Review Pg. 392 #19b – use completing the square

U5L5 – 4.7 – The Quadratic Formula

Students will :
see the development of the quadratic formula to solve quadratic equations that cannot be factored
use the quadratic formula to solve quadratic equations

The height of a ball tossed in the air is given by $h = -5t^2 + 8t + 15$. Find the time(s) at which the height is 0m.
Since this quadratic can't be factored the only method we could use would be to complete the square as follows:

Rather than have to do all of this work over and over each time we have a quadratic that can't be factored let's develop a formula once and use it for all of these kinds of situations!

We will start with the general quadratic equation in standard form:

$$ax^2 + bx + c = 0$$

We will do Part 3 on pg. 398 together

Examples

1. Solve:

a) $2x^2 + 5 = 167$

b) $4(2x - 1)^2 = 36$

2. A digital sensor records the height of a baseball after it is hit into the air. Quadratic regression on the data gives the quadratic relation $y = -4.9x^2 + 20.58x + 0.491$. How long is the ball in the air?

3. Dances at the community centre produce revenue; $R = -60t^2 + 600t$, where R is the revenue and t the ticket price in dollars.
   The profit equation is P = R – E, where E is the expense equation.
   E = 1000 – 90t models the expenses for each dance.

a) Find the break-even price for tickets.

b) Find the maximum profit and the ticket price that yields this profit.

4. Determine how many roots each equation has.

a) $-5x^2 + 8x - 10 = 0$

b) $2(x - 7)^2 - 12 = 0$

Read the Key Ideas on pg. 399
Ex. Pg.403 – 407 #(1 – 6)alt,10,11alt,12,13,16