Problem Solving with Quadratic Equations

Some problems in mathematics can be solved by the following procedure:

i) Introduce a variable to represent an unknown value.

ii) Form a quadratic equation from the given information.

iii) Solve the quadratic equation using the methods in this lesson.

iv) State the solution to the problem.

In this section we will consider fairly routine problems. This topic will be extended in a higher level math course.

The area of a rectangular sheet of paper is 300 cm^2. The length is 5 cm more than the width. Form a polynomial equation and solve it to determine the perimeter of the rectangular sheet.

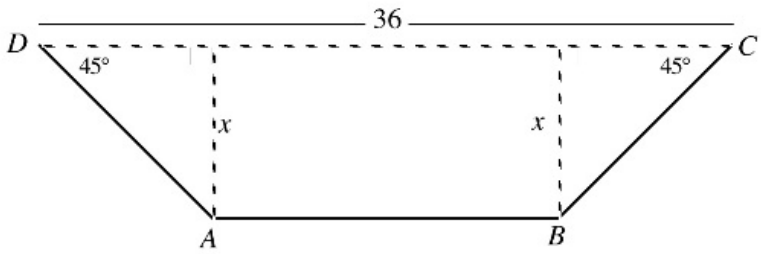
let x = width
$x+5$ = length

$A = l \times w$
$300 = x(x+5)$
$300 = x^2+5x$
$0 = x^2+5x-300$
$0 = (x-15)(x+20)$
$x = 15, -20$
no negative dimensions

$\therefore$ width = 15cm
length = 15+5 = 20cm

$P = 2(l+w)$
$= 2(20+15) = 70\text{cm}$

The diagram shows the cross-section of a water trough whose sloping sides AD and BC make an angle of $45°$ with the horizontal. The length $DC = 36$ cm.



a) Show that the area of the cross-section is $x(36-x)$ cm^2.

questions 5, 8