Honors 1 Name: ____________________________________

Chapter 1 Notes

1.6 – Relations

There are 4 ways to display a relation:

Ordered Pair:

Relation:

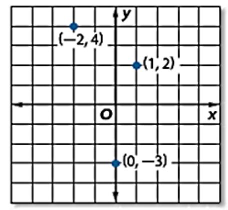
Ordered Pairs

(1, 2)
(−2, 4)
(0, −3)

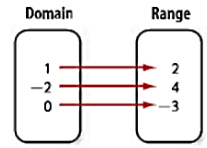
Table

x	y
1	2
−2	4
0	−3

Graph



Mapping



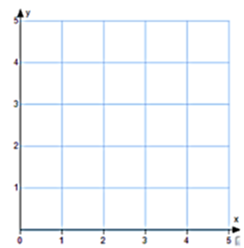
Example: Write the relation in 4 ways: The first person in a checkout line has 5 items. The second person has 3 items. The third person has 1 item. The fourth person has 4 items.

Ordered Pairs

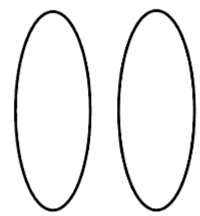
Table

X	Y

Graph



Mapping



Domain:

Range:

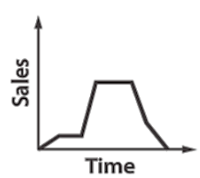
Independent Variable:

Dependent Variable:

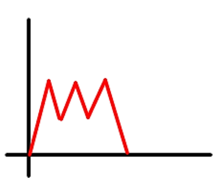
Example: Determine the independent and dependent variables.

1) The air pressure inside a car increases with temperature.
2) The more tickets the student council sells for the homecoming dance the greater the amount of money they can spend on decorations.

Example: Determine the independent and dependent variables and describe the situation.



Example: Describe a situation to go with each graph.

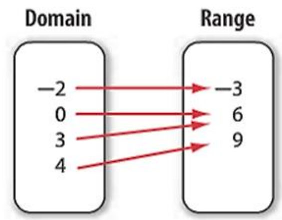


1.7 – Functions

Function:

Example: Determine whether each relation is a function. Explain why or why not.

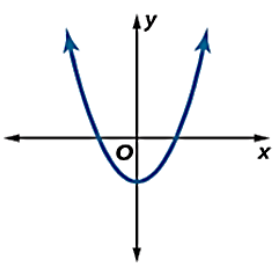
Domain	1	3	5	1
Range	4	2	4	−4

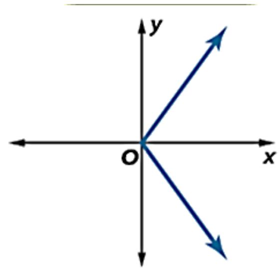


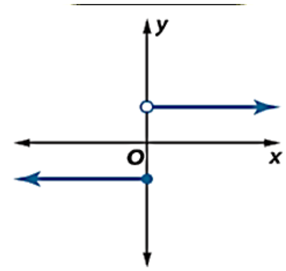
$\{(2, 1), (3, -2), (3, 1), (2, -2)\}$

Vertical Line Test:

Example: Use the vertical line test to determine if each graph is a function or not. Explain where the problem is.







Naming Functions

If y = 5x + 3, find the value of y when x = 2.

If y = 5x + 3, find the value of y when x = 8.

Instead of writing all of that out, we can simplify the process by naming our function "f" and then writing:

If f(x) = 5x + 3, evaluate:

f(2)

f(8)

Example: If $f(x) = x^2$ and $g(x) = x + 4$, evaluate the following:

$f(2) + g(0) + 10$	$g(3a) + 5$
f(☺)	f(g(x))

2.3/2.4 – Solve Multi-Step Equations and Equations with Variables on Both Sides

Steps for Solving a Multi-Step Equation: SSS (Simplify, Same Side, Solve)

1. **Simplify** (distribute, combine like terms already on the same side)
2. Get like terms on the **same side** of equation (variable terms on one side and constant terms on the other)
3. **Solve** for x (undo the final operation on x) and CHECK YOUR ANSWER!!!

