Quadratics in Vertex Form:

Increasing and Decreasing

A quadratic can be written in many forms:

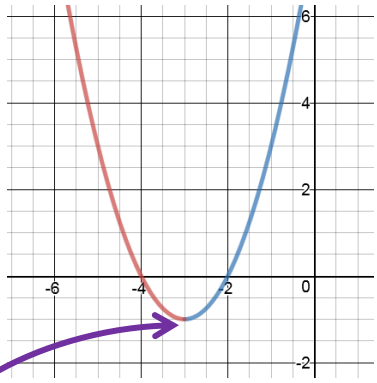
- Vertex Form: $y = a(x-h)^2 + k$
- Transformation Form: $y = a(bx - c) + d$
- Factor Form: $y = a(x-b)(x-c)$
- Standard Form: $y = ax^2 + bx + c$

This station will focus on what interval(s) [or "when" x-values] a function is increasing and on what intervals [or "when" x-values] it is decreasing. The maximum/minimum is the break point used.

x values are increasing

x	$g(x)$
-6	8
-5	3
-4	0
-3.5	-0.75
-3	-1

y value



$f(x) = (x - (-3))^2 - 1$

Moving from left to right

x values are increasing

x	$f(x)$
-3	-1
-2	0
-1	3
0	8
1	15

y values are increasing

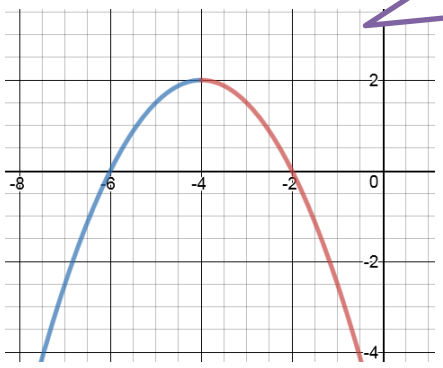
When asked about the function decreasing, we are looking at when the y-values becoming lesser as we move from left to right.

Decreasing: $(-\infty, -3)$ or $x < -3$

When asked about the function increasing, we are looking at when the y-values becoming greater as we move from left to right.

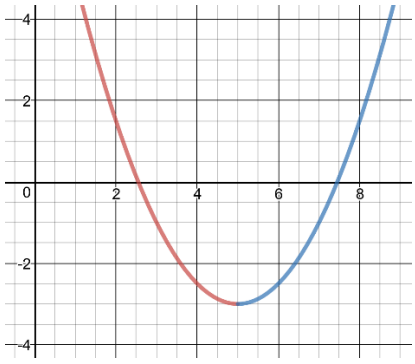
Increasing: $(-\infty, -3)$ or $x < -3$

Notice where the function switches increasing to decreasing: VERTEX/ Max (or min)



Decreasing: $(-4, \infty)$ *or* $x > -4$

Increasing: $(-\infty, -4)$ *or* $x < -4$



Decreasing: $(-\infty, 5)$ *or* $x < 5$

Increasing: $(5, \infty)$ *or* $x > 5$