

Advanced Algebra 1: Lesson Examples/Notes
Consecutive Integers

Consecutive Integers Definition -

If you start with any given integer and count by ones, you will get consecutive integers. So consecutive integers are ONE apart!

Starting with 5, the next four consecutive integers are:

5: $\underline{6} \quad \underline{7} \quad \underline{8} \quad \underline{9}$
 $n \quad n+1 \quad n+2 \quad n+3 \quad n+4$ Add

Example 1: Two consecutive integers have a sum of 77.
Find the integers.

- 1) **Variable:** Let n = the smallest integer
Let $n + 1$ = the second integer
- 2) **Words:** smallest integer + second integer = sum
- 3) **Equation:** $n + (n+1) = 77$
- 4) **Solve:**

$$\begin{array}{r} 2n + 1 = 77 \\ -1 \quad -1 \\ \hline 2n = 76 \\ \frac{2}{2} \quad \frac{2}{2} \\ n = 38 \end{array}$$
35
- 5) **Solution & Check:** 38, 39 $38 + 39 = 77$ ✓

1) The sum of two consecutive integers is 243.
Find the integers.

- Variables:** n = smallest
 $n+1$
- Words:**
- Equation:** $n + (n+1) = 243$
- Solve:**

$$\begin{array}{r} 2n + 1 = 243 \\ -1 \quad -1 \\ \hline 2n = 242 \\ \frac{2}{2} \quad \frac{2}{2} \\ n = 121 \end{array}$$
- Solution/Check:** 121, 122 $121 + 122 = 243$ ✓

2) The sum of three consecutive integers is 234.
Find the integers.

- Variables:** n = smallest
 $n+1$
 $n+2$
- Words:**
- Equation:** $n + (n+1) + (n+2) = 234$
- Solve:**

$$\begin{array}{r} 3n + 3 = 234 \\ -3 \quad -3 \\ \hline 3n = 231 \\ \frac{3}{3} \quad \frac{3}{3} \\ n = 77 \end{array}$$
- Solution/Check:** 77, 78, 79 $77 + 78 + 79 = 234$ ✓

Consecutive Integers (EVEN or ODD)

Note: Even or odd consecutive integers are always TWO apart.

- Name the next three consecutive **ODD** integers larger than 3.
 $3, \overset{+2}{\underline{5}}, \underline{7}, \underline{9}$
- Name the next three consecutive **EVEN** integers larger than 2.
 $2, \underline{4}, \underline{6}, \underline{8}$
 $n+2 \quad n+4 \quad n+6$

Example 2: Two consecutive **ODD** integers have a sum of 92.
Find the integers.

- 1) **Variable:** Let n = the smallest integer
Let $n + 2$ = the second integer
- 2) **Words:** smallest integer + second integer = sum
- 3) **Equation:** $n + (n+2) = 92$
- 4) **Solve:**

$$\begin{array}{r} 2n + 2 = 92 \\ -2 \quad -2 \\ \hline 2n = 90 \\ \frac{2}{2} \quad \frac{2}{2} \\ n = 45 \end{array}$$
- 5) **Solution & Check:** 45, 47 $n = 45$ $45 + 47 = 92$ ✓

3) Find two consecutive **ODD** integers whose sum is -68.

- Variables:** n = smallest
 $n+2$
- Words:**
- Equation:** $n + (n+2) = -68$
- Solve:**

$$\begin{array}{r} 2n + 2 = -68 \\ -2 \quad -2 \\ \hline 2n = -70 \\ \frac{2}{2} \quad \frac{2}{2} \\ n = -35 \end{array}$$
- Solution/Check:** -35, -33 $-35 + -33 = -68$ ✓

4) Find three consecutive **even** integers whose sum is -210.

- Variables:** n = smallest
 $n+2$
 $n+4$
- Words:**
- Equation:** $n + (n+2) + (n+4) = -210$
- Solve:**

$$\begin{array}{r} 3n + 6 = -210 \\ -6 \quad -6 \\ \hline 3n = -216 \\ \frac{3}{3} \quad \frac{3}{3} \\ n = -72 \end{array}$$
- Solution/Check:** -72, -70, -68 $-72 + -70 + -68 = -210$ ✓

Solving Multi-Step Equations

Solve each equation. Then check your solution.

1. $5x + 3 = 23$

2. $4 = 3a - 14$

3. $19 = 3y - 5$

4. $-\frac{2}{3}g - 7 = 2$

5. $8 - 5w = -37$

6. $42 = 18 - 4v$

7. $\frac{-x+8}{6} = -5$

8. $\frac{8-2x}{3} = 9$

9. $\frac{n}{3} - 8 = -2$

10. $\frac{x}{-4} + 5 = 1$

11. $13 = \frac{4c}{-3} - 4$

12. $-7 = \frac{c}{-6} + 12$

13. $\frac{3}{4}x - 7 = 8$

14. $-12 = 6 + \frac{2}{3}y$

15. $-17 = -32 - \frac{3}{5}f$

16. $8 - \frac{3}{8}k = -4$

17. $-14 = \frac{s+12}{-6}$

18. $\frac{u+12}{-4} = 5$

Define a variable, write an equation, and solve each problem. Then check your solution.

19. Find two consecutive odd integers whose sum is 116.

20. Find two consecutive even integers whose sum is 126.

21. Find three consecutive odd integers whose sum is 117.

22. Find two consecutive even integers whose sum is 217.

23. Find four consecutive odd integers whose sum is 8.

24. Find three consecutive even integers whose sum is 396.