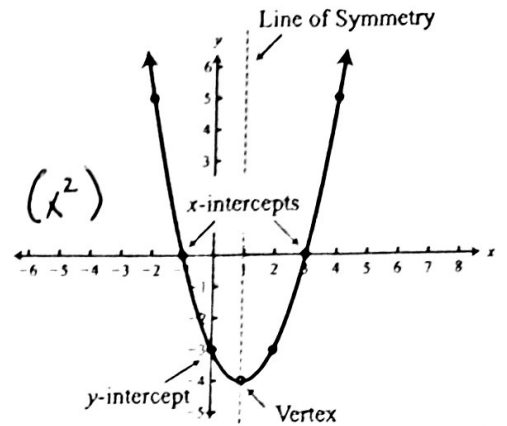


5.1 Key Features of Parabolas

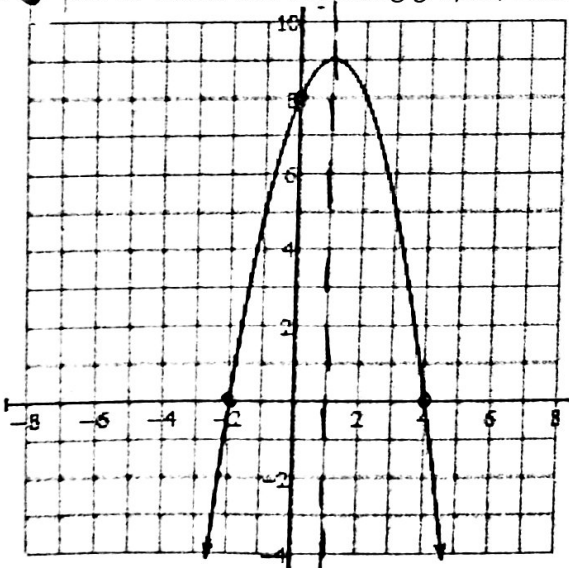


Parabola: The graph shape of a quadratic (x^2)

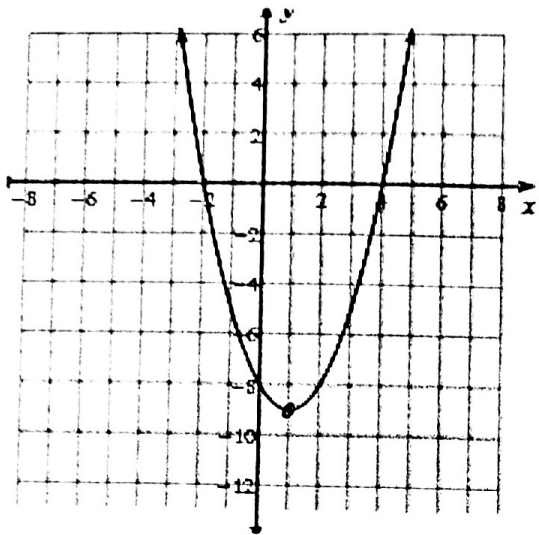


Feature	Definition	Notation	Example (above)
y-intercept	Point where graph crosses the y-axis	$(0, c)$	$(0, -3)$
x-intercept(s)	Point(s) where graph crosses the x-axis	$(p, 0), (q, 0)$	$(-1, 0), (3, 0)$
Axis of Symmetry	Line through vertex that graph is symmetrical about	$x = h$	$x = 1$
Vertex	Turning point of the parabola	(h, k)	$(1, -4)$
Max/Min Value	The highest/lowest y-value of the parabola (y of vertex)	k	-4

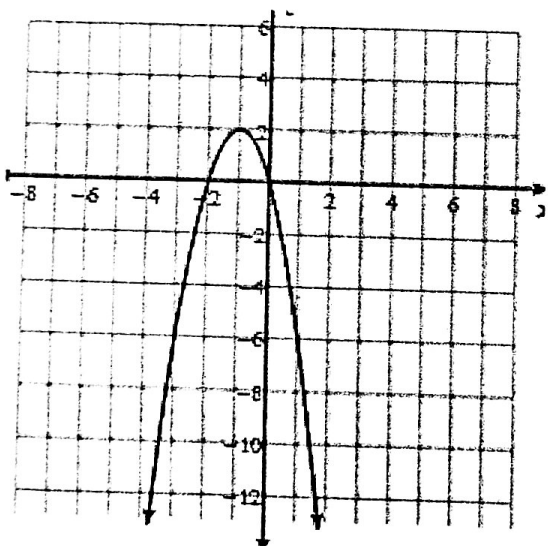
Example 1: Given the following graphs, identify the ...



