



## Problem of the Week Grade 9 and 10

### Where There's A Will Solution

#### Problem

In his will, a father left all of his money to his children in the following manner:

- (i) \$1000 to the oldest child plus  $\frac{1}{10}$  of what remains, then
- (ii) \$2000 to the second oldest child plus  $\frac{1}{10}$  of what then remains, then
- (iii) \$3000 to the third oldest child plus  $\frac{1}{10}$  of what then remains, and so on.

After all of the money had been distributed, each child had received the same amount. How many children were there?

#### Solution 1

Let  $x$  represent the amount each child receives.

Let  $y$  represent the total amount of money to split.

Then  $y \div x$  is the number of children.

The first child gets \$1 000 plus one-tenth of the remainder:

$$x = 1000 + \frac{1}{10}(y - 1000)$$

Multiply both sides by 10:  $10x = 10000 + y - 1000$

Simplify and solve for  $y$ :  $y = 10x - 9000$  (1)

The second child gets \$2 000 plus one-tenth of the remainder after the first child's share and \$2 000 is removed:

$$x = 2000 + \frac{1}{10}(y - x - 2000)$$

Multiply both sides by 10:  $10x = 20000 + y - x - 2000$

Simplify and solve for  $y$ :  $y = 11x - 18000$  (2)

Equating (1) and (2):  $10x - 9000 = 11x - 18000$  and  $x = 9\ 000$

Substitute for  $x$  in (1):  $y = 10(9000) - 9000 = 90000 - 9000 = 81\ 000$

The number of children is  $y \div x = 81000 \div 9000 = 9$

**$\therefore$  there were nine children and each child received \$9 000.**





## Solution 2

Let  $n$  represent the number of children.

Child  $n$  receives  $n \times \$1000$  or  $1000n$ .

So  $1000n$  is  $\frac{9}{10}$  of what remains after child  $(n - 1)$  is given  $(n - 1) \times 1000$ .

$\therefore \frac{1}{10}$  of what remains is  $\frac{1000n}{9}$ .

Then child  $(n - 1)$  receives  $1000(n - 1) + \frac{1000n}{9}$ .

But child  $(n - 1)$  and child  $n$  each receive the same amount.

Therefore,

$$1000(n - 1) + \frac{1000n}{9} = 1000n$$

$$1000n - 1000 + \frac{1000n}{9} = 1000n$$

$$\frac{1000n}{9} = 1000$$

$$1000n = 9000$$

$$n = 9 \text{ and } 1000n = 9\ 000$$

**There are 9 children in the family and each receives \$9 000.**