Example: Solve for x.

$7 - 8x = 2x - 17 + 2x$	$9x - 5 = \frac{1}{4}(16x + 60)$	$5 - x = 3(2x - 6) - 5$

Unique Solutions

Sometimes, when we are solving we don't always get x = number. Sometimes we get something different.

If we get a FALSE statement like 2 = 3, then we say ________________________________

If we get a TRUE statement like 3 = 3, then we say __________________________ OR ____________________

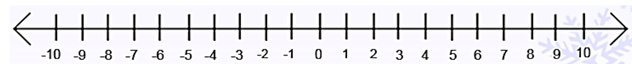
Example: Solve for x.

$3x = 3(x + 4)$	$5(n + 2) = \frac{3}{5}(5 + 10n)$	$8w + 2 = 4(2w + 0.5)$

2.5 – Solving Equations with Absolute Values

Lead-In: Before every NBA game, the referee must verify that the basketball used is inflated to the correct air pressure. If the rules state it must be at 8 pounds per square inch (psi) with an error of ± 0.5 psi, known as the absolute deviation, find the maximum and minimum air pressure readings.

Example: I am thinking of a number that is 7 units away from 0. How can I translate this question to mathematics? What are the solutions?



Example: Solve the absolute value equation: $|x - 3| = 8$.

Example: Solve.

$3|2x - 7| - 5 = 4.$	$8|x + 3| - 4 = 5|x + 3| - 4$

Can you distribute when solving absolute value equations???

Example: Evaluate -2|3+4|.

Example: Solve the absolute value equation: $|x + 5| + 6 = -2$.

SPECIAL CASES

To determine if an absolute value equation has no solutions, you check to see if: ___________________________

2.6 – Ratios and Proportions

Ratio:

Three ways to write ratios: 1) 2) 3)

Proportion:

Example: Solve the following ratio using two different strategies.

$\frac{y}{4}=\frac{15}{20}$	$\frac{y}{4}=\frac{15}{20}$

Cross Product Property *(NOTE: This is not a tool to multiply fractions! It is used to solve proportions.)*

KEY CONCEPT *For Your Notebook*

Cross Products Property

Words The cross products of a proportion are equal.

Example $\frac{3}{4}=\frac{6}{8}$ $4 \cdot 6 = 24$ $3 \cdot 8 = 24$

Algebra If $\frac{a}{b}=\frac{c}{d}$ where $b \neq 0$ and $d \neq 0$, then $ad = bc$.

Example: Solve the following proportions.

1. $\frac{8}{x}=\frac{12}{15}$	2. $\frac{4}{x}=\frac{8}{x-3}$

2.7 – Percent Problems

Where do percent situations come up in real life?

1) Down Payment on Car *2) Determining defective items* *3) Pay raises* *4) Taxes off of your income*

The word percent comes from the parts per meaning _________________ and cent meaning _________.

How to set up percent problems using proportions: $\frac{\text{IS}}{\text{OF}} = \frac{\text{PERCENT}}{100}$

Example: What percent of 25 is 17?

Example: What number is 25% of 88?

How to set up percent problems using equations: "a is p percent of b" $a = p\% \cdot b$

Example: What is 30% of 50?

Example: 35 is what percent of 105?

Using Percents in Life

1. You are looking to buy a car but the dealer requires a 15% down payment. If the down payment is $2700, what is the cost of the car? This translates to:	2. A worker earns $28.50 per hour. If she receives a 7.5% pay raise, how much does she earn per hour now? This translates to:

Percent of Change:

Example: If a worker originally made $45,000 a year and now makes $48,000, what was his percent of change in salary?