Solve for x:

$$-5(2x - 4) + 3 = 10 - (3x + 2)$$

$$-10x + 20 + 3 = 10 - 3x - 2$$

$$-10x + 23 = 8 - 3x$$
$$ -8 \quad -8$$
$$\overline{}$$
$$-10x + 15 = -3x$$
$$+10x \qquad +10x$$
$$\overline{}$$
$$\frac{15}{7} = \frac{7x}{7}$$

$$\frac{15}{7} = x$$

What if we don't combine like terms after distributing?

$$-10x + 23 = 10 - 3x - 2$$
$$+2 \qquad\qquad +2$$
$$\overline{}$$
$$-10x + 25 = 10 - 3x$$
$$-10 \quad -10$$
$$\overline{}$$
$$-10x + 15 = -3x$$
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$$\frac{15}{7} = \frac{7x}{7}$$
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$$\overline{}$$
$$\frac{15}{7} = \frac{7x}{7}$$
$$\frac{15}{7} = x$$

Same answer, but an extra step!

Solving for a Variable using Multiple Steps Practice

1. $18 = 3(3x - 6)$

$18 = 9x - 18$
$+18 \qquad +18$
$\dfrac{36}{9} = \dfrac{9x}{9}$

$\boxed{4 = x}$

2. $30 = -5(6n + 6)$

$30 = -30n - 30$
$+30 \qquad\qquad +30$
$\dfrac{60}{-30} = \dfrac{-30n}{-30}$

$\boxed{-2 = n}$

3. $37 = -3 + 5(x + 6)$

$37 = -3 + 5x + 30$
$37 = 5x + 27$
$-27 \qquad -27$
$\dfrac{10}{5} = \dfrac{5x}{5}$

$\boxed{2 = x}$

4. $4(-x + 4) = 12$

$-4x + 16 = 12$
$-16 \ -16$
$\dfrac{-4x}{-4} = \dfrac{-4}{-4}$

$\boxed{x = 1}$

5. $-2 = -(n - 8)$

$-2 = -1(n - 8)$
$-2 = -n + 8$
$-8 \qquad\quad -8$
$\dfrac{-10}{-1} = \dfrac{-n}{-1}$

$\boxed{10 = n}$

6. $-13 = 5(1 + 4m) - 2m$

$-13 = 5 + 20m - 2m$
$-13 = 5 + 18m$
$-5 \ -5$
$\dfrac{-18}{18} = \dfrac{18m}{18}$

$\boxed{-1 = m}$

7. $10(1 + 3b) = -20$

$$10 + 30b = -20$$
$$\underline{-10 \qquad\quad -10}$$
$$\frac{30b}{30} = \frac{-30}{30}$$
$$\boxed{b = -1}$$

8. $8 = 8v - 4(v + 8)$

$$8 = 8v - 4v - 32$$
$$8 = 4v - 32$$
$$\underline{+32 \qquad +32}$$
$$\frac{40}{4} = \frac{4v}{4}$$
$$\boxed{10 = v}$$

9. $-5n - 8(1 + 7n) = -8$

$$-5n - 8 - 56n = -8$$
$$-61n - 8 = -8$$
$$\underline{\quad +8 \qquad +8}$$
$$\frac{-61n}{-61} = \frac{0}{-61}$$
$$\boxed{n = 0}$$

10. $8(4k - 4) = -5k - 32$

$$32k - 32 = -5k - 32$$
$$\underline{\quad +32 \qquad\quad +32}$$
$$32k = -5k$$
$$\underline{+5k \qquad +5k}$$
$$\frac{37k}{37} = \frac{0}{37}$$
$$\boxed{k = 0}$$

11. $8(1 + 5x) + 5 = 13 + 5x$

$$8 + 40x + 5 = 13 + 5x$$
$$13 + 40x = 13 + 5x$$
$$\underline{-13 \qquad\quad -13}$$
$$40x = 5x$$
$$\underline{-5x \quad -5x}$$
$$\frac{35x}{35} = \frac{0}{35}$$
$$\boxed{x = 0}$$

12. $-11 - 5a = 6(5a + 4)$

$$-11 - 5a = 30a + 24$$
$$\underline{\quad +5a \quad +5a}$$
$$-11 = 35a + 24$$
$$\underline{-24 \qquad\qquad -24}$$
$$\frac{-35}{35} = \frac{35a}{35}$$
$$\boxed{-1 = a}$$

How do we solve for x?

We need to get "x" ... *alone*

How do we do this?

Use inverse operations

Properties of equality

We can do **whatever we want** as long as we use the **Properties of Equality**.

Steps to follow:

- Distribute (if needed)

- Combine Like Terms

- Properties of Equality

Choice of either side of the
Puzzle Sheet.

What Do You Call Someone Who Can't Turn Pancakes?

Cross out the letter pair next to each correct solution.
For each letter pair you DON'T cross out, write the upper
case letter in the box containing the lower case letter.

a	b	c	d	e	f	g	h	i	j	k	l	m

1 $9y + 4 = 2y + 25$

2 $5n - 2 = n + 18$

3 $11 + 8q = 3q - 19$

4 $-3 - 10x = 25 + 4x$

5 $15a = 6a - 90$

6 $24 - 5d = d$

7 Xavier is thinking of a number. Nine more than
four times the number is the same as fifteen less
than twice the number. What is Xavier's number?

