Writing Domain/Range – Inequality Notation Vs. Interval Notation

Inequality notation → rewriting expressions using the six inequality symbols which are …

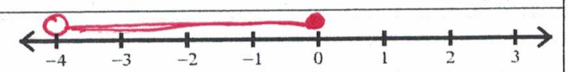
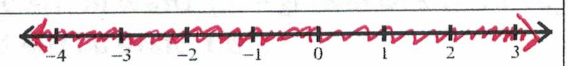
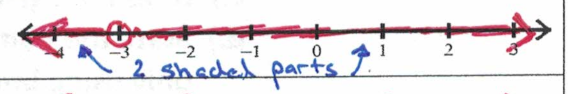
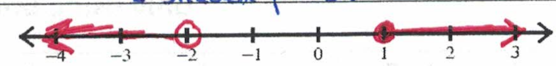
$<$, $>$, $\leq$, $\geq$, $\neq$ (*Not equal to) , and $=$

Interval notation → rewriting inequalities using numbers , infinity symbols $-\infty$ or ∞

*Small #, large # and/or both with grouping symbols such as brackets [ ] and parentheses ( )

- brackets represent: CLOSE DOTS and UNDERLINED Inequalities such as $\leq$, $\geq$, or $=$
- parentheses represents Open DOTS and NOT-underlined inequalities such as $<$, $>$, or $\neq$
- If you have more than 1 interval (or "area of shading"), then you must use union symbol $\cup$

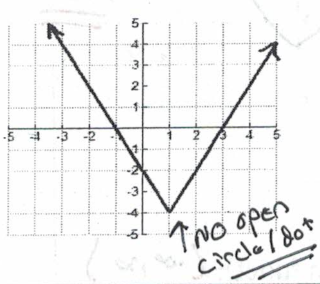
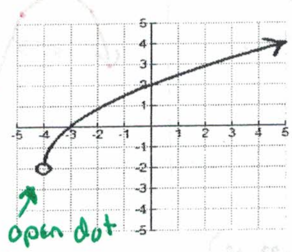
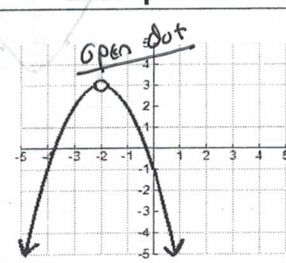
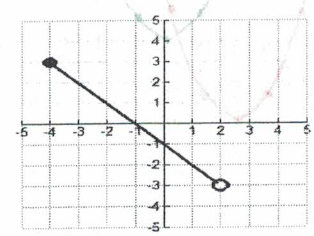
Example 1: Complete the chart below using the appropriate notation(s). * Infinity symbols always get (

	Inequality Notation	Interval Notation	Graph (on a number line)
a.)	$x > 2$	$(2, \infty)$	
b.)	$x \leq -1$	$(-\infty, -1]$	
c.)	compound "AND" $-4 < x \leq 0$	$(-4, 0]$	
d.)	all real numbers (IR) symbol	$(-\infty, \infty)$	
e.)	*All real numbers IR, $x \neq -3$	$(-\infty, -3) \cup (-3, \infty)$	
f.)	compound "OR" $x < -2$ or $x \geq 1$	$(-\infty, -2) \cup [1, \infty)$	

– **domain (of a graph)** → set of all x-values in which a function is defined (look Left → Right) only look at x-values

– **range (of a graph)** → set of all y-values in which a function is defined (look Bottom → Top) only look at y-values.

Example 2: Determine the domain and range (using both notations) of each given graph.

