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 Phones (718) 300-0371, (718) 787-1888)

**My comments:** Solve these problems using materials from previous lectures, do not take shortcuts, and show ALL Steps. Send your work with answers and your name to Farber's Center by emailing [farberscenter@gmail.com](mailto:farberscenter@gmail.com) the day before the next class



## Lecture: Consecutive Integers (Part1)

### IMPORTANT!

In this lecture, we will improve your equation skills and study how to apply your knowledge of equations.

My comments: Solve these problems based on materials from previous lectures. Use only the way we have studied in class to

solve this problem; do not take shortcuts, and show ALL Steps, please). This will be extremely important for developing analytical skills and analytical skills for both this lecture and other lectures.

It is not a good idea to study equations without solving equations. I will remind you of Bruce Lee's expression: "If you want to learn to swim, just practice to swim persistently. On dry land, no frame of mind will ever help you."

### 1. NUMBER CLASSIFICATION:

Numbers can be classified:

#### Natural Numbers

Natural numbers are what you use when you are counting one-to-one objects.

#### Whole Numbers

The only thing that makes them different than natural numbers is that we include the zero.

#### Integers

**Integers-** whole numbers with either positive(or nothing in front) or negative signs in front of them. You can refer to integers as the positive and negative numbers. Integers are -4, -3, -2, -1, 0, 1, 2, 3, 4 and so on.

#### Rational Numbers

Rational numbers have integers, fractions , AND decimals (except decimal values that continue forever without a pattern). A ratio of two integers can represent a Rational Number.

| Name             | Numbers                                    |
|------------------|--------------------------------------------|
| Whole Numbers    | { 0, 1, 2, 3, 4, ... }                     |
| Counting Numbers | { 1, 2, 3, 4, ... }                        |
| Integers         | { ... -4, -3, -2, -1, 0, 1, 2, 3, 4, ... } |

## Part 2. CONSECUTIVE INTEGERS

**Definition:** Consecutive Integers are Integers that follow one another in order.



Examples of consecutive integers: 1, 2, 3 or 9, 10, 11.

$\Delta=1$ , where  $\Delta$  is a Greek letter “delta” is a difference between the next and current integer

We will solve consecutive integers problems using our knowledge of equations, like terms, distributive properties.

Example:

**The sum of two consecutive integers is 17, what are the integers?**

**Model Problem:**

Let the first integer be  $x$

The second integer is  $x + 1$ .

Then the sum, using like terms, is

$$x + (x + 1) = 2x + 1$$

We can write an equation:

$$2x + 1 = 17$$

Solving equation:

$$2x = 16$$

Or

$$x = 8$$

Don't forget the second integer is  $x+1$  or  $8+1=9$ . Check:  $8+9=17$   $17=17$

Answer: So, our integers are 8 and 9.

Answer the following questions for warming up:

A. Is it possible to write 42 as the sum of three consecutive integers?

Answer:

(Yes,  $42 = 13 + 14 + 15$ )

B. Which integers can be written as the sum of four consecutive integers?

Answer:

( $10 = 1 + 2 + 3 + 4$ ;  $14 = 2 + 3 + 4 + 5$ ;  $18 = 3 + 4 + 5 + 6$ ;  $22 = 4 + 5 + 6 + 7$  etc).

*Tell me, and I forget. Teach me, and I remember. Involve me, and I learn.*

*Benjamin Franklin*

Let's have fun and practice with consecutive numbers (Solve the problems below and show steps in your graph paper notebook that we have covered in class)

### Group A: Two Consecutive Integers.

1. The sum of 2 consecutive integers is 95. What are the integers?

2. The sum of 2 consecutive integers is 91. What are the integers?

3. The sum of 2 consecutive integers is 45. What are the integers?
4. The sum of 2 consecutive integers is 47. What are the integers?
5. The sum of 2 consecutive integers is 131. What are the integers?

### **Group B: Three Consecutive Integers.**

6. The sum of 3 consecutive integers is 93. What are the integers?
7. The sum of 3 consecutive integers is 96. What are the integers?
8. The sum of 3 consecutive integers is 60. What are the integers?
9. The sum of 3 consecutive integers is 33. What are the integers?
10. The sum of 3 consecutive integers is 66. What are the integers?
11. The sum of 3 consecutive integers is 120. What are the integers?
12. The sum of 3 consecutive integers is 123. What are the integers?
13. The sum of 3 consecutive integers is 102. What are the integers?
14. The sum of 3 consecutive integers is 348. What are the integers?
15. The sum of 3 consecutive integers is 543. What are the integers?
16. The sum of 3 consecutive integers is 633. What are the integers?
17. The sum of 3 consecutive integers is 1239. What are the integers?
18. The sum of 3 consecutive integers is 3036. What are the integers?
19. The sum of 3 consecutive integers is 3675 what are the integers?
20. The sum of 3 consecutive integers is 1575. What are the integers?

