

Programming the TI-83/84 Plus FACPROP

Note Title

2014-08-10

Factoring polynomials can be tricky and time consuming. You can graph the function and search for zeros. Or you can use this program that uses the factor property for its algorithm.

Recall: $a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$

Zeros of the function must be factors of a_0 divided by the factors of a_n . **Warning:** This program does not determine repeated roots and may show zeros more than once. You can use the roots to reduce the polynomial so that you can use other tools such as the quadratic formula to find the irrational roots.

```
PROGRAM: FACPROP
:abs(Y1(0))÷C
:If C=0
:Then:Disp "FACT
OR OUT VAR"
:Return:End
:C→N
:PRGMFACTSUB
:L1→L2
:Input "A ",A
:abs(A)→N
:PRGMFACTSUB
:L1→L3
:ClrList L1:0→H
:For(I,1,dim(L2))
)
:For(J,dim(L3),1
,-1)
:L2(I)/L3(J)→K
:If Y1(K)=0
:Then:H+1→H
:K→L1(H)
:End
:If Y1(-K)=0
:Then:H+1→H
:-K→L1(H)
:End:End:End
:Disp "RATIONAL
ZEROS"
:Disp L1
```

This program is far too large for me to provide the keystrokes. But I may provide a video later.

Here is an example. I've entered the polynomial in factored form so that you can tell it's working.

```
Plot1 Plot2 Plot3
√Y1=(X-1)(X+4)(2
X-3)(X²-6)
√Y2=
√Y3=
√Y4=
√Y5=
√Y6=
```

```
PRGMFACPROP
A 2
RATIONAL ZEROS
(1 1 1.5 -4 -4)
Done
```

enter a_n

Extra zeros.

Zeros List

List of a_0 factors

List of a_n factors.

L1	L2	L3	1
1 1.5 -4 -4 -----	1 2 4 6 8 10	1 2 -----	
L1(1)=1			

We see that $1 \div 1 = 1$
 $2 \div 2 = 1$

≠

$$-4 \div 1 = -4$$

$$-8 \div 2 = -4$$

gives us the extra zeros.

Recall that we must test \pm factors.

This program requires you to factor out the variable so that there is a constant term!

eg) $x^5 - 3x^4 + 6x^2 = x^2(x^3 - 3x^2 + 6)$

↓ Enter this as your function.
 you have $x=0$ as a double root.