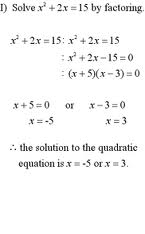
Numbers that could make f(x) = 0 are of the form p/q, where p is a factor of the constant term and q is a factor of the leading coefficient

**4.1 Solving Polynomial Equations**



Recall how we solve quadratic equations by looking at the textbox on the left.

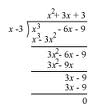
We will use similar steps for solving polynomial equations of degree 3 and 4.

**Example 1:** Determine the solution to

**Step 1:** Bring everything to one side just as you would with a quadratic equation so that one side is 0.

**Step 2:** Factor using whatever method(s) possible – factor by grouping, factor theorem and long division, quadratic formula, etc.

1. Factor theorem and Long division

[](http://www.google.ca/imgres?q=finding+the+roots+intercepts+of+a+cubic+function+with+factoring&start=126&hl=en&biw=1260&bih=668&tbm=isch&tbnid=Aa2PhRxCF8mEoM:&imgrefurl=http://www.exampaper.com.sg/questions/a-maths/a-premium-functions-question-on-an-overcast-day&docid=8xziridvXwRo2M&imgurl=http://www.exampaper.com.sg/blog/wp-content/uploads/2007/09/factorizing-cubic-function.gif&w=120&h=140&ei=4fV9ULDjN8aHywHM7IGwDw&zoom=1&iact=hc&vpx=1058&vpy=297&dur=603&hovh=112&hovw=96&tx=126&ty=68&sig=105752883712364976201&page=7&tbnh=112&tbnw=96&ndsp=27&ved=1t:429,r:42,s:100,i:130)

1. Quadratic formula

No solutions since determinant is less than zero.

**Step 3:** Determine zeroes/roots – in doing so we will find the solutions to the equation.

**Example 2:** Solve . Hint: Follow the same steps as above.

**Check your solution on page 198 of the textbook.**

Company A’s cost can be found using

C=30 +0.02n

Company B’s cost can be found using

C=50 + 0.01n

When will the two companies charge the same?

30 + 0.02n =50 + 0.01n

Then solve for n.

**Example 3:** The paths of two orcas playing in the ocean are modelled by two scientists. The first orca’s path could be modelled by the equation and the second by, where h is their height and t is the time in seconds during the first 8 seconds of play. Over the first 8 seconds, when are the two orcas at the first height?

**Step 1:** Equate the two to find when their heights are the same as was done in the example from grade 9 on the right.

**Step 2:** As we did with quadratic equations, move everything to one side so that one side equals zero.

**Step 3:** Factor (use the factor theorem – hint f(4) =0)

**Step 4:** Use factor theorem again to factor the quotient – hint f(9) = 0

**Step 5:** Use quadratic formula to factor the last bit.

**Step 6:** Find the zeros/roots – these will be the solutions to the problem.

**Check your answer on page 201 in the textbook.**

**Example 4:** Solve each.

1. b) = 0 c) d)

**See page 202-203 for similar examples if you need help!**

**Homework: pg 204 #6-15**

Numbers that could make f(x) = 0 are of the form p/q, where p is a factor of the constant term and q is a factor of the leading coefficient

Explain what this means if you want to use factor theorem on

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