

I. Using the Principle of Square Roots

1. The generalized principle of square roots states that for any real number k , if $X^2 = k$, then $X = \pm\sqrt{k}$, where X is an algebraic expression.

Use this principle to solve each of the following equations. Answers involving radicals should be left in simplified form, and answers involving square roots of negative numbers should be written in the form $a + bi$.

(a) $3x^2 = 10$	(b) $x^2 = -16$
(c) $(x-4)^2 = 18$	(d) $(x+3)^2 = -25$

II. Completing the Square

2. Use the method of completing the square and the generalized principle of square roots to solve each of the equations.

(a) $x^2 + 8x + 3 = 0$	(b) $x^2 - 7x + 2 = 0$
(c) $x^2 - 6x + 13 = 0$	

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3. If $f(x) = x^2 - 10x + 3$,

(a) Find the y-intercept. Write your answer as an ordered pair.

(b) Use the method of completing the square to find the x-intercepts. Write your answers as ordered pairs using exact values and then approximate your answers to the nearest thousandth.

(c) Check your answers to parts (a) and (b) using your graphing calculator.

Answers

1 (a) $x = \pm \frac{\sqrt{30}}{3}$ (b) $x = \pm 4i$ (c) $x = 4 \pm 3\sqrt{2}$ (d) $x = -3 \pm 5i$

2 (a) $x = -4 \pm \sqrt{13}$ (b) $x = \frac{7}{2} \pm \frac{\sqrt{41}}{2} = \frac{7 \pm \sqrt{41}}{2}$ (c) $x = 3 \pm 2i$

3 (a) (0, 3) (b) $(5 + \sqrt{22}, 0)$, $(5 - \sqrt{22}, 0)$, approximate values: (9.690, 0), (.310, 0)