

Self-Check for Tutorial 12 Graphing and Finding Roots for Quadratic and Cubic Equations

Review the graphing directions in the tutorial if you need help using a graphing calculator with these problems.

1. Graph $y = 2x^2 - 5x - 3$. Find the roots (zeroes) using the **CALC** button on your graphing calculator. Are these exact or approximate roots? Why?
2. Graph $y = -x^2 + 6x + 5$. Find the roots (zeroes) using the **CALC** button on your graphing calculator. Are these exact or approximate roots? Why?
3. Use substitution to verify that $x = 1$ is a root for the equation $y = 5x^3 - 6x^2 + 2x - 1$. Graph the equation to support your answer.
4. Graph $y = x^3 + 5x^2 + 2x - 8$. Find the x-intercepts. Are the x-intercepts approximate or exact roots for the equation? Why?
5. Use the Rational Root Theorem to find the set of possible rational roots, or zeroes, for $y = 2x^3 + 3x - 5$. Graph the equation to identify the most likely rational root or roots. Use substitution to verify.

Solutions to the Self-Check for Tutorial 12 Graphing and Finding Roots for Quadratic and Cubic Equations

Review the graphing directions in the tutorial if you need help using a graphing calculator with these problems.

1. Graph $y = 2x^2 - 5x - 3$. Find the roots (zeroes) using the **CALC** button on your graphing calculator. Are these exact or approximate roots? Why?
 $x = -.5$ and $x = 3$ are exact roots or zeroes for the equation.
2. Graph $y = -x^2 + 6x + 5$. Find the roots (zeroes) using the **CALC** button on your graphing calculator. Are these exact or approximate roots? Why?
 $x = -.7416574$ and $x = 6.7416574$ are approximate roots or zeroes for the equation.
3. Use substitution to verify that $x = 1$ is a root for the equation $y = 5x^3 - 6x^2 + 2x - 1$. Graph the equation to support your answer.
Yes, $x = 1$ is a root. From the graph, observe that $x = 1$ is the only root because it is the only place the graph crosses the x -axis.
4. Graph $y = x^3 + 5x^2 + 2x - 8$. Find the x -intercepts for the graph. Are the x -intercepts approximate or exact roots for the equation? Why?
From the graph the x -intercepts are $x = -4, -2,$ and 1 . These values can be confirmed as exact solutions by substituting each x -value into the equation.
5. Use the Rational Root Theorem to find the set of possible rational roots, or zeroes, for $y = 2x^3 + 3x - 5$. Graph the equation to identify the most likely rational root or roots. Use substitution to verify.
 $\pm 1, \pm 1/2, \pm 5, \pm 5/2$ are possible rational roots. The graph indicates that $+1$ is a rational root. Substitution will verify that $x = +1$ is a root of the equation.