- e·N 4
- a·P −6
- f·I −1
- d·R −12
- l·F 3
- b·A 7
- i·E −10
- g·S 5
- j·L −9
- k·U −2

8 $2 + 11b = 8b + 15$

9 $7m + 32 = 12 - m$

10 $16 - 5y = 1 - 4y$

11 $2x - 8x + 1 = 9 - 10x$

12 $-3t - 8 + 7t = 34 + 9t - 2$

13 $2a + 3a + 4a = 5a - 18$

14 Yvonne is thinking of a number. Fifty, decreased by
three times the number, is the same as seven times the
number, increased by 80. What is Yvonne's number?

- c·N 15
- k·O −6
- e·H $-2\frac{1}{2}$
- m·T −3
- g·P $-3\frac{3}{4}$
- a·R −8
- l·S $4\frac{1}{3}$
- h·D 2
- d·F 11
- i·L $-4\frac{1}{2}$

15 $5(x + 4) = 7x - 26$

16 $20 - 9w = 4(15 - w)$

17 $2(11 + 3n) = 12n$

18 $10 - 4(p + 7) = 2(1 - p)$

19 $11x = 8x - 3(5 - 2x)$

20 $9 - 6(4u - 1) = u + 15$

21 Zabato is thinking of a number. Three times the
sum of the number and ten is the same as eight
times the number. What is Zabato's number?

- e·T −8
- l·V 6
- h·S −10
- l·P 18
- m·E $3\frac{2}{3}$
- e·L −9
- c·N 0
- i·G 23
- a·P 5
- i·F $6\frac{1}{3}$

Why Do Cowboys Have So Much Trouble With Math?

Solve each equation or problem and find your solution in the answer column.
Write the letter of the answer in each box that contains the exercise number.
If the answer has a ●, shade in the box instead of writing a letter in it.

1. $8x + 15 = 3x - 20$

2. $9n - 2 = 7n + 50$

3. $18 - 5y = y + 4$

4. $-7a - 10 = 20 - 3a$

5. $11d = 81 - 16d$

6. $-22 - x = 5 + 6x + 9$

7. $10b - 25 - 3b = 4b - 1$

8. $33 + 15w = 3w - w + 4w$

9. The Sun Spa charges annual dues of $125 plus $10 per hour to use the facilities. The Moon Spa charges annual dues of $230 plus $7 per hour to use the facilities. For what number of hours would the two spas charge the same total amount?

10. $9(m - 2) = m + 40$

11. $3(2p + 7) = 15(p - 4)$

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13. $16 - 5(3t - 4) = 8(-2t + 11)$

14. $7(7c + 1) - 4c = 13(3c - 2)$

15. $12(5 + 2y) = 4y - (6 - 9y)$

16. $3q - 16q = 7 + 2(-8q - 3)$

17. $14 - 3(5t - 12) = 1 - (20t + 1)$

18. Simon says: "Five times my age 4 years ago is the same as 3 times my age in 2 years." How old is Simon now?

Answers 1-9
- (A) 8
- (I) $-7\frac{1}{2}$
- (K) 38
- ● $-5\frac{1}{7}$
- (O) -7
- (P) $-3\frac{2}{3}$
- (T) 3
- (E) $2\frac{1}{3}$
- (D) 35
- (C) $-4\frac{1}{4}$
- (S) 26
- (J) 5

Answers 10-18
- (M) 18
- (L) $-5\frac{1}{2}$
- (N) 13
- (G) 9
- (R) -10
- (B) $-7\frac{3}{4}$
- ● 52
- (W) $7\frac{1}{4}$
- (F) 12
- (H) $\frac{1}{3}$
- (Y) -15
- (U) -6

5	16	3	12	6	7	14	10	7	12	2	13	17	1	15	18	9	6	5	16	4	18	11	2	13	15	8

Homework

Finish classwork

Solving for a Variable using Multiple Steps Practice

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$$\boxed{-1 = a}$$

How do we solve for x?

We need to get "x" ... *alone on one side of the equation and numbers on the other.*

How do we do this?

Using Properties of Equality

We can do **whatever we want** as long as we use the **Properties of Equality**.

Steps to follow:

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Equations and Problems:
Solving Equations With the Variable on Both Sides

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Answers 1-9

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Ⓘ	$-7\frac{1}{2}$
Ⓚ	38
●	$-5\frac{1}{7}$
Ⓞ	-7
Ⓟ	$-3\frac{2}{3}$
Ⓣ	3
Ⓔ	$2\frac{1}{3}$
Ⓓ	35
Ⓒ	$-4\frac{1}{4}$
Ⓢ	26
Ⓙ	5

Answers 10-18

Ⓜ	18
Ⓛ	$-5\frac{1}{2}$
Ⓝ	13
Ⓖ	9
Ⓡ	-10
Ⓑ	$-7\frac{3}{4}$
●	52
Ⓦ	$7\frac{1}{4}$
Ⓕ	12
Ⓗ	$\frac{1}{3}$
Ⓨ	-15
Ⓤ	-6

5	16	3	12	6	7	14	10	7	12	2	13	17	1	15	18	9	6	5	16	4	18	11	2	13	15	8

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