CONSECUTIVE INTEGERS – QUADRATIC

❑ *INTRODUCTION*

Recall: Consecutive Integers: $n,\ n+1,\ n+2,\ n+3, \ldots$

Consecutive Even Integers: $n,\ n+2,\ n+4,\ n+6, \ldots$

Consecutive Odd Integers: $n,\ n+2,\ n+4,\ n+6, \ldots$

If this layout above is unclear, check out Consecutive Integers — Linear.

Note: This chapter's problems will result in quadratic equations, all of which can be solved by the factoring method. But if you've learned the Quadratic Formula, you might use that method to give yourself extra practice.

❑ *EXAMPLES*

EXAMPLE 1: **Find four consecutive <u>negative</u> even integers such that the <u>product</u> of the smallest and the largest is 40.**

Solution: If we let n represent the smallest of the four even integers, then the four integers are n, $n + 2$, $n + 4$, and $n + 6$. The problem then stipulates that

$$n(n+6) = 40$$

$$\Rightarrow \quad n^2 + 6n = 40$$

$\Rightarrow \quad n^2 + 6n - 40 = 0$

$\Rightarrow \quad (n + 10)(n - 4) = 0$

$\Rightarrow \quad n = -10 \text{ OR } n = 4$

Since the problem is asking for negative integers, we'll use the solution $n = -10$, thus giving us our four integers:

$-10, -8, -6, -4$

EXAMPLE 2: **Find three consecutive positive odd integers such that the product of the two largest integers is 13 more than 10 times the smallest.**

Solution: Letting n, $n + 2$, and $n + 4$ represent the integers, we get

$(n + 2)(n + 4) = 10n + 13$

$\Rightarrow \quad n^2 + 6n + 8 = 10n + 13$

$\Rightarrow \quad n^2 - 4n - 5 = 0$

$\Rightarrow \quad (n - 5)(n + 1) = 0$

$\Rightarrow \quad n = 5 \text{ OR } n = -1$

Taking the positive solution, $n = 5$, we get our integers:

5, 7, 9

Homework

1. Find five consecutive positive integers such that the product of the two largest integers is 54 more than the sum of the first three integers.

Solutions

1. 5, 6, 7, 8, 9

“Change is the result of all true learning.”

Leo Buscaglia