

Problem Solving using Factoring

In this lesson you will learn how to word problem using factoring and zero product property.

Example 1: Find the consecutive integers whose product is 72.

EXPLORE This problem can be solved by using an equation.

Let x = one integer. Then $x + 1$ = the next greater integer.

PLAN $x(x + 1) = 72$

SOLVE

$$x^2 + x = 72$$

$$x^2 + x - 72 = 0$$

$$(x + 9)(x - 8) = 0$$

$$x + 9 = 0 \quad \text{or} \quad x - 8 = 0$$

$$x = -9 \quad \text{or} \quad x = 8$$

If $x = -9$, then $x + 1 = -8$.
If $x = 8$, then $x + 1 = 9$.

EXAMINE Since $-9(-8) = 72$ and $8 \cdot 9 = 72$, the consecutive integers are -9 and -8 or 8 and 9 .

Example 2: Find two integers whose sum is 15 and whose product is 54.

EXPLORE Let n = one integer. Then $15 - n$ = the other integer.

PLAN $n(15 - n) = 54$

SOLVE

$$n(15 - n) = 54$$

$$15n - n^2 = 54$$

$$-n^2 + 15n - 54 = 0$$

$$n^2 - 15n + 54 = 0 \quad \text{Multiply both sides by } -1.$$

$$(n - 9)(n - 6) = 0$$

$$n - 9 = 0 \quad \text{or} \quad n - 6 = 0$$

$$n = 9 \quad \text{or} \quad n = 6$$

If $n = 9$, then $15 - n = 6$.
If $n = 6$, then $15 - n = 9$.

EXAMINE Since $6 + 9 = 15$ and $6 \cdot 9 = 54$, the two integers are 6 and 9 .