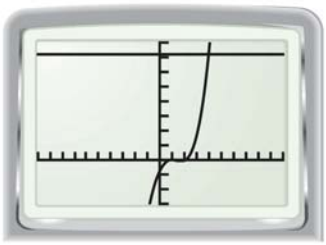
METHOD 2

Using a Graph Another approach is to make a graph. You can use the graph to find the value of x that makes the volume of the basin 36 cubic feet.

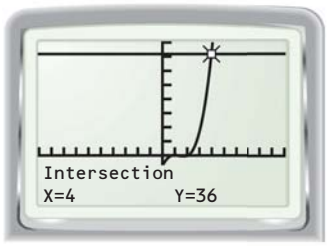
STEP 1 **Write** the function. From the diagram, you can see that the volume y of water the basin can hold is given by this function:

$$y = (2x - 2)(x - 2)(x - 1)$$

STEP 2 **Graph** the equations $y = 36$ and $y = (x - 1)(2x - 2)(x - 2)$. Choose a viewing window that shows the intersection of the graphs.



STEP 3 **Identify** the coordinates of the intersection point. On a graphing calculator, you can use the *intersect* feature. The intersection point is (4, 36).



▶ The volume of the basin is 36 cubic feet when x is 4 feet. So, the outer dimensions of the basin should be as follows:

$$\text{Length} = 2x = 8 \text{ feet}$$

$$\text{Width} = x = 4 \text{ feet}$$

$$\text{Height} = x = 4 \text{ feet}$$

PRACTICE

SOLVING EQUATIONS **Solve the polynomial equation using a table or using a graph.**

1. $x^3 + 4x^2 - 8x = 96$
2. $x^3 - 9x^2 - 14x + 7 = -33$
3. $2x^3 - 11x^2 + 3x + 5 = 59$
4. $x^4 + x^3 - 15x^2 - 8x + 6 = -45$
5. $-x^4 + 2x^3 + 6x^2 + 17x - 4 = 32$
6. $-3x^4 + 4x^3 + 8x^2 + 4x - 11 = 13$
7. $4x^4 - 16x^3 + 29x^2 - 95x = -150$
8. **WHAT IF?** In the problem on page 360, suppose the basin is to hold 200 cubic feet of water. Find the outer dimensions of the basin using a table and using a graph.
9. **PACKAGING** A factory needs a box that has a volume of 1728 cubic inches. The width should be 4 inches less than the height, and the length should be 6 inches greater than the height. Find the dimensions of the box using a table and using a graph.
10. **AGRICULTURE** From 1970 to 2002, the average yearly pineapple consumption P (in pounds) per person in the United States can be modeled by the function

$$P(x) = 0.0000984x^4 - 0.00712x^3 + 0.162x^2 - 1.11x + 12.3$$

where x is the number of years since 1970. In what year was the pineapple consumption about 9.97 pounds per person? Solve the problem using a table and a graph.