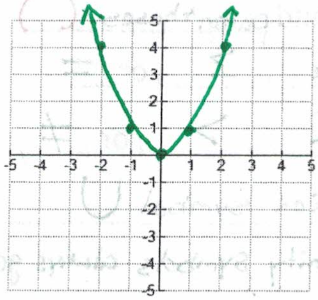
Example 2a	Example 2b	Example 2c	Example 2d
			
D/R – Using an Inequality	**D/R – Using an Inequality**	**D/R – Using an Inequality**	**D/R – Using an Inequality**
D: $x = \mathbb{R}$ *All real numbers*	D: $x > -4$	D: $x = \mathbb{R}, \neq -2$	D: $-4 \leq x < 2$
R: $y \geq -4$	R: $y > -2$	R: $y < 3$	R: $-3 < y \leq 3$
D/R – Using an Interval	**D/R – Using an Interval**	**D/R – Using an Interval**	**D/R – Using an Interval**
D: $(-\infty, \infty)$	D: $(-4, \infty)$	D: $(-\infty, -2) \cup (-2, \infty)$	D: $[-4, 2)$
R: $[-4, \infty)$	R: $(-2, \infty)$	R: $(-\infty, 3)$	R: $(-3, 3]$

Math 2 Unit 2.7 Quadratic Functions: Interval Notation and Transformations Name: ______________

Graphing Quadratic Functions Using Transformations (slides, reflections, vertical compression / stretch)

Characteristics of Parent Quadratic Function

Parent Function of a Quadratic: $y = x^2$



x	y
-1	1
0	0
1	1

- Vertex Pt: (0,0)
- AOS: X=0

* X-coord. of the vertex is the AOS.

- Domain: $(-\infty, \infty)$
- Range: $[0, \infty)$

Transformation # 1 – Vertical Translations

If have y = $x^2 \pm d$ then you can have ... Not in ( )!

- + d which means translates UP "d" units
- – d which means translates DOWN "d" units

You will add or subtract from y-coor

Transformation # 2 – Horizontal Translations

If have y = $(x \pm c)^2$ then you can have ...

- + c which means translates LEFT "c" units
- – c which means translates Right "c" units

You will add or subtract from X-coord

Transformation # 3 – Reflection

If have y = $-x^2$ then you have...

a Reflection about X-axis causing function to flip down.

* If you have a translation L or R and or U or D and a reflection, Do the reflection first!

Example 3: **Do the following – a.) Draw in the original quadratic parent graph.**
b.) State all the transformations in the given function.
c.) Graph the given function based on its transformations.
d.) State the domain and range of graphed/transformed function only using interval notation.

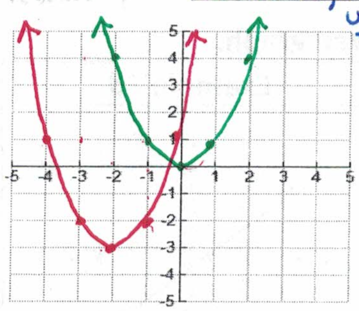
Example 3a

$y = x^2$

"c" "d"

Given Function: $y = (x \boxed{+2})^2 \boxed{-3}$

Transformations: left 2 units, down 3 units!



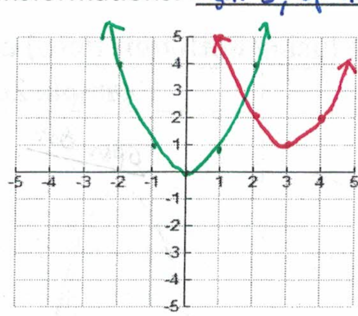
Domain (of given funct): $(-\infty, \infty)$

Range (of given funct): $[-3, \infty)$

Example 3b

Given Function: $y = (x \boxed{-3})^2 \boxed{+1}$

Transformations: Right 3, up 1



Domain (of given funct): $(-\infty, \infty)$

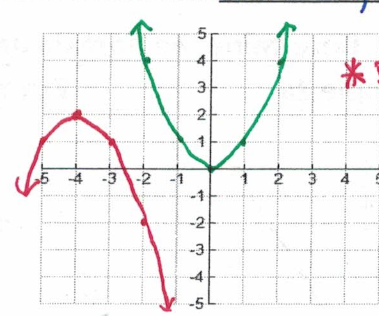
Range (of given funct): $[1, \infty)$

Example 3c

Given Function: $y = \boxed{-}(x \boxed{+4})^2 \boxed{+2}$

Transformations: Reflect x-axis, left 4, up 2

* Do the reflection first!



Domain (of given funct): $(-\infty, \infty)$

Range (of given funct): $(-\infty, 2]$