IM2 Problem Set 7.10 - Working with Quadratic Functions

BIG PICTURE of this UNIT:	- How do we analyze and then work with a data set that shows both increase and decrease - What is a parabola and what key features do they have that makes them useful in modeling applications - How do I use graphs, data tables and algebra to analyze quadratic functions? - How can I use graphs and equations of quadratic relations to make predictions from data sets & their models

1. (CI) Solving Quadratic Equations $\Rightarrow$ Factoring $ax^2 + bx + c = 0$ when $a = 1$

   a. (i) G/C   (ii) Using Vertex form   (iii) Using symmetry

   b. Examples:
      i. $x^2 + 2x - 15 = 0$
      ii. $x^2 + 4x + 4 = 0$
      iii. $x^2 + 5x - 24 = 0$
      iv. $x^2 - 5x = 0$
      v. $x^2 - 16 = 6x$
      vi. $x^2 = 7x - 12$

2. (CI) Solving Quadratic Equations $\Rightarrow$ Factoring $ax^2 + bx + c = 0$ when $a \neq 1$

   a. (i) G/C   (ii) Decomposition   (iii) using vertex form   (iv) Using symmetry

   b. Examples:

      i. $3x^2 - 5x - 2 = 0$
      ii. $2x^2 + 3x - 2 = 0$
      iii. $3x^2 - 4x - 15 = 0$
      iv. $6x^2 - x - 2 = 0$
      v. $4x^2 - 4x = 3$
      vi. $9x^2 + 1 = 6x$

3. (CI) Solving Quadratic Equations $\Rightarrow$ When factoring doesn't work .....

   a. (i) using vertex form   (ii) Using symmetry

   b. Examples:

      i. $x^2 + 5x - 2 = 0$
      ii. $4x^2 - 8x + 3 = 0$
      iii. $x^2 + 1 = 4 - 2x^2$
      iv. $x(x + 5) = 2x + 7$
      v. $3x^2 + 5x - 3 = x^2 + 4x + 1$
      vi. $(x + 3)^2 - 2x = 15$

4. (CI) Solving Systems of Equations:

   a. Solve the system defined by the equations $f(x) = x^2 - 2x - 3$ and $g(x) = 2x - 3$

   b. Solve the system defined by the equations $f(x) = -(x + 2)^2 + 5$ and $g(x) = 2 - 6x$

   c. Solve the system defined by the equations $f(x) = x^2 - 2x + 4$ and $g(x) = x - 1$

   d. Solve the system defined by the equations $f(x) = -2x^2 - 4x - 1$ and $g(x) = 2x + 4$

   e. Solve the system defined by the equations $f(x) = 2x^2 - 5x + 6$ and $g(x) = 3x - 2$

   f. Solve the system defined by the equations $f(x) = -x^2 - 3x + 2$ and $g(x) = x + 6$

   g. Solve the system defined by the equations $f(x) = 2x^2 + 4x - 1$ and $-5x + y = 5$