A.REI.B.4: Solving Quadratics 8

1 Max solves a quadratic equation by completing the square. He shows a correct step:

\[(x + 2)^2 = -9\]

What are the solutions to his equation?
1) \(2 \pm 3i\)
2) \(-2 \pm 3i\)
3) \(3 \pm 2i\)
4) \(-3 \pm 2i\)

2 The roots of the equation \(x^2 + 2x + 5 = 0\) are
1) \(-3\) and \(1\)
2) \(-1\), only
3) \(-1 + 2i\) and \(-1 - 2i\)
4) \(-1 + 4i\) and \(-1 - 4i\)

3 The roots of the equation \(x^2 - 4x + 9 = 0\) are
1) \(2 \pm i\sqrt{5}\)
2) \(2 \pm \sqrt{5}\)
3) \(2 \pm i\sqrt{13}\)
4) \(2 \pm \sqrt{13}\)

4 The solutions to the equation \(-\frac{1}{2} x^2 = -6x + 20\) are
1) \(-6 \pm 2i\)
2) \(-6 \pm 2\sqrt{19}\)
3) \(6 \pm 2i\)
4) \(6 \pm 2\sqrt{19}\)

5 Solve for \(x\) in simplest \(a + bi\) form: \(x^2 + 8x + 25 = 0\)

6 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.

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

8 Express, in simplest \(a + bi\) form, the roots of the equation \(x^2 + 5 = 4x\).

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

10 Solve the equation \(x^2 - 4x = -13\) and express the roots in the form \(a + bi\).

11 Express the roots of the equation \(x^2 = 2x - 5\) in \(a + bi\) form.

12 Solve the equation \(x^2 = 4x - 20\) and express your answers in the form \(a + bi\).
13 Solve the equation $x^2 - 4x = -10$ and express the roots in terms of $i$.

14 Solve the equation $6x - 34 = x^2$ and express the roots in simplest $a + bi$ form.

15 Solve for $x$ and express the roots in simplest $a + bi$ form: $x^2 = 6x - 10$

16 Solve for $x$ and express your answer in simplest $a + bi$ form: $x^2 + 29 = 4x$

17 Solve for $x$ and express your answer in simplest $a + bi$ form: $x^2 - 10x = -41$

18 Solve the equation $x(x - 2) + 2 = 0$, and express the roots in the form $a + bi$.

19 Express the roots of the equation $x^2 + 1 = 8(x - 3)$ in $a + bi$ form.

20 Express the roots of the equation $x^2 + 1 = 4(x - 1)$ in $a + bi$ form.

21 Express the roots of the equation $2x^2 + 4x + 5 = 0$ in simplest $a + bi$ form.

22 Solve for $x$ and express in simplest $a + bi$ form:

$$3x^2 - 6x + 4 = 0$$

23 Solve for $x$ and express your answer in simplest $a + bi$ form:

$$\frac{x^2}{4} = x - 2$$
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Answer Section

1  ANS: 2
   \((x + 2)^2 = -9\)
   \(x + 2 = \pm \sqrt{-9}\)
   \(x = -2 \pm 3i\)
   REF: 011408a2

2  ANS: 3
   \(x^2 + 2x + 1 = -5 + 1\)
   \((x + 1)^2 = -4\)
   \(x + 1 = \pm 2i\)
   \(x = -1 \pm 2i\)
   REF: 081703aii

3  ANS: 1  REF: 088422siii

4  ANS: 3

\(-2 \left( \frac{1}{2} x^2 = -6x + 20 \right)\)

\(x^2 - 12x = -40\)
\(x^2 - 12x + 36 = -40 + 36\)
\((x - 6)^2 = -4\)
\(x - 6 = \pm 2i\)
\(x = 6 \pm 2i\)

REF: fall1504aii
5 ANS:
\[ x^2 + 8x = -25 \]
\[ x^2 + 8x + 16 = -25 + 16 \]
\[ (x + 4)^2 = -9 \]
\[ x + 4 = \sqrt{-9} \]
\[ x = -4 \pm 3i \]

REF: 010222b

6 ANS:
\[ x^2 + 2x = -7 \]
\[ x^2 + 2x + 1 = -7 + 1 \]
\[ (x + 1)^2 = -6 \]
\[ x + 1 = \sqrt{-6} \]
\[ x = -1 \pm i\sqrt{6} \]

REF: 010627b

7 ANS:
\[ x^2 - 6x = -12 \]
\[ x^2 - 6x + 9 = -12 + 9 \]
\[ (x - 3)^2 = -3 \]
\[ x - 3 = \sqrt{-3} \]
\[ x = 3 \pm i\sqrt{3} \]

REF: fall9928b

8 ANS:
\[ x^2 - 4x = -5 \]
\[ x^2 - 4x + 4 = -5 + 4 \]
\[ (x - 2)^2 = -1 \]
\[ x - 2 = \sqrt{-1} \]
\[ x = 2 \pm i \]

REF: 080328b
9 ANS:
\[ x^2 - 2x = -7 \]
\[ x^2 - 2x + 1 = -7 + 1 \]
\[ (x - 1)^2 = -6 \]
\[ x - 1 = \pm \sqrt{-6} \]
\[ x = 1 \pm i\sqrt{6} \]

REF: 010931b

10 ANS:
\[ 2 \pm 3i \]

REF: 068038siii

11 ANS:
\[ 1 \pm 2i \]

REF: 088537siii

12 ANS:
\[ 2 \pm 4i \]

REF: 088637siii

13 ANS:
\[ 2 \pm i\sqrt{6} \]

REF: 088738siii

14 ANS:
\[ 3 \pm 5i \]

REF: 088937siii

15 ANS:
\[ 3 \pm i \]

REF: 019736siii

16 ANS:
\[ 2 \pm 5i \]

REF: 010339siii

17 ANS:
\[ 5 \pm 4i \]

REF: 060042siii

18 ANS:
\[ 1 \pm i \]

REF: 018737siii
19 ANS:
\[ 4 \pm 3i \]
REF: 019638siii

20 ANS:
\[ 2 \pm i \]
REF: 018942siii

21 ANS:
\[ -1 \pm \frac{\sqrt{6}}{2} i \]
REF: 089939siii

22 ANS:
\[ 1 \pm \frac{i\sqrt{3}}{3} \]
REF: 019440siii

23 ANS:
\[ 2 \pm 2i \]
REF: 010242siii