

Assignment

Write

Describe the difference between the solutions of a quadratic equation and the solutions of a quadratic inequality.

Remember

The solution set of a quadratic inequality is determined by first solving for the roots of the quadratic equation, then determining which interval(s) created by the roots satisfy the inequality.

Practice

- A nutrition company has determined that the fixed cost associated with producing cases of its special health bars is \$1000. The variable cost is $\frac{3}{4}x + 25$ dollars per case that they produce. The selling price of the cases of health bars is $135 - \frac{1}{4}x$ per case that they sell.
 - Determine the cost function $C(x)$ for this product based on the number of cases, x , that they produce and sell. Simplify if necessary.
 - Determine the revenue function $R(x)$ for this product based on the number of cases, x , that they produce and sell. Simplify if necessary.
 - The profit that a company makes is the difference between the revenue and the cost. Determine the profit function $P(x)$ for this product.
 - Determine when the company will break even.
 - If they make and sell fewer than 10 cases of health bars, will they have a positive or negative profit? Explain your reasoning.
 - If they make and sell more than 100 cases of health bars, will they have a positive or negative profit? Explain your reasoning.
 - Determine how many units the company must produce and sell to make a profit of at least \$1800.
- Solve each inequality.
 - $2y^2 + 2y - 12 > 0$
 - $x^2 + 6x \leq 0$
 - $4b^2 + 14b + 16 < 10$
 - $a^2 \geq 4(2a - 3)$
 - $2t^2 > 9t + 18$
 - $k^2 + 3k + 2 < -3(k + 2)$

Stretch

- Marelby and Merily both started their own companies with \$3000. Marelby's profits can be represented as $g(x) \geq x^2 - 5x + 3$. Merily's profits can be represented by $h(x) \leq -x^2 + 5x + 3$. Graph the solutions to the quadratic inequalities and state what the shaded region means in regards to Marelby and Merily's profits.

Review

1. Determine each product.

a. $(3x - 9)^2$

b. $(6x^2 + 5x + 4)(-x - 3)$

2. Solve each equation.

a. $x^2 = 5x - 4$

b. $x^2 + 9x - 23 = 0$

3. Determine the roots of each function.

a. $f(x) = (x + 5)^2 + 9$

b. $g(x) = x^2 - 3x + 5$