

Relationships Among Quantities

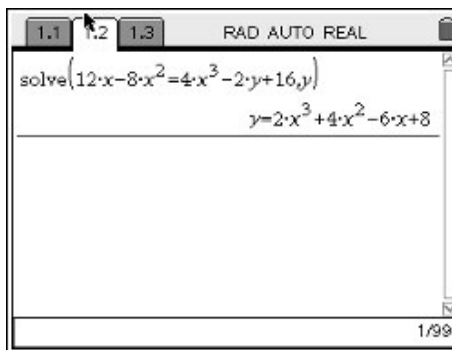
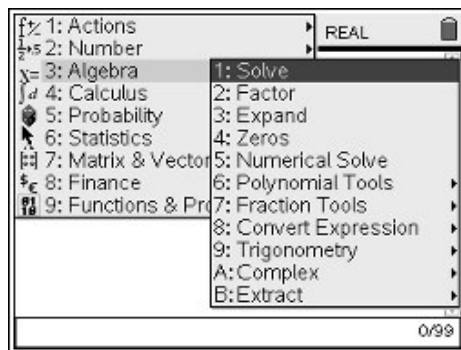
You can use a computer algebra system (CAS) to represent relationships among quantities.

Example Solve Nonlinear Equations

Two quantities are related by $12x - 8x^2 = 4x^3 - 2y + 16$. Use a CAS to solve this equation for y . Then represent the relationship using a graph and a table.

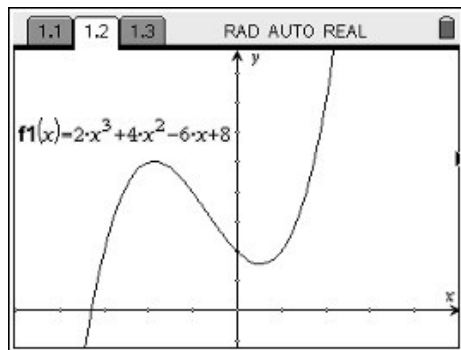
Step 1 Solve for y .

Under the Home menu, select **Calculator**. Next, press the menu key, scroll down to **Algebra**, and select **Solve**. Then enter the equation as shown to solve for y .

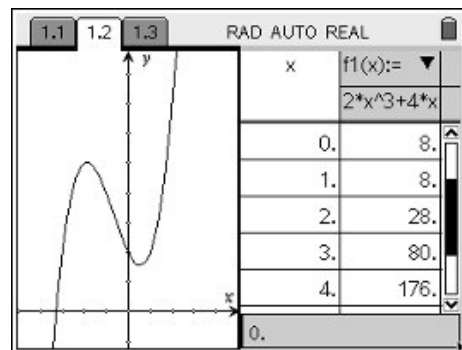


Step 2 Graph the equation that you found in Step 1, and generate a table of values.

Under the Home menu, select **Graphs & Geometry**. Enter the equation that you found in Step 1 as $f_1(x)$ and press **Enter**. You can adjust the window by pressing the menu key and scrolling down to **Window**. To generate a table of values press the menu key, scroll down to **View**, and select **Add Function Table**.



$[-5, 5]$ scl: 1 by $[-5, 35]$ scl: 4



$[-5, 5]$ scl: 1 by $[-5, 35]$ scl: 4

Exercises

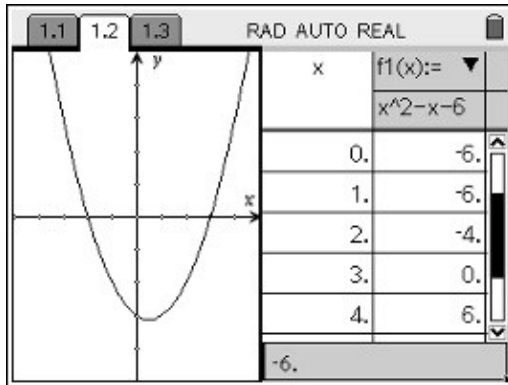
Use CAS to solve each equation for y . Then represent each relationship using a graph and a table.

- $3y - 3x^2 - 24 = -3x - 42$
- $4x^2 + 16x + 8 = 26 - 2y$
- $2x - 4x^4 - 6 = -8x^3 - 4x^2 + 2y$
- $3y^2 - 12 - 3x = -3$
- $2y^2 - 2x^2 + 8 = 2x - 2x^2 - 12$
- $-12x^3 + 24x^2 + 8x = -4y + 8$
- $20x^3 + 10x^2 + 25 = 15x^4 + 5x - 5y + 5$
- $3x^3 + 9x^2 + 3 = 6x^4 - 3y + 6x - 9$

