

A.REI.B.4: Complex Conjugate Root Theorem

- 1 Which quadratic equation has the roots $3 + i$ and $3 - i$?
 - 1) $x^2 + 6x - 10 = 0$
 - 2) $x^2 + 6x + 8 = 0$
 - 3) $x^2 - 6x + 10 = 0$
 - 4) $x^2 - 6x - 8 = 0$
- 2 Which quadratic equation has the roots $5 + i$ and $5 - i$?
 - 1) $x^2 - 10x + 24 = 0$
 - 2) $x^2 + 10x + 24 = 0$
 - 3) $x^2 - 10x + 26 = 0$
 - 4) $x^2 + 10x + 26 = 0$
- 3 Which quadratic equation has the roots $(1 + 3i)$ and $(1 - 3i)$?
 - 1) $x^2 + 2x - 10 = 0$
 - 2) $x^2 - 2x + 10 = 0$
 - 3) $x^2 + 2x - 8 = 0$
 - 4) $x^2 - 2x - 8 = 0$
- 4 Which equation has $1 - i$ as a solution?
 - 1) $x^2 + 2x - 2 = 0$
 - 2) $x^2 + 2x + 2 = 0$
 - 3) $x^2 - 2x - 2 = 0$
 - 4) $x^2 - 2x + 2 = 0$
- 5 Which equation has the complex number $4 - 3i$ as a root?
 - 1) $x^2 + 6x - 25 = 0$
 - 2) $x^2 - 6x + 25 = 0$
 - 3) $x^2 + 8x - 25 = 0$
 - 4) $x^2 - 8x + 25 = 0$
- 6 If $2 + i$ and $2 - i$ are the roots of the equation $x^2 - 4x + c = 0$, what is the value of c ?
 - 1) -5
 - 2) 5
 - 3) -4
 - 4) 4
- 7 Write a quadratic equation whose roots are $5 + i\sqrt{2}$ and $5 - i\sqrt{2}$.
- 8 If the solution set of $x^2 + px + q = 0$ is $\{1 + i, 1 - i\}$, find the value of p .
- 9 The roots of a quadratic equation are $r_1 = 3 + 2i$ and $r_2 = 3 - 2i$. Find the sum of the roots r_1 and r_2 . Find the product of the roots r_1 and r_2 . Write a quadratic equation that has roots r_1 and r_2 .
- 10 If $2 + 3i$ is one root of a quadratic equation with real coefficients, what is the sum of the roots of the equation?

A.REI.B.4: Complex Conjugate Root Theorem Answer Section

1 ANS: 3

The product of the roots equals $(3+i)(3-i) = 9 - i^2 = 10 = \frac{c}{a}$.

REF: 010714b

2 ANS: 3

REF: 089325siii

3 ANS: 2

REF: 088620siii

4 ANS: 4

If $1-i$ is one solution, the other is $1+i$. $(x-(1-i))(x-(1+i)) = 0$

$$x^2 - x - ix - x + ix + (1-i^2) = 0$$

$$x^2 - 2x + 2 = 0$$

REF: 081601aii

5 ANS: 4

If $4-3i$ is one root, the other is $4+3i$. The sum of the roots is $4+3i+4-3i = 8 = -\frac{b}{a}$

REF: 080718b

6 ANS: 2

$$\frac{c}{a} = (2+i)(2-i)$$

$$\frac{c}{1} = 4 - i^2$$

$$c = 5$$

REF: 060719b

7 ANS:

$$x^2 - 10x + 27 = 0$$

REF: 089442siii

8 ANS:

$$-2$$

REF: 018411siii

9 ANS:

$$6, 13, x^2 - 6x + 13 = 0$$

REF: 080041siii

10 ANS:

$$2+3i+2-3i = 4$$

REF: 010522b