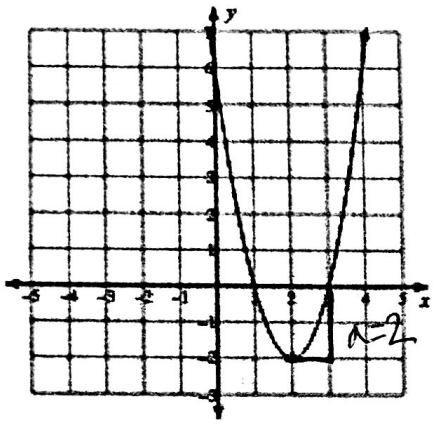
5.6 Writing Equations from a Graph

From a graphing standpoint, we are going to focus on writing equations from graphs in vertex and intercept form.

1) Write the function that the graph represents.



Vertex Form

$y = a(x-h)^2 + k$

Info Needed

a-value

Vertex (h, k)

Equation

$a = 2$ V: $(2, -2)$

$y = 2(x-2)^2 - 2$

a -h k

Intercept Form

$y = a(x-p)(x-q)$

Info Needed

a-value

x-intercepts p & q

Equation

$a = 2$ x-int: $(1,0)$, $(3,0)$ (p, q)

$y = 2(x-1)(x-3)$

a -p -q

2) Using the equations that you wrote above, write the function that the graph represents in standard form.

From Vertex Form ★ Distribute ★

From Intercept Form

$y = 2(x-1)(x-3)$ — Multiply binomials

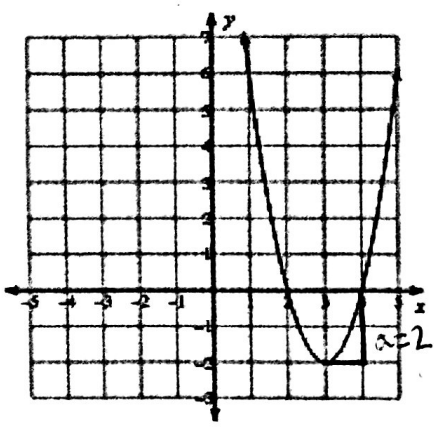
$y = 2(x^2 - 3x - 1x + 3)$

$y = 2(x^2 - 4x + 3)$ — Distribute coefficient

$y = 2x^2 - 8x + 6$

3) Write the function that the graph represents in all three forms.

a.



- Vertex form: $a = 2$ V: $(3, -2)$

$y = 2(x-3)^2 - 2$

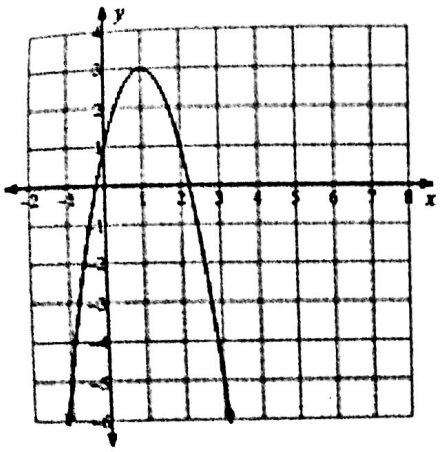
- Intercept form:

$a = 2$ x-int: $(2,0)$, $(4,0)$

$y = 2(x-2)(x-4)$

Standard form:

b.



Vertex form:

Intercept form:

Standard form:

x-intercept(s):

y-intercept:

Axis of Symmetry:

Vertex:

Max/min value:

Domain:

Range:

Increasing:

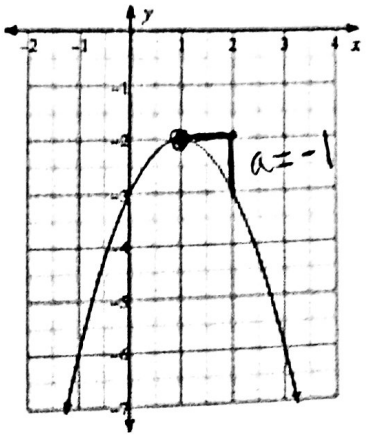
Decreasing:

Positive:

Negative:

End behavior:

c.



Vertex form:
$a=-1 \quad V: (1,-2)$

$\boxed{y=-(x-1)^2-2}$

Intercept form:

NA (no x-intercepts)

★ When there are no x-intercepts, the equation has imaginary solutions ★

Standard form:

$y=-(x-1)^2-2$

Multiply binomials: $y=-(x-1)(x-1)-2$

Distribute: $y=-(x^2-2x+1)-2 \rightarrow y=-x^2+2x-1-2$

$\boxed{y=-x^2+2x-3}$

Combine like terms

x-intercept(s):

y-intercept:

Axis of Symmetry:

Vertex:

Max/min value:

Domain:

Range:

Increasing:

Decreasing:

Positive:

Negative:

End behavior: