

Lesson 4.7 Warm Up

1. Write the equation of the perpendicular line to $y = 3x - 1$ that goes through the point $(-2, 4)$.
2. What is the least squares regression line? How is calculated and what is it used for?

Lesson 4.7 The Quadratic Formula

Essential Understanding: You can solve a quadratic equation $ax^2 + bx + c = 0$ in more than one way. In general, you can find a formula that gives values of x in terms of a , b , and c .

**Key Concept The Quadratic Formula**

To solve the quadratic equation $ax^2 + bx + c = 0$, use the **Quadratic Formula**.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Ex. What are the solutions? Leave your answer in exact, simplified form.

$$2x^2 - x = 4$$

Ex. Solve $x^2 + 6x + 9 = 0$

Ex. Solve: $x^2 + 4x = -4$

1 Solve (put yours in exact, simplified form):

$$x^2 + 4x - 3 = 0$$

Ex. Your school's jazz band is selling CDs as a fundraiser. The total profit p depends on the amount x that your band charges for each CD. The equation $p = -x^2 + 48x - 300$ models the profit of the fundraiser. What is the least amount, in dollars, you can charge for a CD to make a profit of \$200?

We have solve quadratic equations that had 0, 1, or 2 solutions. The discriminant of a quadratic equation is the value of the expression $b^2 - 4ac$ and tells you how many solutions the equation will have.

When the discriminant is: positive = 2 solutions
zero = 1 solution
negative = 0 solutions

Ex. How many solutions does $5x^2 - 2x + 3 = 0$ have?

*Would a negative profit make sense in this problem?
Explain.

Ex. How many solutions does $-2x^2 + 5x = -13$ have?

2 How many solutions does the following equation have?

$$2x^2 - 3x + 7 = 0$$

3 You hit a golf ball into the air from a height of 1 in. above the ground with an initial vertical velocity of 85 ft/s. The function below models the height, in feet, of the ball at time t , in seconds. Will the ball reach a height of 115 ft? Be able to explain how you reached your conclusion.

$$h = -16t^2 + 85t + \frac{1}{12}$$

Yes

No

4 Using the same equation from the previous problem, will the golf ball ever reach a height of 110 ft? Be able to explain.

Yes

No