

Algebra 2 · Quadratic Equations with Complex Solutions · Worksheet

Common Core N-CN.C.7, A-REI.B.4b · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

These 24 problems practice solving quadratic equations whose solutions are complex numbers (N-CN.C.7, A-REI.B.4b). You will use the square root method, completing the square and the quadratic formula, and read the discriminant from an equation or a graph.

The set moves from solving simple equations to finding unknown constants, building equations from roots, and word problems where a negative discriminant says the situation is impossible.

Algebra 2 Common Core: N-CN.C.7 · A-REI.B.4b

Problem 1: Square root method

Solve $x^2 = -49$.

Problem 2: Isolate the square

Solve $3x^2 + 27 = 0$.

Problem 3: Square of a binomial

Solve $(x-2)^2 = -25$.

Problem 4: Complete the isolation

Solve $2(x+1)^2 + 18 = 0$.

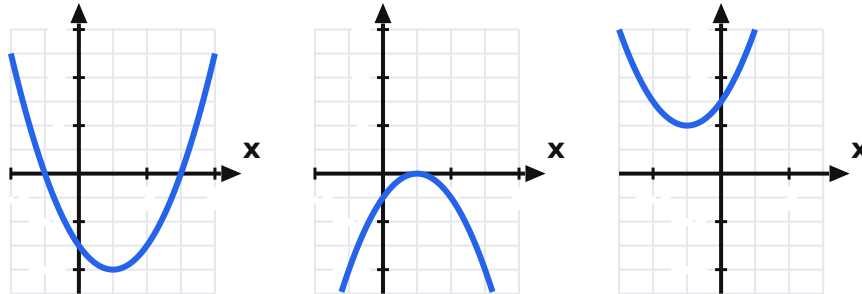
Problem 5: Compute discriminants

Find the discriminant of each equation and say whether it has two real, one repeated real, or two complex solutions.

- a. $x^2 - 6x + 5 = 0$
- b. $x^2 - 6x + 9 = 0$
- c. $x^2 - 6x + 13 = 0$

Problem 6: Match graphs to discriminants

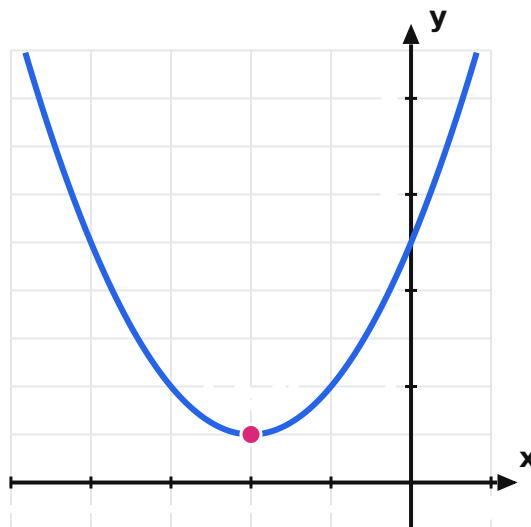
Each graph shows $y = ax^2 + bx + c$. Match graphs I, II, and III to $D > 0$, $D = 0$, and $D < 0$, and state the number of real solutions of $ax^2 + bx + c = 0$ for each.



Graphs I, II, and III.

Problem 7: Graph and solve

The graph of $y = x^2 + 4x + 5$ is shown. How many real solutions does $x^2 + 4x + 5 = 0$ have? Then find all solutions.



The graph of $y = x^2 + 4x + 5$.

Problem 8: Quadratic formula

Use the quadratic formula to solve $x^2 - 2x + 10 = 0$.

Problem 9: Complete the square

Solve $x^2+6x+13=0$ by completing the square.

Problem 10: Larger coefficients

Solve $x^2-8x+25=0$.

Problem 11: Leading coefficient not 1

Solve $2x^2-4x+5=0$. Write the answer in simplest form.

Problem 12: Fractions in the answer

Solve $3x^2+2x+1=0$.

Problem 13: Rearrange first

Solve $x^2=2x-17$.

