Name: _____ Date: _____

More Work with Linear Equations – Consecutive Integer Games
Common Core Algebra I

One of the ways we can practice our ability to work with algebraic expressions and equations is to play around with problems that involve **consecutive integers**. Make sure you known what the integers are:

The Integers and Consecutive Integers

The **integers** are the subset of the **real numbers**: $\{\ldots -4, -3, -2, -1, 0, 1, 2, 3, \ldots\}$ (so positive and negative whole numbers).

Consecutive integers are any list of integers (however long) that are separated by only 1 unit. Such as:

1, 2, 3 or 5, 6, 7, 8 or $-4, -3, -2$ or $-10, -9, -8, -7, -6$

Consecutive Evens	Consecutive Odds
4, 6, 8 or $-8, -6, -4, -2$ or 14, 16	7, 9, 11 or $-5, -3, -1, 1$ or $-9, -7, -5$

***Exercise* #1:** Let's work with just two consecutive integers first. Say we have two consecutive integers whose sum is eleven less than three times the smaller integer.

(a) It is important to play around with this problem numerically. So, try a variety of combinations and see if you can find the correct pair of consecutive integers. Be sure to show your calculations.

4 and 5 → 9

3(4) − 11 → 12 − 11 → 1

10 and 11 → 21

(b) Now, carefully set up let statements that give expressions for our two consecutive integers. Using these expressions, set up an equation that allows you to find them and solve the equation.

let x = smaller integer = 12

let $x+1$ = larger integer = 13

$x + x + 1 = 3x - 11$

$2x + 1 = 3x - 11$

$-2x \quad -2x$

$1 = x - 11$

$+11 \quad +11$

$x = 12$

Let's try some more problems. We always encourage you to play around with numbers before you go to the algebraic set up. The algebra should flow from what you do with numbers, not the other way around.

***Exercise* #2:** I'm thinking of three consecutive odd integers. When I add the larger two the result is nine less than three times the smallest of them. What are the three consecutive odd integers?

let x = smallest integer → 15
let x+2 = middle integer → 17
let x+4 = largest integer → 19

$x+2+x+4 = 3x-9$

$2x+6 = 3x-9$

$-2x \quad -2x$

$6 = x-9$

$+9 \quad +9$

$15 = x$

***Exercise* #3:** Three consecutive even integers have the property that when the difference between the first and twice the second is found, the result is eight more than the third. Find the three consecutive even integers.

1st integer
let x = smallest integer → −8
2nd integer
let x+2 = middle integer → −6
3rd integer
let x+4 = largest integer → −4

$x - 2(x+2) = x+4+8$

$x - 2x - 4 = x + 12$

$-1x - 4 = x + 12$

$+4 \quad +4$

$-1x = x + 16$

$-x \quad -x$

$\frac{-2x}{-2} = \frac{16}{-2}$

$x = -8$

***Exercise* #4:** The sum of four consecutive integers is −18. What are the four integers?

let x = 1st # (smallest)
let x+1 = 2nd #
let x+2 = 3rd #
let x+3 = 4th #

$x + x+1 + x+2 + x+3 = -18$

$4x + 6 = -18$

$-6 \quad -6$

$\frac{4x}{4} = \frac{-24}{4}$

$x = -6$

−6, −5, −4, −3

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MORE LINEAR EQUATIONS AND CONSECUTIVE INTEGER GAMES
COMMON CORE ALGEBRA I HOMEWORK

FLUENCY

1. Set up let statements for appropriate expressions and using these expressions set up an equation that allows you to find each number described. Be sure to find EACH integer you are looking for.

   (a) Find two consecutive integers such that ten more than twice the smaller is seven less than three times the larger.

   (b) Find two consecutive even integers such that their sum is equal to the difference of three times the larger and two times the smaller.

   (c) Find three consecutive integers such that three times the largest increased by two is equal to five times the smallest increased by three times the middle integer.

   (d) Find three consecutive odd integers such that the sum of the smaller two is three times the largest increased by seven.