

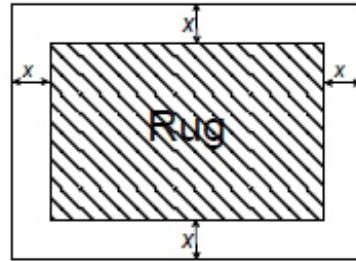
Quadratic Equation/Quadratic Function Problems (Max and Mins) Mixed

1

A skier decides to jump a ramp. The path of the jump can be represented by the quadratic relationship $h(t) = -6t^2 + 12t + 1$ where h represents the height above the ground in metres, and t represents time after leaving the ramp in seconds. Algebraically determine the maximum height reached by the jumper and the time at which this maximum height occurs.

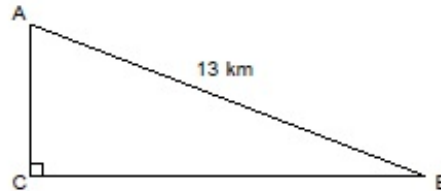
2

A rectangular rug 4 m by 2 m is placed in a room with floor area 24 m^2 such that a strip of bare floor of uniform width surrounds the rug. Set up a function which models this situation and use it to algebraically determine the width of the strip of bare floor.



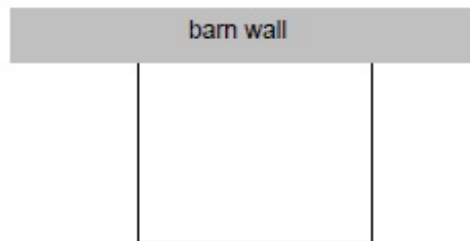
3

A person leaves house A and walks to house B and then to house C as shown below. The distance between houses B and C is 7 km more than the distance between houses A and C. Algebraically determine an equation to model this situation and use it to find the direct distance between houses A and C.



4

A farmer is constructing a pig pen and is using his barn wall as one side of the pen. If he has 32 m of fencing and wants to use it all, write the quadratic function that models the area of the pig pen, and use it to determine the maximum area of the pen.



5

A baseball player hits a ball into the air. The ball's height above the ground, in metres, t seconds after being hit, is approximated by $h(t) = 1 + 13t - 5t^2$. Algebraically determine the time when the ball first reaches a height of 9 m.

6 If $3x^2 - 8x + 8 = 0$

A) find the discriminant and determine the nature of the roots

B) How many x-intercepts does the graph have?

7 If $4x^2 + kx + 3 = 0$

A) determine the value of k if $x = 2$ is a root

B) determine the value of k if $x = -3$ is a root