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# Using Simultaneous Equations to Solve Problems

Name: \_\_\_\_\_

Class: \_\_\_\_\_

## Examples

1 Using  $x$  and  $y$ , write an equation for each sentence.

a The sum of two numbers is 11.

$$x + y = 11$$

b Twice one number minus the other is 13.

$$2x - y = 13$$

2 Solve the equations in Example 1 simultaneously to find the numbers.

$$x + y = 11 \quad \text{(A)}$$

$$2x - y = 13 \quad \text{(B)}$$

(A) + (B) to eliminate  $y$ .

$$3x = 24$$

$$x = 8$$

Substitute  $x = 8$  in (A).

$$8 + y = 11$$

$$y = 3$$

$\therefore$  The numbers are 8 and 3.

## Exercise

1 If two numbers are  $x$  and  $y$ , write an equation for each sentence.

- The sum of two numbers equals 3.
- Twice one number minus another number equals 12.
- The difference of two numbers is 4.
- Twice the sum of two numbers is 12.
- One number is 2 more than another.
- One number plus three times another gives 14.
- One number is three times the other.
- The difference between two numbers is 4.

2 Write equations for the following.

- Six times  $x$  plus five times  $y$  equals 28.
- Three times  $x$  less  $y$  is equal to 5.
- The sum of twice  $x$  and triple  $y$  is 19.
- The total of three  $x$  and four  $y$  is 78.
- $y$  is 3 less than five times  $x$ .
- The difference between two times  $x$  and three times  $y$  is 4.
- $y$  is three times  $x$  plus 7.
- Four times  $x$  equals seven times  $y$ .

3 Solve these equations simultaneously from Question 1 to find the numbers.

a 1a with 1b

b 1b with 1c

c 1c with 1d

d 1e with 1f

e 1g with 1h

f 1e with 1g

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1 a  $x + y = 3$

e  $y = x + 2$

2 a  $6x + 5y = 28$

e  $y = 5x - 3$

3 a  $x = 5, y = -2$

e  $x = -2, y = -6$

b  $2x - y = 12$

f  $x + 3y = 14$

b  $3x - y = 5$

f  $2x - 3y = 4$

b  $x = 8, y = 4$

f  $x = 1, y = 3$

c  $x - y = 4$

g  $y = 3x$

c  $2x + 3y = 19$

g  $y = 3x + 7$

c  $x = 5, y = 1$

d  $2(x + y) = 12$

h  $x - y = 4$

d  $3x + 4y = 78$

h  $4x = 7y$

d  $x = 2, y = 4$