

NAME: _____

1. 010714b, P.I. A2.A.25

Which quadratic equation has the roots $3+i$ and $3-i$?

- [A] $x^2 - 6x + 10 = 0$ [B] $x^2 + 6x - 10 = 0$
[C] $x^2 - 6x - 8 = 0$ [D] $x^2 + 6x + 8 = 0$

2. 080718b, P.I. A2.A.25

Which equation has the complex number $4 - 3i$ as a root?

- [A] $x^2 - 6x + 25 = 0$ [B] $x^2 + 6x - 25 = 0$
[C] $x^2 - 8x + 25 = 0$ [D] $x^2 + 8x - 25 = 0$

3. 010222b, P.I. A2.A.25

Solve for x in simplest $a + bi$ form:
 $x^2 + 8x + 25 = 0$

4. 080328b, P.I. A2.A.25

Express, in simplest $a + bi$ form, the roots of the equation $x^2 + 5 = 4x$.

5. 010931b, P.I. A2.A.25

Find the roots of the equation $x^2 + 7 = 2x$ and express your answer in simplest $a + bi$ form.

6. 080931b, P.I. A2.A.25

Solve the equation $3x^2 + 5 = 4x$ and express the roots in simplest $a + bi$ form.

7. fall9928b, P.I. A2.A.25

Solve the equation $x^2 = 6x - 12$ and express the roots in simplest $a + bi$ form.

8. 010627b, P.I. A2.A.25

In physics class, Taras discovers that the behavior of electrical power, x , in a particular circuit can be represented by the function $f(x) = x^2 + 2x + 7$. If $f(x) = 0$, solve the equation and express your answer in simplest $a + bi$ form.

9. 010522b

If $2 + 3i$ is one root of a quadratic equation with real coefficients, what is the sum of the roots of the equation?

[1] A

[2] C

[2] $-4 \pm 3i$, and appropriate work is shown.

[1] The quadratic formula is used correctly, but one computational error is made.

or [1] $\frac{-8 \pm 6i}{2}$, but appropriate work is shown.

or [1] $-4 \pm 3i$, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[3] incorrect procedure.

[4] $2 \pm i$, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made, but the result is expressed as a complex number in simplest $a + bi$ form.

or [3] Appropriate work is shown, but the roots are not expressed in simplest $a + bi$ form.

or [3] Appropriate work is shown, but only one complex root, in simplest $a + bi$ form, is found.

[2] Appropriate work is shown, but one computational error is made, resulting in a solution that is not a complex number.

or [2] Appropriate work is shown, but two or more computational errors are made, but the result is expressed as a complex number in simplest $a + bi$ form.

or [2] Appropriate work is shown, but one conceptual error is made.

or [2] An incorrect quadratic formula is used, but the result is expressed as a complex number in simplest $a + bi$ form.

[1] Incorrect substitution is made into the quadratic formula, such as $a = 1$, $b = 5$, and $c = -4$, but the resulting equation is solved appropriately.

or [1] $2 \pm i$, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[4] incorrect procedure.

- [4] $1 \pm i\sqrt{6}$, and appropriate work is shown.
 [3] Appropriate work is shown, but one computational error is made.
 or [3] Appropriate work is shown, but the solution is expressed as $\frac{2 \pm 2i\sqrt{6}}{2}$.
 [2] Appropriate work is shown, but two or more computational errors are made.
 or [2] Appropriate work is shown, but one conceptual error is made.
 or [2] Appropriate work is shown, but the solution is expressed as $\frac{2 \pm \sqrt{-24}}{2}$.
 [1] Appropriate work is shown, but one conceptual error and one computational error are made.
 or [1] A correct substitution is made in the quadratic formula, but no further correct work is shown.
 or [1] $1 \pm i\sqrt{6}$, but no work is shown.
 [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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- [4] $\frac{2}{3} \pm \frac{i\sqrt{11}}{3}$, and appropriate work is shown.
 [3] Appropriate work is shown, but one computational error is made.
 or [3] Appropriate work is shown to obtain $\frac{4 \pm 2i\sqrt{11}}{6}$, but no further correct work is shown.
 [2] Appropriate work is shown, but two or more computational errors are made.
 or [2] Appropriate work is shown, but one conceptual error is made, such as the incorrect use of the quadratic formula.
 or [2] Appropriate work is shown to obtain $\frac{4 \pm \sqrt{-44}}{6}$, but no further correct work is shown.
 [1] Appropriate work is shown, but one conceptual error and one computational error are made.
 or [1] A correct substitution is made into the quadratic formula, but no further correct work is shown.
 or [1] $\frac{2}{3} \pm \frac{i\sqrt{11}}{3}$, but no work is shown.
 [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
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[4] Finds $3 + i\sqrt{3}$ and $3 - i\sqrt{3}$, or $3 + 1.73i$ and $3 - 1.73i$ by using the quadratic formula or some other valid method.

[3] Finds a correct answer, but does not simplify.

or [3] Uses a correct procedure, but makes an arithmetic mistake or simplifies improperly.

or [3] Finds incorrect roots based upon a mistake in the quadratic formula which keeps the discriminant negative.

[2] Writes a correct equation:

$x^2 - 6x + 12 = 0$, and a correct discriminant of $i\sqrt{12}$ or $2i\sqrt{3}$, but incorrect roots.

or [2] Uses a correct procedure, but makes more than one error.

[1] Writes the correct equation only.

or [1] Obtains correct answer, but no work is shown.

[0] Response is completely incorrect, irrelevant, or incoherent; or is a correct response that was obtained by an obviously

[7] incorrect procedure.

[4] $-1 \pm i\sqrt{6}$, and appropriate work is shown, such as appropriately substituting for a , b , and c in the quadratic formula, solving the equation, and simplifying the answer correctly.

[3] Appropriate work is shown, but one computational or simplification error is made.

[2] Appropriate work is shown, but two or more computational or simplification errors are made.

or [2] Appropriate work is shown, but one conceptual error is made, such as writing the quadratic formula incorrectly.

[1] Appropriate work is shown, but one conceptual error and one computational or simplification error are made.

or [1] $-1 \pm i\sqrt{6}$, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[8] incorrect procedure.

[2] 4, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or [1] Appropriate work is shown, but one conceptual error is made.

or [1] The second root of the equation is found, but the sum of the roots is not calculated or is calculated incorrectly.

or [1] 4, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously

[9] incorrect procedure.
