

3.1 Quadratic Functions and Inequalities

Write the quadratic function in the standard form $y = a(x - h)^2 + k$. State the vertex and sketch the graph. Do not find the x -intercepts.

1. $y = x^2 + 6x + 2$

2. $y = x^2 + 5x + 3$

3. $y = -2x^2 - 8x + 7$

Find the x -intercepts, write in the standard form $y = a(x - h)^2 + k$, state the vertex, and sketch the graph.

4. $y = x^2 + 4x + 3$

5. $y = x^2 - 2x - 8$

6. $y = 2x^2 + 6x + 4$

Solve the inequality.

7. $x^2 - 5x - 6 < 0$

8. $x^2 + 3x + 1 > 0$

9. $x^2 + 5x + 6 > 0$

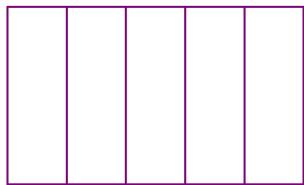
10. $x^2 - x - 6 < 0$

11. A ball is thrown straight up into the air. The height of the ball is given by

$$y(t) = -16t^2 + 32t$$

Where the height, y , is in feet, and the time, t , is in seconds. What is the maximum height that the ball will attain?

12. Mary-Joe has 2400 feet of fencing to construct a rectangular pen for her pigs. The pig pen will include four parallel interior walls. What overall dimensions will maximize the area?



Find the point of intersection of the parabola and the straight line given by the following equations. Sketch the graph of the line and the parabola on the same plane.

13. $y = -x + 6$ and $y = x^2 - 2x$

14. $y = 2x - 1$ and $y = x^2 + 8x - 8$

15. $y = -x + 1$ and $y = -x^2 - 3x + 4$