

Aim: How can we solve verbal problems leading to a Quadratic Equation?

Do now: Complete the following 6 questions with your group. After you complete your work enter the answers into your www.mygradebook.com account.

1.

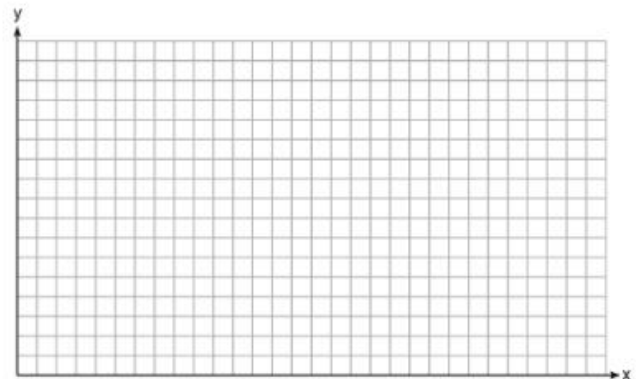
John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x , will they have the same amount of money saved? Explain how you arrived at your answer.

Question 2 is subdivided into questions
2a, 2b, and 2c

2.

A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \leq x \leq 150$.



Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

3.

Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6 . Do you agree with Amy's solutions? Explain why or why not.

4.

The height, H , in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

Determine, algebraically, how many seconds it will take for the object to reach the ground.

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5.

In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b .

6.

A student was given the equation $x^2 + 6x - 13 = 0$ to solve by completing the square. The first step that was written is shown below.

$$x^2 + 6x = 13$$

The next step in the student's process was $x^2 + 6x + c = 13 + c$.

State the value of c that creates a perfect square trinomial.

Explain how the value of c is determined.

Answers for Lesson 12B

1) Yes, he will score

2) No, he will not score

3) -4 and -6

4) 3 by dividing b by 2 and then

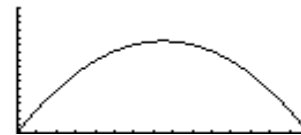
squaring it

5) Amy is correct

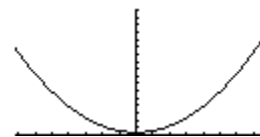
6) Amy is not correct

7) 7

8)



9)



10) 75 and 25

11) 48 and 3

12) 9 by dividing b by 2 and then squaring it

13) 4 and 6

Homework #12B

7.

A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

9.

A toy rocket is launched from the ground straight upward. The height of the rocket above the ground, in feet, is given by the equation $h(t) = -16t^2 + 64t$, where t is the time in seconds.

Determine the domain for this function in the given context. Explain your reasoning.

11.

Solve the equation $x^2 - 6x = 15$ by completing the square.

8.

How many real solutions does the equation $x^2 - 2x + 5 = 0$ have? Justify your answer.

10.

Janice is asked to solve $0 = 64x^2 + 16x - 3$. She begins the problem by writing the following steps:

$$\text{Line 1 } 0 = 64x^2 + 16x - 3$$

$$\text{Line 2 } 0 = B^2 + 2B - 3$$

$$\text{Line 3 } 0 = (B + 3)(B - 1)$$

Use Janice's procedure to solve the equation for x .

Explain the method Janice used to solve the quadratic equation.

12.

An Air Force pilot is flying at a cruising altitude of 9000 feet and is forced to eject from her aircraft. The function $h(t) = -16t^2 + 128t + 9000$ models the height, in feet, of the pilot above the ground, where t is the time, in seconds, after she is ejected from the aircraft.

Determine and state the vertex of $h(t)$. Explain what the second coordinate of the vertex represents in the context of the problem.

After the pilot was ejected, what is the maximum number of feet she was above the aircraft's cruising altitude? Justify your answer.

Answers to Homework #12B

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

1) -100

2) 60

3) 60 and 100

4) $\frac{2 \pm \sqrt{-16}}{2}$

5) $\frac{1}{8}$

6) None

7) $3 \pm 2\sqrt{6}$

8) 4

9) $0 \leq t \leq 4$

10) 256

11) (4, 9256) and 256

12) (0, 9256) and 4