- x-intercept(s): $(-2, 0), (4, 0)$
- y-intercept: $(0, 8)$
- axis of symmetry: $x = 1$
- vertex: $(1, 9)$
- Max or Min? Max
- Max/Min Value: 9



- x-intercept(s): $(-2, 0), (4, 0)$
- y-intercept: $(0, -8)$
- axis of symmetry: $x = 1$
- vertex: $(1, -9)$
- Max or Min? Min
- Max/Min Value: -9

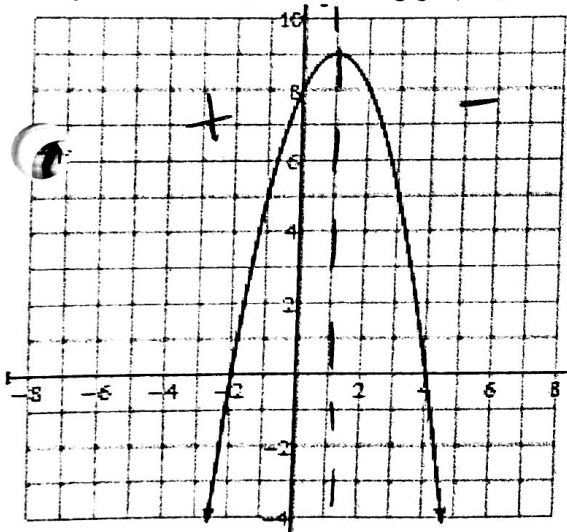


- x-intercept(s): $(-2, 0), (0, 0)$
- y-intercept: $(0, 0)$
- axis of symmetry: $x = -1$
- vertex: $(-1, 2)$
- Max or Min? Max
- Max/Min Value: 2

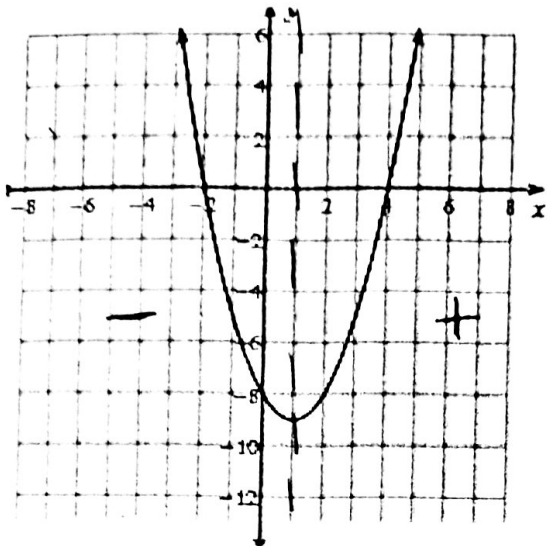
Term	Definition	Notation
Domain 1	All possible <u>x-values</u> of a graph/equation	$(-\infty, \infty)$ IR $-\infty < x < \infty$ *Pick the one you like
Range	All possible <u>y-values</u> of a graph/equation	Lowest to highest $[k, \infty)$ $(-\infty, k]$ *k is y of vertex
Increasing Up	Trace graph with finger from left to right	All <u>x-values</u> where graph has a positive slope
Decreasing Down		All <u>x-values</u> where graph has a negative slope
Direction of Opening	Up or Down	\curvearrowright Up \curvearrowleft Down

*Note: All intervals (except for range) are done according to the x-values.

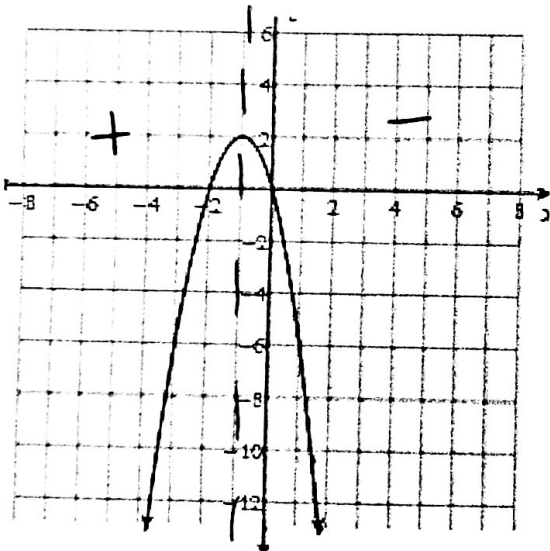
Example 2: Given the following graphs, identify the ...



- Domain: $(-\infty, \infty)$
- Range: $(-\infty, 9]$
- Increasing: $(-\infty, 1)$
- Decreasing: $(1, \infty)$
- Direction of Opening: Down



- a. Domain: $(-\infty, \infty)$
- b. Range: $[-9, \infty)$
- c. Increasing: $(1, \infty)$
- d. Decreasing: $(-\infty, 1)$
- e. Direction of Opening: \cup_P



- a. Domain: $(-\infty, \infty)$
- b. Range: $(-\infty, 2]$
- c. Increasing: $(-\infty, -1)$
- d. Decreasing: $(-1, \infty)$
- e. Direction of Opening: Down