} \approx 9.56$.

c. Weeks are counted in whole numbers: 9 weeks give \$81, which is not enough; **10 weeks** give \$90, which is enough.

22 Error in an inequality



Jo subtracted 5, but 5 multiplies x . The inverse operation is division: $x \leq 40 \div 5 = 8$.

Inside: $x = 6$ gives $30 \leq 40$, true. Outside: $x = 9$ gives $45 \leq 40$, false. With Jo's answer, $x = 30$ would be allowed but $5 \times 30 = 150$ is far too big.



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