6.1 Solving Equations

Quick Review

At Home / At School

➤ When you solve an equation you find the value of the variable that makes the equation true.

You can solve an equation by *systematic trial* or by *inspection.*

➤ Sharon baby-sits for an hourly wage.
She works for 2 h and is given an extra $3 as a tip.
Sharon earns $17. What is her hourly rate?

Let d dollars per hour represent Sharon's hourly rate.

Then $2 \times d$, or $2d$ is how much she earns for 2 h work.
Include the $3 tip, then an equation that represents this situation is: $2d + 3 = 17$

Tip

Each trial provides information to guide you in choosing a value for the next trial.

Solve by Systematic Trial

$2d + 3 = 17$

Choose a value for d and substitute.

Try $d = 10$; then $2 \times 10 + 3 = 23$	23 is too large. Try a lesser value.
Try $d = 5$; then $2 \times 5 + 3 = 13$	13 is too small. Try a value between 5 and 10.
Try $d = 6$; then $2 \times 6 + 3 = 15$	15 is too small. Try a value between 6 and 10.
Try $d = 7$; then $2 \times 7 + 3 = 17$	$d = 7$ makes the equation true.

So, $d = 7$

Solve by Inspection

$2d + 3 = 17$

To solve the equation by inspection, ask yourself:
"Which number added to 3 gives 17?"

$$2d + 3 = 17$$
You know that $14 + 3 = 17$
So, $2d = 14$

Then ask yourself, "Two times which number gives 14?"
You know that $2 \times 7 = 14$.
So, $d = 7$
Sharon earns $7/h.

Practice

1. Look at these algebraic expressions and equations.

$2p = 16$ $\quad x + 12$

$\frac{n}{5} = 4$ $\quad z - 6 = 20$

$\frac{k+3}{2}$

a) Which are expressions? _____

b) Which are equations? _____

2. Solve by inspection.

a) $2n = 12$ _____

b) $x + 10 = 30$ _____

c) $25 - p = 20$ _____

d) $x - 8 = 2$ _____

e) $5n = 15$ _____

f) $\frac{x}{2} = 5$ _____

3. Solve the equation $2x + 5 = 37$ by systematic trial.

Input	Evaluate $2x + 5$	Too large or too small?
$x = 30$	$2 \times 30 + 5 = 65$	This is too large.
$x = 20$	$2 \times 20 + 5 = 45$	This is too large.
$x = 5$	$2 \times 5 + 5 = 15$	This is too small.
$x = 10$	$2 \times 10 + 5 =$	
$x = 15$	$2 \times 15 + 5 =$	

4. Solve.

a) $3x = 60$ _____

b) $x + 12 = 30$ _____

c) $\frac{x}{5} = 9$ _____

d) $5x - 4 = 26$ _____

5. Which value of n makes the equation $\frac{20}{n} + 5 = 9$ true? Circle your answer.

a) $n = 1$ b) $n = 2$ c) $n = 4$ d) $n = 5$ e) $n = 10$ f) $n = 20$

6. Jasmine has 135 butterfly stickers.
She gave 15 to her little sister and the rest to her friends.
Each friend has 20 stickers. How many friends did she give stickers to?
Fill in the missing expressions to create an equation you can solve.
Let f represent the number of friends.

_____ + _____ = _____

number of stickers to sister	number of stickers to friends	total number of stickers

Jasmine gave stickers to _____ friends.

7. Write an equation you could use to solve each problem.
Solve each equation.

a) Joshua purchased tennis balls for $8 each. He spent $128.
How many tennis balls did Joshua buy?

The equation is: _____

Joshua bought ____ tennis balls.

b) Five more than three times a number is 35.
What is the number?

The equation is: _____

The number is: ____

c) A box of apples is divided among 6 people.
Each person received 3 apples.
How many apples were in the box?

The equation is: _____

There were _____ apples in the box.

d) Petra works for 5 h. She gets a bonus of $10.
Petra's total earnings are $70. What is her hourly rate?

The equation is: _____

Petra's hourly rate is _____.