7A - CHAPTER 2: OPERATIONS WITH INTEGERS - NOTE SHEET

NAME: Miss Cramer HOUR: 3rd

Lesson 2.1: Integers and Absolute Value

Vocabulary	
Term	Definition
Integer	Any number in the set $\{\ldots, -3, -2, -1, 0, 1, 2, 3\ldots\}$
Positive Number $0 < x$	A number greater than zero
Negative Number $0 > x$	A number less than zero
Opposite Numbers	Numbers that are the same distance from zero (same absolute value)

Write an integer for each situation. Then identify its opposite and describe what it means.

1a. A loss of 8 yards

-8; 8

gain 8 yards

1b. A deposit of \$15

15; -15

Withdraw \$15

2a. Write two inequalities involving -7 and -3.

$-7 < -3$

$-3 > -7$

2b. Replace the ● with $<$, $>$, or $=$ in -1 ● 2 to make a true statement.

$-1 < 2$

3. The recorded highs in degrees Celsius at Niagara Falls from February 21 to 28 of a recent year are 4, 2, 3, -6, -5, -1, 0, and 1. Order the temperatures from greatest to least.

4, 3, 2, 1, 0, -1, -5, -6

Vocabulary	
Term	Definition
Absolute Value	The distance of a number from zero on the number line. $\lvert -6 \rvert = 6$ $\lvert 1,285 \rvert = 1,285$

* the absolute value is always positive or zero

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4a. $|-3| = 3$

4b. $|-4| - |3|$ $|3| - |-4| = -1$

1

5a. Evaluate $|y| + 8$ if $y = -7$

1 $|-7| + 8$

$7 + 8 = \boxed{15}$

5b. Evaluate $9 - 5|z|$ if $z = 3$

12 $9 - 5 \cdot 3$

$9 - 5|3|$ $9 - 15$

$\boxed{= -6}$

Lesson 2.2: Adding Integers

DO FIRST

Write an integer for each situation. Identify its opposite and describe its meaning.	
1. A bank withdrawal of \$500 -500 500 depositing	2. A gain of 4 pounds 4 -4 loss 4 lbs
Write two inequalities using the number pairs. Use the symbols < or >.	
3. 2 and −5 $2 > -5$ $-5 < 2$	4. −4 and − 8 $-4 > -8$ $-8 < -4$
Evaluate each expression if $x = 7$ and $y = -6$.	
5. $15 - \|y\|$ 9	6. $\|y\| + x$ 13

Key Concepts

To <u>add integers with the same sign</u>, add their absolute values.

The sum is:

- positive if both numbers are positive
- negative if both numbers are negative

1a. $-3 + (-4)$ 1b. $-6 + (-14)$ 1c. $-7 + (-2)$

-7 -20 -9

2a. $-8 + (-2)$ 2b. $-1 + (-12)$

-10 -13

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To <u>add integers with different signs</u>, Subtract their absolute values

The sum is:

- positive if the number with the bigger absolute value is positive
- negative if the number with the bigger absolute value is negativ

3a. $5 + (-2)$

3

3b. $4 + (-8)$

-4

4a. $-20 + 4$

24 $\boxed{-16}$

4b. $16 + (-5)$

11

5. A scuba diver is 120 feet below the water's surface. She then <u>ascends</u> 83 feet. What is her current depth? Write an addition equation and then solve. Interpret the sum.

-203

$-120 + 83 = -37$

37 feet below sea level

Vocabulary	
Term	Definition
Additive Inverse	An integer and its opposite
Additive Inverse Property	The sum of any number and its additive inverse is zero

6a. $4 + (-2) + (-7)$

-5

6b. $-10 + 3 + (-7) + 12$

-2

6c. $-9 + 12 + (-11)$

-8

6d. $-8 + 4 + (-1) + 6$

1

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Lesson 2.3: Subtracting Integers

DO FIRST

1. $-7 + (-3)$	2. $17 + (-8)$
-10	9

Write and solve an addition equation. Then interpret the sum.

3. Ty had \$450 in his savings account. He made a withdrawal of \$160 to buy a bicycle. What is the balance in his account after the withdrawal?

\$290 He has account balance of \$290

4. $-7 + (-1) + 7$	5. $-15 + 4 + (-5) + 10$
-1	-6

Key Concepts

To subtract an integer, add its additive inverse.

