

5.3

Solving a Linear Equation: Problem Type 1

• Example 1

(a) Solve

$$4x - 5 = 7$$

By successive operations on both sides, we transform this equation into equivalent equations, the last one being $x = 3$, which is the solution of $4x - 5 = 7$. The explanation for each step is shown in parentheses.

$$4x - 5 = 7$$

$$4x - 5 + 5 = 7 + 5 \quad (\text{Adding } 5 \text{ on both sides})$$

$$4x = 12 \quad (\text{Simplifying})$$

$$\frac{1}{4} \cdot 4x = \frac{1}{4} \cdot 12 \quad \left(\text{Multiplying by } \frac{1}{4} \text{ on both sides} \right)$$

$$x = 3 \quad (\text{Simplifying})$$

The solution is 3. To check, replace x with 3 in the original equation:

$$4 \cdot 3 - 5 = 7$$

That is,

$$7 = 7.$$

(b) Solve

$$3x + 8 = -4$$

$$3x + 8 - 8 = -4 - 8 \quad (\text{Subtracting } 8 \text{ from both sides})$$

$$3x = -12 \quad (\text{Simplifying})$$

Now divide both sides by 3 to isolate x on the left.

$$\frac{3x}{3} = \frac{-12}{3}$$

$$x = -4$$

The solution is -4 . We'll leave the check of this result to you.

● ● ● CHECK YOURSELF 1

Solve and check.

a. $6x + 9 = -15$

b. $5x - 8 = 7$

● ● ● CHECK YOURSELF ANSWER

1. (a) -4 ; (b) 3 .

5.3 Exercises

Name _____

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Solve for x and check your result.

1. $2x + 1 = 9$

2. $3x - 1 = 17$

3. $3x - 2 = 7$

4. $5x + 3 = 23$

5. $4x + 7 = 35$

6. $7x - 8 = 13$

7. $2x + 9 = 5$

8. $6x + 25 = -5$

9. $7x - 5 = 16$

10. $10 - 3x = -2$

11. $8x + 9 = 41$

12. $12 + 5x = 37$

A N S W E R S

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____