

I. About Quadratic Functions and Their Graphs

1. A quadratic function has a degree of 2.

2. There are 3 forms of quadratic equations:

(a) Standard: $ax^2 + bx + c$ Good when: identifying end behavior

(b) Vertex: $a(x-h)^2 + k$ Good when: identifying the vertex and transformations

(c) Factored: $(x-p)(x-q)$ Good when: graphing

3. Example of a quadratic equation in all 3 forms:

(a) $2x^2 + 4x - 6$

(b) $\frac{1}{2}(x-2)^2 + 4$

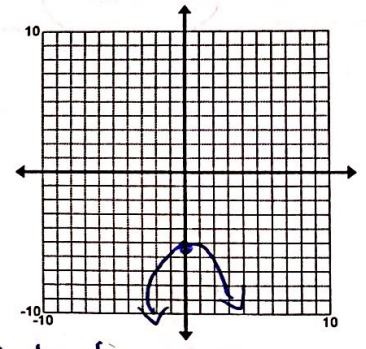
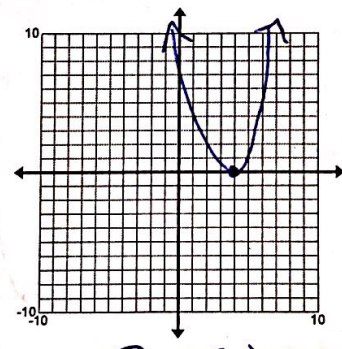
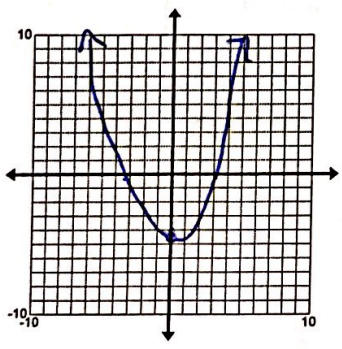
(c) $(x-1)(x+2)$

II. Possibilities for the Graphs of a Quadratic Function – called a parabola

4. (a) two solutions

(b) one solution

(c) No solutions



5. The degree of an equation represents the possible solutions.

6. You can find real solutions by graphing.

7. Solve each quadratic equation by graphing. Use your graphing calculator.

(a) $x^2 + 2x - 3 = 0$

$x = 1, x = -3$

(b) $10 - 3x = x^2$ $x^2 + 3x - 10$

$x = 2, x = -5$

(c) $x^2 = -7$ $x^2 + 7 = 0$

No solution

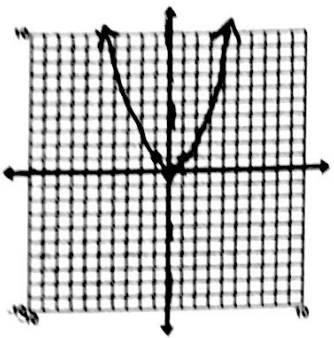
(d) $y = (x - 2)^2$

$x = 2$

2nd trace
#2 zero
left bound
right bound
enter

III. Transformations of Quadratic Functions - usually done in Vertex form!

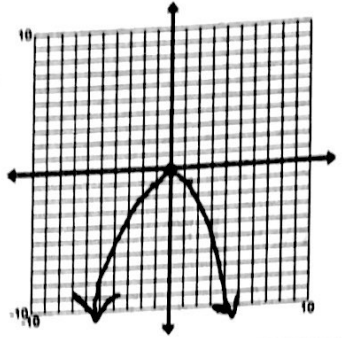
8. $y = x^2$ Parent



vertex: (0,0)
 axis: ~~0~~ x=0
 domain: (-∞, ∞)
 range: (0, ∞)
 maximum or minimum?

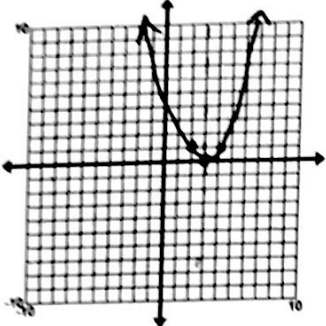
X-values
Y-values

9. $y = -x^2$



vertex: (0,0)
 axis: x=0
 domain: (-∞, ∞)
 range: (-∞, 0)
maximum or minimum?

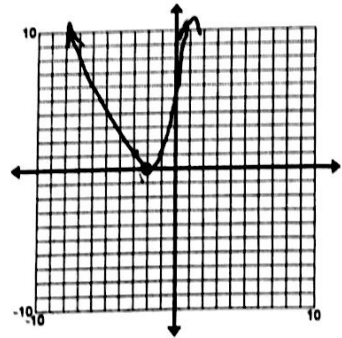
10. $y = (x - 3)^2$



vertex: (3,0)
 axis: x=3 ←
 domain: (-∞, ∞)
 range: (0, ∞)
 maximum or minimum?

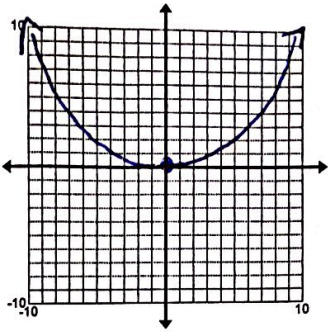
value of vertex

11. $y = (x + 2)^2$



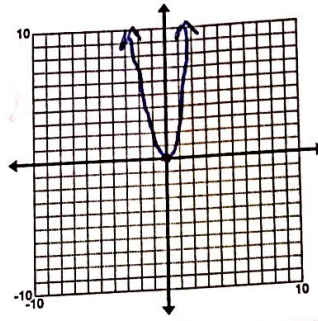
vertex: (-2,0)
 axis: x=-2
 domain: (-∞, ∞)
 range: (0, ∞)
 maximum or minimum?

12. $y = \frac{1}{4}x^2$



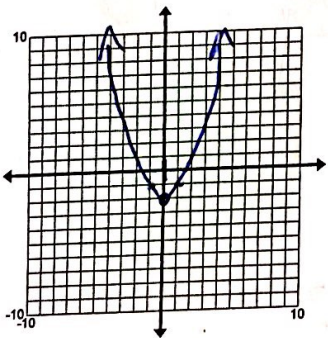
vertex: (0,0)
 axis: $x=0$
 domain: $(-\infty, \infty)$
 range: $(0, \infty)$
 maximum or minimum?

13. $y = 4x^2$



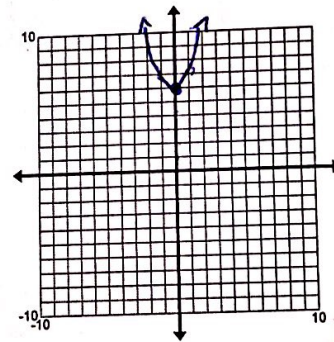
vertex: (0,0)
 axis: $x=0$
 domain: $(-\infty, \infty)$
 range: $(0, \infty)$
 maximum or minimum?

14. $y = x^2 - 2$



vertex: (0,-2)
 axis: $x=0$
 domain: $(-\infty, \infty)$
 range: $(-2, \infty)$
 maximum or minimum?

15. $y = x^2 + 5$



vertex: (0,5)
 axis: $x=0$
 domain: $(-\infty, \infty)$
 range: $(5, \infty)$
 maximum or minimum?

IV. Summary

If $y = a(x-h)^2 + k$, then: ...

- the vertex is located at the point (h,k)
- the axis of symmetry is the line $x=h$
- $|a| > 1$ means the graph is stretched
- $|a| < 1$ means the graph is compress
- $-a$ means the graph is reflect