$2 + {}^{-}7$ $2 - {}^{-}7 = 2 + 7$

1a. $4 - 15$

-11

1b. $-3 - 12$

-15

2a. $18 - (-2) = 18 + 2$

20

2b. $-5 - (-11)$ $-5 + 11$

6

change + to −

Find the distance between each pair of integers

3a. -30 and -22

8

3b. -6 and 5

11

4. A gopher begins digging at 7 inches below ground level and stops digging at 16 inches below ground level. How far did the gopher dig?

9

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Lesson 2.4: Multiplying Integers

DO FIRST

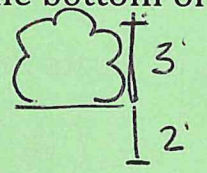
1. $3 - 5$	2. $-7 - (-11)$
$3 + -5$ $\quad -2$	$-7 + 11$ $\quad 4$

Find the distance between each pair of integers.

3. -1 and -7	4. -8 and 8
6	16

5. Moira dug a hole 2 feet deep to transplant a shrub. The shrub stands 3 feet above the ground. Write an expression to find the distance from the bottom of the hole to the top of the shrub. What is the distance?

$3 - -2$ $\quad 5ft$



Key Concepts

* Multiplying Two Integers with Different Signs: the answer will be negative

$p \cdot n = n$

1a. $7(-8)$ $\quad -56$

1b. $-6 \cdot 12$ $\quad -72$

* Multiplying Two Integers with the Same Sign: the answer will be positive

$p \cdot p = p \quad n \cdot n = p$

2a. $-5(-11)$ $\quad 55$

2b. $-13(-4)$ $\quad 52$

3. A scuba diver descends from the surface at a rate of 7 feet per minute. What was the scuba diver's depth after 15 minutes? Write a multiplication expression. Then find and interpret the product.

$-7 \cdot 15$ $\quad -105$

105 below the surface

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Even Number of Negatives	Odd Number of Negatives
* Answer = positive	Answer = negative

4a. $-7(9)(-6)$

368 **378**

4b. $-3(-4)(-5)$

-60

5a. $-3(6y)$

$-18y$

5b. $-9x(3y)$

$-27xy$

6a. Evaluate $2rs$ if $r = 5$ and $s = -10$

$2(5)(-10) = -100$

6b. Evaluate $4ab$ if $a = -8$ and $b = -4$

128

Lesson 2.5: Dividing Integers

DO FIRST

1. $8(-3)(-5)$	2. $-2(-9)(-5)$
3. Mr. Heppner bought lunch with his debit card every day for 5 days. Each day he spent \$8. If these were his only transactions, what was the change in his account balance? Write a multiplication expression. Then find and interpret the product.	
4. $8j$, if $j = -11$	5. $-9cd$, if $c = -3$ and $d = -7$

Key Concepts

Divide Integers with Different Signs: the answer is negative.

* $p \div n = n$ $\quad \frac{p}{n} = n$ $\quad n \div p = n$

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1a. $-63 \div 7$

-9

1b. $\frac{110}{-10}$

-11

Divide Integers with the Same Signs: the answer will be positive

$P \div P = P$ $\quad$ $n \div n = P$

2a. $-35 \div (-5)$

7

2b. $\frac{39}{3}$

13

Evaluate each expression if $x = -6$ and $y = -3$

3a. $2y \div x$

$2(-3) \div -6 = 1$

3b. $3x \div (-y)$

-6 $\quad$ $3(-6) \div -(-3)$

4a. Linda has scores of $-3, -2, 1$, and 0 during 4 rounds of golf. Find the mean and interpret the quotient.

-1.25 $\quad$ $\boxed{-1}$ ← on average she is one below par

4b. The last four transactions Jesse posted in her checkbook were $-\$35, \$23, -\$156$, and $\$60$. Find the mean and interpret the quotient.

-27 ← on average he is spending $27 per transaction.

Review Day 1

DO FIRST

1. $40 \div (-10)$

-4

2. $\frac{-72}{-9}$

8 $\quad$ $\frac{-72}{-9}$

3. The following are the changes of a value of a certain stock over the last 5 days: $-\$7, \$3, +\$6, -\$2, -\$5$. Find the mean and interpret the quotient.

-1

The stock value on average is $-\$1$