

Sect. 7.4 Solving Problems Using Quadratic Equations

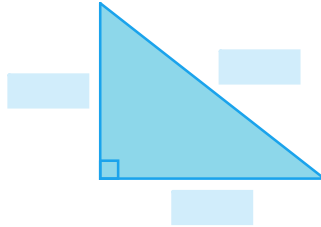
Example 1:

A right triangle has sides of length x , $2x + 4$, and $3x - 4$. Write a quadratic equation to determine the value of x . Is there more than one solution?

x

$2x + 4$

$3x - 4$

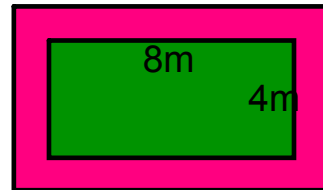
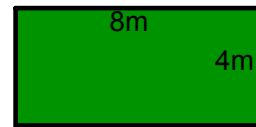


Inadmissible solutions:

- A root of an equation that does not lead to a solution that satisfies the original problem.
- The root may not be in the domain defined by the problem/ context.
- A root that does not mark sense in the context of the problem
- Some examples of situations where you may find inadmissible roots are negative values for:
 - > times
 - > heights,
 - > lengths.
- Think about the context -- temperatures can be negative.

Example 2:

A rectangular lawn measures 8m by 4m. Joe wants to put a flower bed border of uniform width completely surrounding the lawn. The combined area of the lawn and the flower bed is 165m^2 . Algebraically determine the width of the flower bed?



Example 3:

A baseball is thrown from an initial height of 3m and reaches a maximum height of 8m 2 seconds after it was thrown. Algebraically determine at what time the ball hits the ground?

Example 4:

Algebraically determine two consecutive whole numbers such that the sum of their squares is 265.

Example 5:

The sum of two numbers is 13 and their product is -300.
Algebraically determine the numbers.

Example 6:

A diver's path when diving off a platform is given by
 $d = -5t^2 + 10t + 20$, where d is the distance above water (in feet)
and t is the time from the beginning of the dive (in seconds).
Algebraically determine the following:

- a) How high is the diving platform?
- b) After how many seconds is the diver 25 feet above the water?
- c) When does the diver enter the water?

In Summary

Key Ideas

- A function, a graph, or a table of values can represent a relation. Use the form that is most helpful for the context of the problem.
- Depending on the information that is given in a problem, you can use a quadratic function in vertex form or in standard form to model the situation.

Need to Know

- A problem may have only one admissible solution, even though the quadratic equation that is used to represent the problem has two real solutions. When you solve a quadratic equation, verify that your solutions make sense in the context of the problem.

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Attachments

7s4e2 finalt.mp4

7s4e3 finalt.mp4

7s4e4 finalt.mp4