### Group C: Four Consecutive Integers.

21. The sum of 4 consecutive integers is 46. What are the integers?
22. The sum of 4 consecutive integers is 110. What are the integers?
23. The sum of 4 consecutive integers is 114. What are the integers?
24. The sum of 4 consecutive integers is 126. What are the integers?
25. The sum of 4 consecutive integers is 426. What are the integers?
26. The sum of 4 consecutive integers is 1806. What are the integers?
27. The sum of 4 consecutive integers is 826. What are the integers?
28. The sum of 4 consecutive integers is 446. What are the integers?
29. The sum of 4 consecutive integers is 486. What are the integers?
30. The sum of 4 consecutive integers is 86. What are the integers?

### Group D: Five Consecutive Integers.

31. The sum of 5 consecutive integers is 65. What are the integers?
32. The sum of 5 consecutive integers is 550. What are the integers?
33. The sum of 5 consecutive integers is 420. What are the integers?
34. The sum of 5 consecutive integers is 250. What are the integers?
35. The sum of 5 consecutive integers is 350. What are the integers?

How can you describe the next  
**Consecutive** integers if you 1st number  
is the variable "n"?

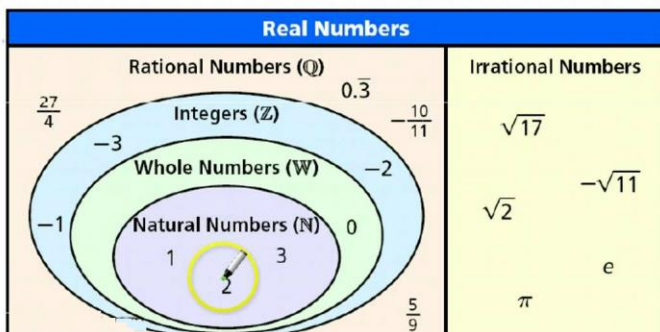
1st     $n$   
2nd    $n + 1$   
3rd    $n + 2$



### Group E: What are the smallest/greatest integers?

36. The sum of 3 consecutive integers is 123. What is the greatest integer?
37. The sum of 3 consecutive integers is 120. What is the smallest integer?
38. The sum of 5 consecutive integers is 100. What is the greatest integer?
39. The sum of 5 consecutive integers is 65. What is the greatest integer?
40. The sum of 5 consecutive integers is 110. What is the smallest integer?
41. The sum of 5 consecutive integers is 820. What is the smallest integer?
42. The sum of 5 consecutive integers is 200. What is the greatest integer?
43. The sum of 5 consecutive integers is 1000. What is the greatest integer?
44. The sum of 5 consecutive integers is 880. What is the greatest integer?
45. The sum of 5 consecutive integers is 900. What is the greatest integer?

All numbers that can be represented on a number line are called **real numbers** and can be classified according to their characteristics.



#### Consecutive Integers:

Numbers are one apart

$$\begin{matrix} \underline{1^{\text{st}}} & \underline{2^{\text{nd}}} & \underline{3^{\text{rd}}} & \underline{4^{\text{th}}} \\ x, & x+1, & x+2, & x+3, \dots \end{matrix}$$

#### Consecutive Odd and Even Integers:

Numbers are two apart

$$\begin{matrix} \underline{1^{\text{st}}} & \underline{2^{\text{nd}}} & \underline{3^{\text{rd}}} & \underline{4^{\text{th}}} \\ x, & x+2, & x+4, & x+6, \dots \end{matrix}$$

#### Consecutive Numbers

numbers in their counting order

4, 5, 6, 7, 8, 9 YES!

1, 3, 4, 2, 9, 5 NO

Even Integers

2, 4, 6, 8, 10, 12

Odd Integers

-3, -1, 1, 3, 5, 7

#### Consecutive Integers

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$$n, (n+1), (n+2), (n+3), \dots$$

$$1, 2, 3, 4, \dots$$

#### Consecutive Odd/Even Integers

$$n, (n+2), (n+4), (n+6), \dots$$

$$1, 3, 5, 7, \dots$$

$$2, 4, 6, 8, \dots$$