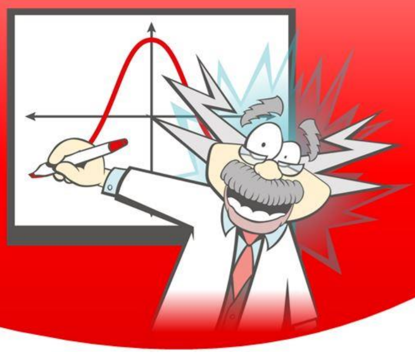

Factor & Remainder Theorem

Each of the questions included here can be solved using either the TI-nspire CX or CX CAS.

Scan the QR code or use the link: http://bit.ly/FactorRemainder

Question: 1.

Given $f(3)=0$, determine one of the factors of the polynomial $f(x)$.

Question: 2.

If $f(x)=x^3-6x^2+3x+13$, change the value of the constant (13) so that $(x-5)$ is a factor of $f(x)$.

Question: 3.

If $f(x)=g(x)\cdot h(x)$ and $g(4)=0$, determine the value of $f(4)$.

Question: 4.

Given that $(x-5)$ is a factor of $f(x)=x^3+bx^2-11x+30$, determine the value of b.

Question: 5.

When $f(x)=x^3-3x^2-x+3$ is divided by $d(x)=x^2-1$ the result is a linear function $q(x)$. Determine the expression for this linear function.

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Answers

Question 1

Since $f(3)=0$ then $(x-3)$ is a factor of $f(x)$. [Factor Theorem]

Question 2

This question is covered in the video (6:20), can be related to the numerical outcomes where the remainder tells us how far our dividend is from becoming a multiple. So if $(x-5)$ is to be a factor of $f(x)$ then we need: $f(5)=0$.

Currently $f(5)=3$, therefore $f(x)=x^3-6x^2+3x+10$ results in $f(5)=0$ making $(x-5)$ a factor of $f(x)$.

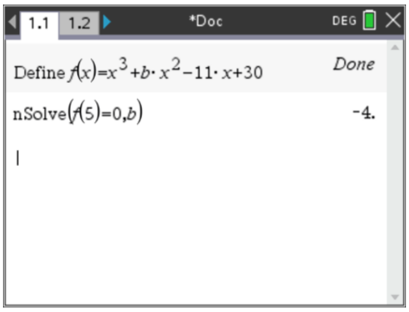
Question 3

This question is a direct extension of applying understanding of numbers. As $f(x)=g(x)\cdot h(x)$ then it follows that any factors of $g(x)$ and $h(x)$ will automatically be factors of $f(x)$. From the factor theorem so it follows that $f(4)=0$.

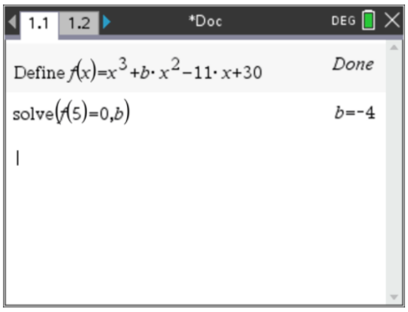
Question 4

TI-nspire CX and CX CAS series

The problem can be solved directly or by first defining the function. The problem could also be solved graphically, but this would be less time efficient.



TI-nspire CX



TI-Nspire CX CAS

Question 5

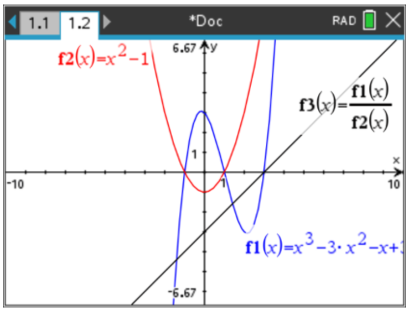
TI-nspire CX and CX CAS series

The problem can be solved directly. The coefficient of x^3 is 1, therefore our linear factor will be of the form $(x-a)$.

We know the product of the factors will be equal to: x^3-3x^2-x+3, so it follows that the remaining factor is $(x-3)$.

This result could be checked by expanding $(x^2-1)(x-3)$ or by evaluation of $f(3)$.

An alternative is to graph the original function (dividend) and the divisor, the result is the linear quotient. The equation to this quotient can be determined easily from the graph (see below): $f_3(x)=x-3$.



TI-nspire CX and CX CAS

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