Quadratic Equations with Complex Solutions Worksheet

Algebra 2 · Common Core HSN-CN.C.7

> Solve quadratic equations with real coefficients that have complex solutions.

Practice

Builds the skill step by step.

1. The solutions of $x^2 = -9$ are $x = \pm bi$ with $b > 0$. What is b?

2. The solutions of $x^2 + 16 = 0$ are $x = \pm bi$ with $b > 0$. What is b?

3. The solutions of $x^2 + 25 = 0$ are $x = \pm bi$ with $b > 0$. What is b?

4. What is the discriminant $b^2 - 4ac$ of $x^2 + 2x + 5 = 0$?

5. A quadratic equation with real coefficients has a negative discriminant. What kind of solutions does it have?

   A. two real solutions

   B. no solutions at all

   C. one real solution

   D. two non-real complex solutions

6. What is the discriminant of $x^2 - 4x + 13 = 0$?

7. The solutions of $(x - 1)^2 = -4$ are $a \pm bi$ with $b > 0$. What are a and b?

8. How many real solutions does $x^2 + 4 = 0$ have?

9. The solutions of $x^2 + 2x + 5 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

10. The solutions of $2x^2 + 18 = 0$ are $x = \pm bi$ with $b > 0$. What is b?

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On Level

Grade-level practice.

1. The solutions of $x^2 - 4x + 13 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

2. The solutions of $x^2 + 6x + 10 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

3. The solutions of $x^2 - 2x + 10 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

4. The solutions of $(x + 3)^2 + 9 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

5. What kind of solutions does $3x^2 - 2x + 1 = 0$ have?

   A. two non-real complex solutions

   B. two real solutions

   C. one real solution

   D. one real and one non-real solution

6. The solutions of $4x^2 + 9 = 0$ are $x = \pm bi$ with $b > 0$. What is b?

7. The solutions of $x^2 - 6x + 25 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

8. Explain how the discriminant tells you what kind of solutions a quadratic equation with real coefficients has.

9. The solutions of $x^2 + 4x + 8 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

10. What is the sum of the two solutions of $x^2 - 4x + 13 = 0$?

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Challenge

Multi-step and word problems that stretch it.

1. The solutions of $2x^2 - 4x + 10 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

2. What is the product of the two solutions of $x^2 + x + 1 = 0$?

3. $x^2 + 6x + k = 0$ has solutions $-3 \pm 2i$. What is k?

4. $x^2 + bx + c = 0$ has solutions $2 \pm 5i$. What are b and c?

5. For which values of c does $x^2 + 4x + c = 0$ have non-real solutions?

   A. $c > 4$

   B. $c < 4$

   C. $c = 4$

   D. $c > -4$

6. What is the real part of the solutions of $3x^2 + 2x + 1 = 0$?

7. A quadratic equation with real coefficients has $4 + i$ as a solution. What is the other solution?

   A. $-4 + i$

   B. $-4 - i$

   C. $4 - i$

   D. $4 + i$ again

8. A ball's height is $h = -16t^2 + 32t + 5$ feet after t seconds. Use the discriminant to explain whether the ball reaches 30 feet.

9. The solutions of $x^2 - 10x + 34 = 0$ are $a \pm bi$ with $b > 0$. What are a and b?

10. $x^4 - 16 = 0$ factors as $(x^2 - 4)(x^2 + 4) = 0$. How many of its solutions are non-real?