Problem 14: Expand then solve

Solve $x(x+6)=-10$.

Problem 15: Find a constant

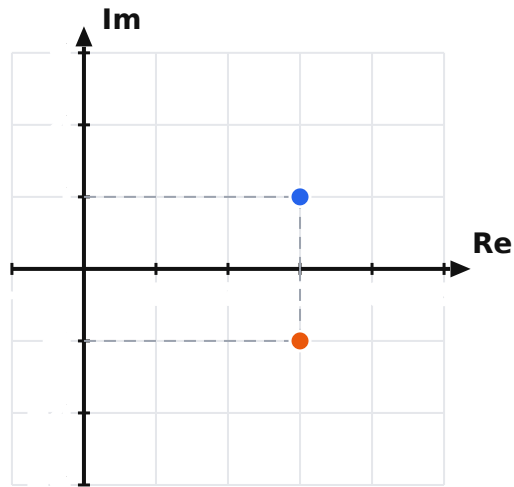
For $x^2+6x+k=0$, find the values of k that give (a) exactly one real solution and (b) two complex solutions.

Problem 16: Verify a complex solution

Show that $1-2i$ is a solution of $x^2-2x+5=0$.

Problem 17: Build an equation from its roots

The roots of $x^2+bx+c=0$ are the points shown. Read the roots, then find b and c .



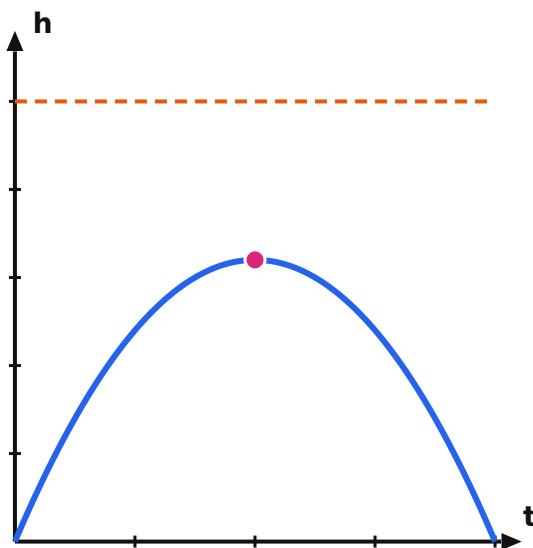
The two roots of a quadratic equation in the complex plane.

Problem 18: Conjugate roots

One root of $x^2 + bx + c = 0$, where b and c are real, is $2 - 5i$. Find the other root, b , and c .

Problem 19: Does the ball reach 100 feet?

Priya kicks a ball. Its height in feet after t seconds is $h = -16t^2 + 64t$. Solve $h = 100$ and explain what the answer says about the ball.



Height h (feet) of a ball after t seconds, with the line $h = 100$.

Problem 20: Revenue at the school store

The revenue from selling a school sweatshirt at price p dollars is $R = -5p^2 + 100p$ dollars. Can

the revenue be exactly \$600? Solve $R = 600$ and interpret the result.

Problem 21: Find the error

Ethan solves $x^2 - 6x + 10 = 0$ and writes $x = \frac{6 \pm \sqrt{-4}}{2} = \frac{6 \pm 2}{2}$, so $x = 4$ or $x = 2$. Explain his mistake, show that $x = 4$ fails, and give the correct solutions.

Problem 22: Garden with perimeter 20 feet

Aisha wants a rectangular garden with perimeter 20 ft and area 30 sq ft. Let w be the width. Write and solve an equation for w , then explain whether the garden is possible.



A rectangular garden with perimeter 20 ft.

Problem 23: Integer values of k

Find all integers k for which $x^2 + kx + 16 = 0$ has two non-real solutions. How many are there?

Problem 24: Sum and product of solutions

Solve $2x^2 + 8x + 11 = 0$. Then verify that the sum of the solutions is $-\frac{b}{a}$ and the product is $\frac{c}{a}$.