

Quadratic Functions

HSF.IF.C.8

HSA.REI.B.4

Name _____ Date _____

Show your work. Write vertices as ordered pairs and give complex roots in the form $a \pm bi$ with radicals in simplest form.

1. Find the axis of symmetry of $y = x^2 - 8x + 3$.
2. Give the vertex of the parabola written in vertex form: $y = (x - 5)^2 + 2$.
3. Identify the vertex and state whether $y = -3(x + 1)^2 - 4$ opens up or down.
4. Complete the square to write $y = x^2 + 4x + 1$ in vertex form.
5. Complete the square to write $y = x^2 - 6x + 5$ in vertex form, then state the vertex.
6. Write $y = x^2 + 10x + 21$ in vertex form by completing the square.
7. Complete the square to write $y = 2x^2 - 12x + 13$ in vertex form.
8. Find the minimum value of $y = x^2 - 6x + 5$ and the x -value where it occurs.
9. Solve for the complex roots: $x^2 + 4 = 0$.
10. Use the quadratic formula to solve $x^2 - 2x + 5 = 0$.
11. Use the quadratic formula to solve $x^2 + 6x + 13 = 0$.
12. Which best describes the roots of $x^2 - 4x + 7 = 0$?

A) Two real roots

C) Two complex (non-real) roots

B) One repeated real root

D) No roots at all

13. Use the quadratic formula to solve $2x^2 - 4x + 5 = 0$.
14. A profit function is $P(x) = -x^2 + 8x - 7$, where x is the price in dollars. Complete the square to find the price that maximizes profit and the maximum profit.
15. A ball is thrown upward; its height in feet is $h(t) = -16t^2 + 32t + 48$ after t seconds. Find the time it reaches maximum height and the maximum height.