

Quadratics with Complex Solutions

Grade 11 – Algebra 2 math · Test · Standards: N-CN.C.7, A-REI.B.4b

Name: _____ Date: _____ Class: _____

This test checks how well a student classifies quadratics with the discriminant and solves them with complex solutions. Write exact answers, simplify every radical, and show the discriminant when it is used. No calculator is needed. The test is worth 20 points.

Standards: N-CN.C.7, A-REI.B.4b · **Level:** Grade 11 Algebra 2

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Discriminants (2 points)

For each equation, find the discriminant and state whether the solutions are two real, one real, or non-real.

- a. $x^2 - 10x + 25 = 0$
- b. $2x^2 + x - 15 = 0$
- c. $x^2 - 2x + 8 = 0$
- d. $4x^2 + 4x + 5 = 0$

(2 points)

Question 2 Squared binomial equation (2 points)

Solve $(x - 5)^2 = -36$.

Question 3 Quadratic formula (3 points)

Solve $3x^2 + 2x + 7 = 0$. Write each solution in the form $p \pm qi$ with exact values.

Question 4 Completing the square (3 points)

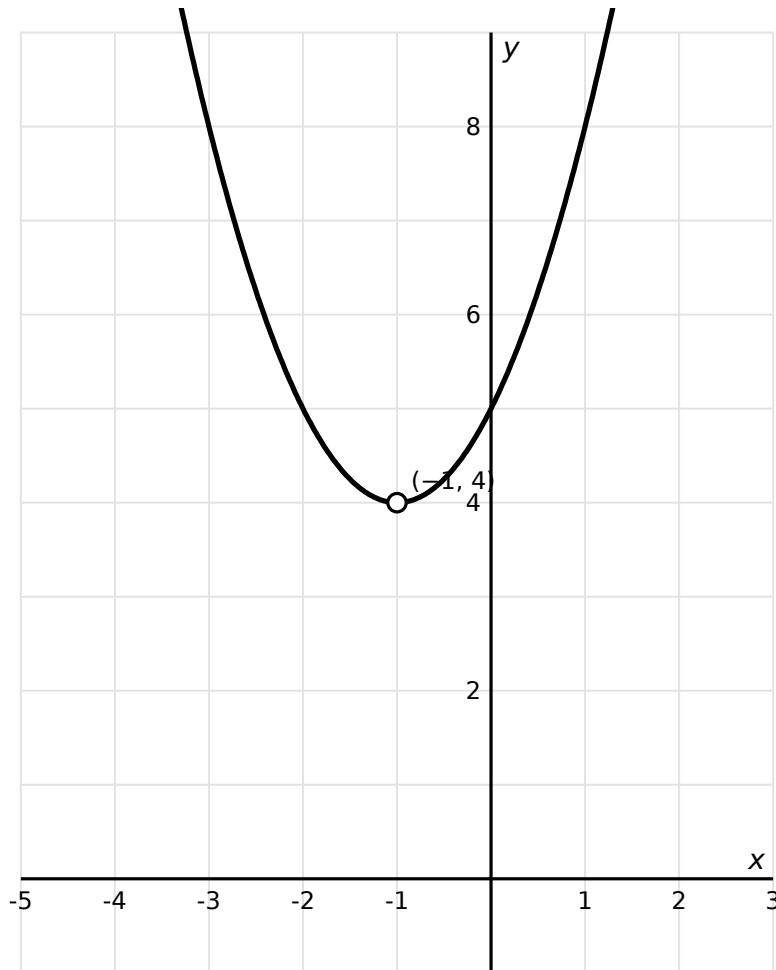
Solve $x^2 + 8x + 41 = 0$ by completing the square.

Question 5 Range of a constant (2 points)

Find all values of k for which $x^2 + 6x + k = 0$ has non-real solutions.

Question 6 A graph and its equation (2 points)

The graph of $y = x^2 + 2x + 5$ is shown.



Graph of $y = x^2 + 2x + 5$.

- How many real solutions does $x^2 + 2x + 5 = 0$ have? Explain using the graph. (1 point)
- Solve the equation. (1 point)

Question 7 Writing an equation (3 points)

One solution of a quadratic equation with real coefficients is $2 + 7i$.

- State the other solution. (1 point)
- Find the sum and the product of the two solutions. (1 point)
- Write the equation in the form $x^2 + bx + c = 0$. (1 point)

Question 8 Will the drone reach the height? (3 points)

A drone released from a 6-foot platform has height $h(t) = -16t^2 + 20t + 6$ feet after t seconds. A sensor sits 15 feet above the ground.



Height of the drone and the sensor line at 15 feet.

- a. Write the equation that gives the times when the height is 15 feet in the form $at^2 + bt + c = 0$. (1 point)
- b. Use the discriminant to decide whether the drone reaches the sensor. (1 point)
- c. Solve the equation. (1 point)