TECHNOLOGY EXTENSION

Solving Quadratic Equations

Some graphing calculators, such as the TI-92 and TI-92 Plus, have the capability to solve quadratic equations algebraically.

Exploring the Calculator

1. Try to solve each of the following quadratic equations using the solve function of the graphing calculator.
   - a) \( x^2 + 3x + 1 = 0 \)
   - b) \( x^2 - 2x + 4 = 0 \)
   - c) \( 2x^2 + x - 2 = 0 \)
   - d) \( 3x^2 + 2x + 2 = 0 \)
2. Use the cSolve function to solve each equation from question 1.
3. Using your results from questions 1 and 2, compare the capabilities of the solve function and the cSolve function for solving quadratic equations.

Solving Equations

Use the cSolve function of the graphing calculator.

4. Solve.
   - a) \( x^2 + 5x + 3 = 0 \)
   - b) \( y^2 - 4y - 2 = 0 \)
   - c) \( x^2 - 3x + 6 = 0 \)
   - d) \( n^2 + 3n + 7 = 0 \)
   - e) \( x^2 + 8x = 3 \)
   - f) \( z^2 - 5z = -8 \)
   - g) \( 2 - t^2 = 3t \)
   - h) \( 8x - 17 = x^2 \)
5. Solve.
   - a) \( 3k^2 + 2k - 4 = 0 \)
   - b) \( 4x^2 + 8x + 5 = 0 \)
   - c) \( 4 = 5a^2 - 10a \)
   - d) \( 3w - 6w^2 = -1 \)
   - e) \( \frac{5}{2}x^2 - 2x - \frac{3}{4} = 0 \)
   - f) \( \frac{y^2}{3} - \frac{y}{2} + \frac{3}{2} = 0 \)
   - g) \( 0.5m^2 + m = 2.5 \)
   - h) \( \frac{x - 1}{2} - \frac{x + 1}{3} = x^2 \)

Problem Solving

6. Garden fence Is it possible to enclose all four sides of a rectangular garden with an area of 150 m² using each of the following lengths of fencing? If so, give the dimensions of the garden that can be enclosed. Round to the nearest tenth of a metre, if necessary.
   - a) 60 m
   - b) 50 m
   - c) 40 m
7. Thrown object The following equation expresses the approximate height, \( h \) metres, of an object thrown upward from the top of an 80-m cliff at 20 m/s as a function of the time, \( t \) seconds, since the object was thrown.
   \[ h = -5t^2 + 20t + 80 \]
Will the object reach each of the following heights? If so, after what length of time will the object reach this height?
   - a) 110 m
   - b) 100 m