

Aim: How can we use the quadratic formula to solve quadratic equations?

Do Now:

The number of bacteria in a refrigerated food is given by $N(T) = 20T^2 - 20T + 120$, for $-2 \leq T \leq 14$ and where T is the temperature of the food in Celsius. At what temperature will the number of bacteria be minimal?



I – The Quadratic Formula

$$1) \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

The Quadratic Formula ...

$$2) \quad \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

For Quadratic Equations
 $ax^2 + bx + c = 0$

It's not that bad

3) Where does the quadratic equation come from?

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

**KEEP
CALM
AND USE THE
QUADRATIC
FORMULA**

$$ax^2 + bx + c = 0$$

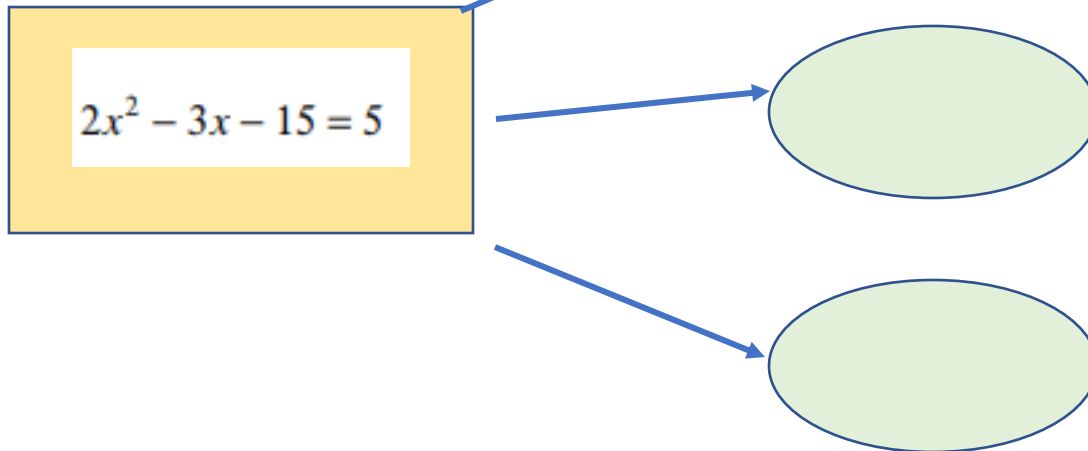
$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

What did I do here to the standard form of the equation?

Aim: How can we use the quadratic formula to solve quadratic equations?

II- Let's Use the Quadratic Formula (try all the methods to solve a quadratic equation)

1) Write at least three methods to solve



2) **Solve each equation with the quadratic formula.**

1) $m^2 - 5m - 14 = 0$

2) $b^2 - 4b + 4 = 0$

3) $2m^2 + 2m - 12 = 0$

4) $2x^2 - 3x - 5 = 0$

5) $x^2 + 4x + 3 = 0$

6) $2x^2 + 3x - 20 = 0$

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III- Online Challenge

<https://www.khanacademy.org/math/algebra/quadratics/solving-quadratics-using-the-quadratic-formula/e/quadratic-equation>

Homework # 10

- 1) A rectangular field is to be enclosed by 400 m of fence. What is the maximum area? What dimensions will give the maximum area?

- 2) Last year, talent show tickets were sold for \$11 each and 400 people attended. It has been determined that an increase of \$1 in ticket price would cause a decrease in attendance of 20 people. What ticket price would maximize revenue?

- 3) The sum of the squares of two consecutive even integers is 452. Find the integers.

- 4) A football is punted into the air. Its height h , in metres, after t seconds is given by the equation $h = -4.9t^2 + 24.5t + 1$.
 - a) How high is the ball after 1 second?
 - b) Find the maximum height of the ball to one decimal place.
 - c) When does the ball reach its maximum height?
 - d) When does the ball hit the ground?

Aim: How can we use the quadratic formula to solve quadratic equations?

- 5) The height, h , in feet of an object above the ground is given by $h = -16t^2 + 64t + 190$, $t \geq 0$ where t is the time in seconds. Find the time it takes the object to strike the ground and find the maximum height of the object.
- 6) The length of a rectangle is three more than twice the width. Determine the dimensions that will give a total area of 27 m^2 . What is the minimum area that this rectangle can have?

Solve each equation with the quadratic formula.

7) $4b^2 + 8b + 7 = 4$

8) $2m^2 - 7m - 13 = -10$

9) $2x^2 - 3x - 15 = 5$

10) $x^2 + 2x - 1 = 2$

Answers to Homework # 10

Please select the correct answers number for each question. There are more answers than questions. Answers may be repeated.

1) $\frac{7 \pm \sqrt{193}}{18}$

8) 15.50

2) $\frac{7 \pm \sqrt{73}}{4}$

9) 4, -5/2

10) 100 and 100

3) 9 and 3; no minimum

11) 20.6

4) 9 and 3; 27 is the minimum

12) 1, -3

5) 14, 16

13) 31.6

6) -1/2, -3/2

14) 5.98 and 254

7) 5.04

15) 2.5