Solving Linear Equations

GCSE Mathematics • **Foundation Tier** • Grades 3–5 • Non-calculator

WORKED SOLUTIONS

Name: worked example Class: ..... Total: 45 / 45

Show all your working. Marks are given for correct method as well as the final answer.

1. Solve $x + 7 = 12$. **[1 mark]**

take 7 from both sides
$x = 12 - 7$

Answer: $x = 5$

2. Solve $x - 4 = 9$. **[1 mark]**

add 4 to both sides
$x = 9 + 4$

Answer: $x = 13$

3. Solve $5x = 40$. **[1 mark]**

divide both sides by 5

Answer: $x = 8$

4. Solve $\frac{x}{3} = 6$. **[1 mark]**

multiply both sides by 3

Answer: $x = 18$

5. Solve $2x + 5 = 17$. **[2 marks]**

-5 both sides: $2x = 12$
$\div 2$: $x = 6$
undo the + before the $\times$

Answer: $x = 6$

6. Solve $4x - 9 = 11$. **[2 marks]**

$+9$ both sides: $4x = 20$
$\div 4$: $x = 5$

Answer: $x = 5$

7. Solve $3x + 8 = 2$. **[2 marks]**

-8 both sides: $3x = -6$
$\div 3$: $x = -2$
a negative answer is fine

Answer: $x = -2$

8. Solve $7 - 2x = 1$. **[2 marks]**

-7 both sides: $-2x = -6$
$\div -2$: $x = 3$
minus $\div$ minus = plus

Answer: $x = 3$

9. Solve $\frac{x}{4} + 3 = 7$. **[2 marks]**

-3 both sides: $\frac{x}{4} = 4$
$\times 4$: $x = 16$

Answer: $x = 16$

10. Solve $5x = 2x + 12$. **[2 marks]**

$-2x$ both sides: $3x = 12$
$\div 3$: $x = 4$

Answer: $x = 4$

11. Solve $7x - 4 = 3x + 16$. **[3 marks]**

$-3x$: $4x - 4 = 16$
$+4$: $4x = 20$
$\div 4$: $x = 5$

Answer: $x = 5$

12. Solve $2x + 9 = 5x - 6$. **[3 marks]**

$-2x$: $9 = 3x - 6$
$+6$: $15 = 3x$
$\div 3$: $x = 5$
collect x on the bigger side

Answer: $x = 5$

13. Solve $3(x + 4) = 21$. **[2 marks]**

expand: $3x + 12 = 21$
-12: $3x = 9$
$\div 3$: $x = 3$

Answer: $x = 3$

14. Solve $2(3x - 1) = 16$. **[2 marks]**

expand: $6x - 2 = 16$
$+2$: $6x = 18$
$\div 6$: $x = 3$

Answer: $x = 3$

15. Solve $4(x + 2) = 2(x + 7)$. **[3 marks]**

$4x + 8 = 2x + 14$
$-2x$: $2x + 8 = 14$
-8: $2x = 6$
$\div 2$: $x = 3$

Answer: $x = 3$

16. Solve $5(x - 3) = 2(x + 3)$. **[3 marks]**

$5x - 15 = 2x + 6$
$-2x$: $3x - 15 = 6$
$+15$: $3x = 21$
$\div 3$: $x = 7$

Answer: $x = 7$

17. Solve $4x + 1 = 8$. Give your answer as a fraction. **[2 marks]**

-1: $4x = 7$
$\div 4$: $x = \frac{7}{4}$
leave it as a fraction

Answer: $x = \frac{7}{4}$

18. Solve $\dfrac{2x+1}{3} = 5$. **[3 marks]**

$\times 3$ both sides: $2x + 1 = 15$
-1: $2x = 14$
$\div 2$: $x = 7$

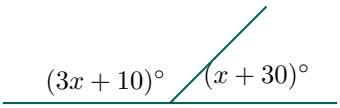
Answer: $x = 7$

19. I think of a number, multiply it by 4, then subtract 7. The result is 25. **[3 marks]**

let the number be x
$4x - 7 = 25$
$+7$: $4x = 32$
$\div 4$: $x = 8$

Answer: the number is 8

20. The two angles below lie on a straight line.



(a) Use the angles to write an equation in x. **[2 marks]**

angles on a line add to 180°
$(3x + 10) + (x + 30) = 180$

(b) Solve it to find x, then find the larger angle. **[3 marks]**

$4x + 40 = 180$
-40: $4x = 140$
$\div 4$: $x = 35$
$3x + 10 = 115°$ $x + 30 = 65°$
larger is 115°

Answer: $x = 35$, larger angle 115°

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