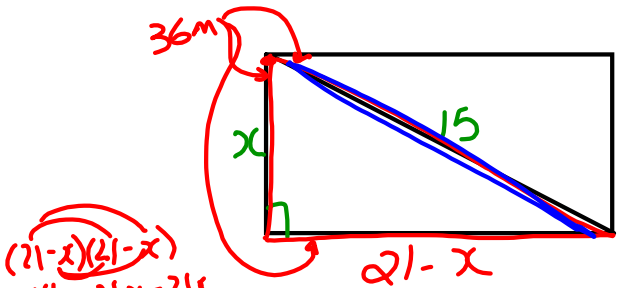
Unit 6: Solving Quadratic Equations

Day 9: Solving Word Problems - A Random Mix

Example:

Nancy walks 15m diagonally across a rectangular field. She returns to her starting position by walking along the outside of the field. The total distance she walks is 36 m. What are the dimensions of the field?



15 of them on hyp
∴ 21 m left

Let x represent the width of the field.

Let 21-x represent the length of the field.

$(21-x)(21-x)$
$441 - 21x - 21x$

$a^2+b^2=c^2$

$(x)^2+(21-x)^2=(15)^2$

$x^2+441-42x+x^2=225$

$2x^2-42x+216=0$

$2(x^2-21x+108)=0$ (×108, ÷21)

$2(x-12)(x-9)=0$

$x-12=0$
$x=12$
width = 12 m
length = 21 - 12
= 9m

$x-9=0$
$x=9$
width = 9m
length = 21 - 9
l = 12m

OR

∴ the field is 9m x 12m.

MPM2DI UNIT 6: QUADRATIC WORD PROBLEMS PART 4b

SOLVING QUADRATIC WORD PROBLEMS
– A RANDOM MIX –

EXAMPLE

Nancy walks 15 *m* diagonally across a rectangular field. She then returns to her starting position along the outside of the field. The total distance she walks is 36 *m*. What are the dimensions of the field?

ADDITIONAL QUESTIONS

1. A rectangular picture frame measures 20 *cm* by 30 *cm*. A matte is made of uniform width to go inside the frame and make a nice border for the picture. The area of the matte is to be equal to the area of the picture. What is the width of the matte?

2. Farmer Tom wants to fence in a rectangular area that has one side bordered by a stream. If he has 80 *m* of fence, what are the dimensions and the maximum area he can enclose?

3. Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height could be modeled by the equation $h = -16t^2 + 16t + 480$, where *t* is the time in *seconds* and *h* is the height in *feet*.
   a) How long did it take for Jason to reach his maximum height?
   b) What was the highest point that Jason reached?
   c) After how many *seconds*, did Jason hit the water?

4. A sporting goods store sells 90 ski jackets in a season for $200 each. They determined that each $10 decrease in the price would result in five more jackets being sold. Find the number of jackets sold and the selling price to give revenues of $17 600 from sales of ski jackets.

5. Mr. Jackson had a rectangular shaped garden where the length was 2 *m* less than twice the width. If the area of the garden was 420 *square metres*, find the dimensions of the garden.

6. The hypotenuse in a right triangle is 13 *cm*. Of the other two sides, one is 7 *cm* longer than the other. Determine the lengths of those two sides.

7. While playing catch with his grandson yesterday Tim threw a ball as hard as possible into the air. The height, *h* in *feet* of the ball was given by $h = -16t^2 + 64t + 8$ where *t* is in *seconds*.
   a) How long did it take for the ball to reach his grandson's glove if he caught it at a height of 3 *ft*?
   b) What is the maximum height of the ball?

ANSWERS

1. 3.49 *cm*
2. 20 *m* x 40 *m*, A = 800 m^2
3. a) 0.5 *sec* b) 484 *ft* c) 6 *sec*
4. $160 or $220
5. 15 *m* x 28 *m*
6. 5 *cm*, 12 *cm*
7. a) 4.03 *sec* b) 72 *ft*