Detective Zero

Name:___________________________

Over the past few days you've learned a lot about finding both real and imaginary zeros of a polynomial function. Today we're going to put everything together! Use the clues given to answer the questions below. Put those graphing calculators away because this one's all you!

Let $f(x) = x^4 - 2x^3 + 6x^2 - 32x + 40$.

Clue 1: A table of selected values

x	$f(x)$
-2	160
-1	81
0	40
1	13
2	0
3	25

Clue 2: $f(x) \geq 0$ for all *x*.

Clue 3: $f(x)$ has at least one imaginary zero.

1. How many real zeros does $f(x)$ have? How many imaginary zeros does $f(x)$ have? How do you know?

2. List one of the real zeros. Explain how you can figure out the multiplicity.

3. Show how you can find the remaining zeros.

4. Write $f(x)$ in factored form.

5. Were all the clues necessary to find the zeros? Explain why or why not.

CALC MEDIC

Section 2.5—Connecting Zeros Across Multiple Representations

Important Ideas:

Check Your Understanding!

1. Let $g(x) = -x^4 - 2x^3 - 22x^2 - 50x + 75$.
   a. Use your graphing calculator to find the real zeros of $g(x)$. State their multiplicity.

   b. Find the remaining zeros.

   c. Write $g(x)$ in factored form.

2. (Multiple Choice) Let $h(x)$ be a polynomial with 3 real zeros and two imaginary zeros. Which of the following could be the equation of $h(x)$?

   A) $h(x) = (x-2)(x-5)(x+7)(x^2 - 7x + 12)$

   B) $h(x) = (x-3)^3(x^2 - 2x + 2)$

   C) $h(x) = x^6 - 5x^3 + 3x^2$

   D) $h(x) = (x^2 - 9)^2(x - (2 + 3i))$