QUADRATICS: Solving Quadratics – 80%

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The question will ask you to solve a quadratic equation with imaginary solutions.
Nspire will calculate a precise answer in $a + bi$ form if b is rational.

The roots of the equation $x^2 - 4x = -13$ are

(1) $2 \pm 3i$

(2) $2 \pm 6i$

(3) $2 \pm \sqrt{17}$

(4) $2 \pm i\sqrt{13}$

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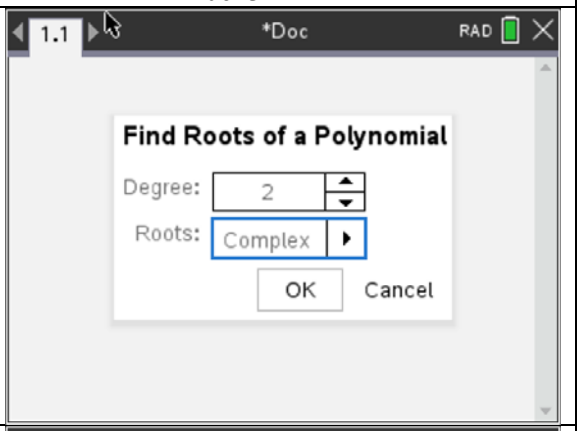
Add a Calculator page.

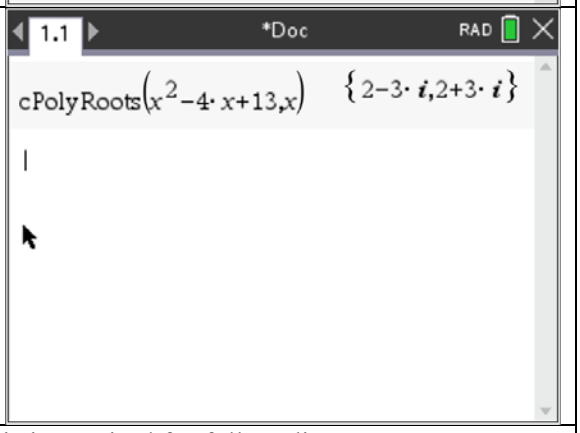
Enter menu, 3, 3, 1. Change Roots to Complex.



The equation written in standard form is $x^2 - 4x + 13 = 0$.

Enter $a_2 = 1,\ a_1 = -4,\ a_0 = 13$.

(1) is the correct response.



If this were an open ended question, algebraic work similar to this is required for full credit:

$$x^2 - 4x + 4 = -13 + 4$$

$$(x-2)^2 = -9$$

$$x - 2 = \pm 3i$$

$$x = 2 \pm 3i$$

The quadratic formula may also be used.

Nspire will not display a precise answer in $a + bi$ form if b is irrational.

A solution of the equation $2x^2 + 3x + 2 = 0$ is

(1) $-\frac{3}{4} + \frac{1}{4}i\sqrt{7}$

(3) $-\frac{3}{4} + \frac{1}{4}\sqrt{7}$

(2) $-\frac{3}{4} + \frac{7}{4}i$

(4) $\frac{1}{2}$

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Add a Calculator page.

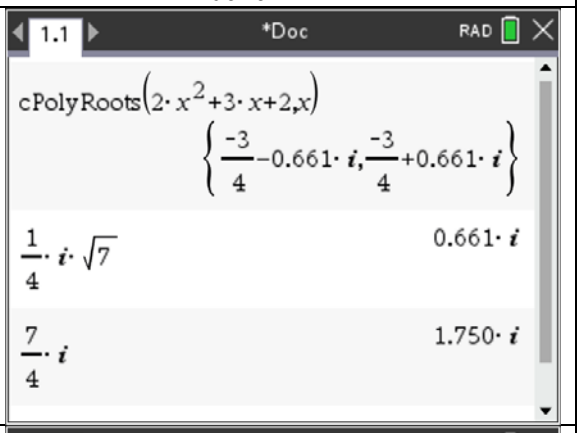
Enter menu, 3, 3, 1. Change Roots to Complex.

Enter $a_2 = 2,\ a_1 = 3,\ a_0 = 2.$

(3) and (4) are eliminated as they are not imaginary solutions.

The calculated value of *b* equals the value of *b* in (1).

(1) is the correct response.



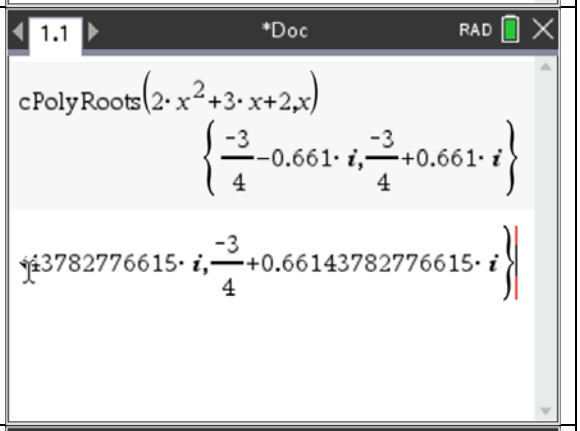
You may be able to find *b* by squaring the displayed value of *b*, then expressing the square root of the result.

Add a Calculator page.

Enter menu, 3, 3, 1. Change Roots to Complex.

Enter $a_2 = 2,\ a_1 = 3,\ a_0 = 2.$

Arrow up and hit enter to display a more precise value of *b*.

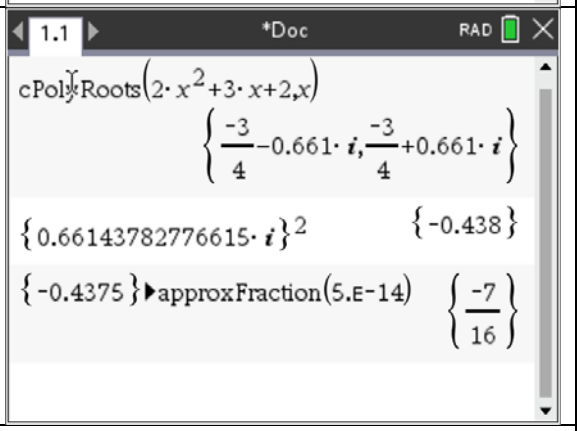


Delete everything except one occurrence of ***bi*** and the braces.

Square that value.

Enter menu, 2, 2 to convert to a fraction.

$$\sqrt{\frac{-7}{16}} = \boldsymbol{i}\frac{\sqrt{7}}{4}$$



If this were an open ended question, algebraic work similar to this is required for full credit:

$$x = \frac{-3 \pm \sqrt{3^2 - 4(2)(2)}}{2(2)} = \frac{-3 \pm \sqrt{-7}}{4} = -\frac{3}{4} \pm \frac{i\sqrt{7}}{4}$$

For more questions, go to https://www.jmap.org/htmlstandard/A.REI.B.4.htm.