

"Sheet #220"

Group Members: _____

FINDING A ZERO WITHOUT A CALCULATOR: A CUBIC POLYNOMIAL.

You are charged with finding a zero of the function

$$f(x) = 54x^3 - 40x^2 + 76x - 30.$$

You may not use a calculator to solve this problem. Put the TI-83 away!

a, Explain why $f(x)$ has at least one zero.

b, Complete the table, Make a sketch!

x	f(x)
1	
0	
-1	

c, Between what x-values is a good place to look for zeros? _____

Explain a "good enough" method, that does not involve a lot of computation, for estimating the zero to 1 decimal. Give your estimate.

Hint: lines or proportion reasoning may be useful.

FIRST ESTIMATE

$x \approx$ _____
(1 decimal)

d, A reliable source tells you that the function $f(x)$ is concave up from $x=0.25$ to $x=1.00$.

How could this knowledge be used to improve your estimate? Explain.

What is your "final answer to the question c?"

UPDATED ESTIMATE

$x \approx$ _____

e, You get hold of a non-graphing CALCULATOR. How would you find the zero to 2 decimals?

f, If you get this far, ask for permission to use a TI-83 calculator to find the zero to 3 decimals. $x \approx$ _____

PERMISSION (TEACHER'S INITIALS)	
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How did you do it?

g, then compute $x^2 \approx$ _____

MAKE A CONJECTURE FOR THE EXACT ZERO, $x =$ _____

CHECK YOUR ANSWER USING $f(x)$.