Relationships Among Quantities

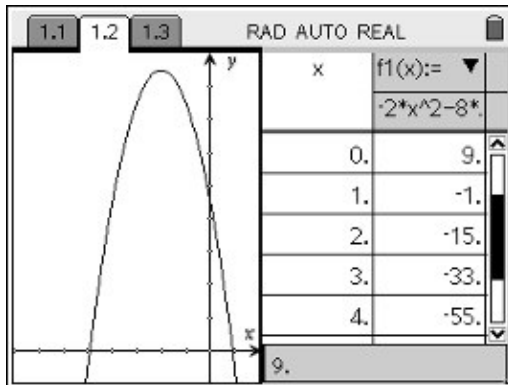
Answers

1. $y = x^2 - x - 6$



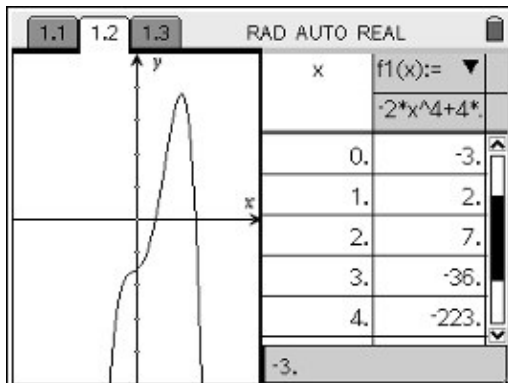
[-5, 5] scl: 1 by [-10, 10] scl: 2

2. $y = -2x^2 - 8x + 9$



[-8, 2] scl: 1 by [-2, 18] scl: 2

3. $y = -2x^4 + 4x^3 + 2x^2 + x - 3$

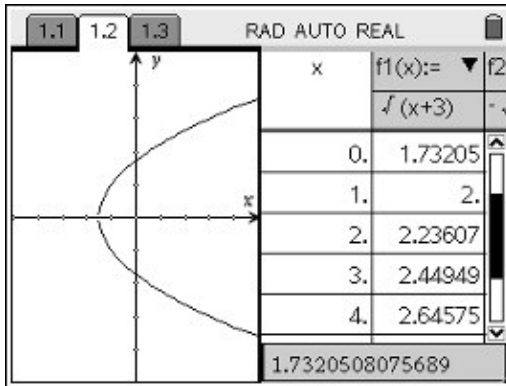


[-5, 5] scl: 1 by [-10, 10] scl: 2

Relationships Among Quantities

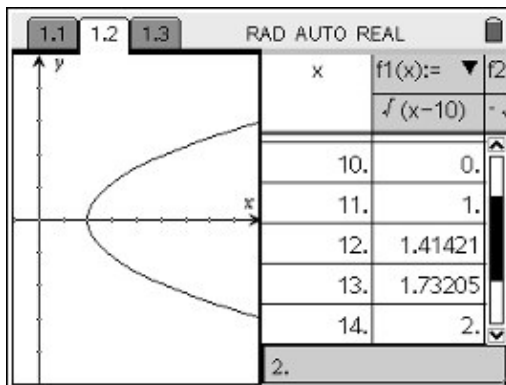
Answers (continued)

4. $y = \pm\sqrt{x+3}$



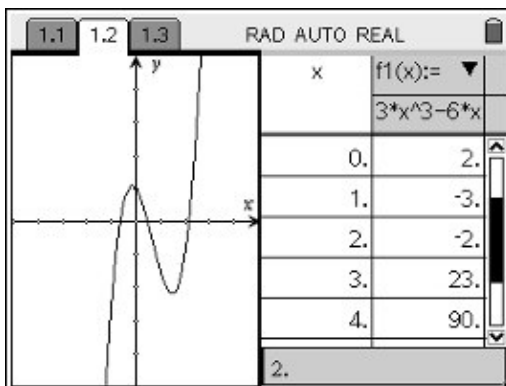
$[-10, 10]$ scl: 2 by $[-5, 5]$ scl: 1

5. $y = \pm\sqrt{x-10}$



$[-5, 45]$ scl: 5 by $[-10, 10]$ scl: 2

6. $y = 3x^3 - 6x^2 - 2x + 2$

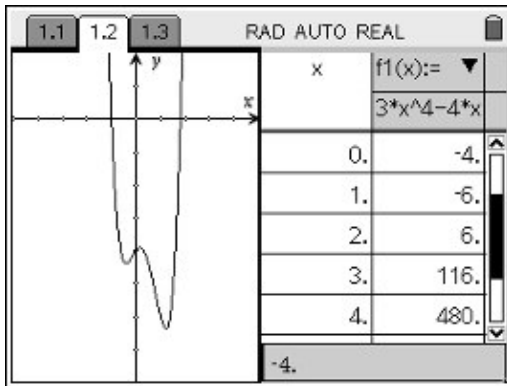


$[-5, 5]$ scl: 1 by $[-10, 10]$ scl: 2

Relationships Among Quantities

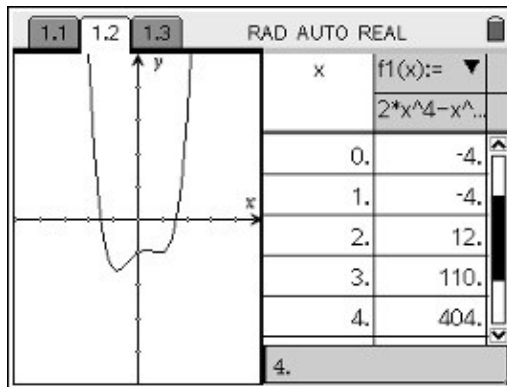
Answers (continued)

7. $y = 3x^4 - 4x^3 - 2x^2 + x - 4$



[-5, 5] scl: 1 by [-8, 2] scl: 1

8. $y = 2x^4 - x^3 - 3x^2 + 2x - 4$



[-5, 5] scl: 1 by [-20, 20] scl: 4