Questions: Introduction to quadratic equations

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Summary

A selection of questions for the study guide on introduction to quadratic equations.

Before attempting these questions, it is highly recommended that you read Guide: Introduction to quadratic equations.

Q1

For each of the quadratic equations below, identify the variable and the coefficients a, b, c.

1.1. $x^2 - 7x + 6 = 0$.

1.2. $y^2 + 14y + 49 = 0$.

1.3. $h^2 - h - 56 = 0$.

1.4. $y^4 - y^2 = 0$

1.5. $5n^2 - 14n + 100 = 0$.

1.6. $A^2 - 144 = 0$.

1.7. $25M^2 = 0$.

1.8. $e^{2x} - 4e^x + 4 = 0$.

1.9. $-9s^2 + 3s - 1 = 0$.

1.10. $2e^{6x} + e^{3x} + 1 = 0$.

1.11. $\cos^2(x) + 4\cos(x) - 4 = 0$.

1.12. $8x^8 - 4x^4 - 1 = 0$.

Q2

Find the discriminant of every equation in Question 1, and comment on the possible number of real roots in the variable given. You do not need to find the roots of the equation in order to do this question.

You may use the facts that for all real numbers x, then $e^x > 0$, $x^2, x^4 > 0$, and $-1 < \cos(x), \sin(x) < 1$. In addition, you may also use the facts that if $\cos(x) = y$ and y is between -1 and 1, then there are infinitely many solutions in x; if $e^x = y$ and y is positive, then $x = \ln(y)$.

Q3

Although it may not look like it, the following equations are quadratic equations. In each of these cases, comment on the number of real roots of the equation.

3.1. $x = 1/x - 1$.

3.2. $(y - 1)(y - 4) = -(y + 2)(y + 3)$.

3.3. $4m(m + 1) + 6 = 5$.

3.4. $(t^2 - 1)(t^2 + 1) = -2$.

3.5. $\dfrac{x - 1}{x - 2} = 5x$.

3.6. $\dfrac{e^x - e^{-x}}{2} = 1$.

After attempting the questions above, please click this link to find the answers.

Version history and licensing

v1.0: initial version created 04/23 by tdhc.

- v1.1: edited 05/24 by tdhc.