Quiz 3
Monday, March 15, 2010

NO CALCULATORS. Show your reasoning. Use standard notation correctly.

1. (14 points) Find all of the complex zeros of the polynomial and state the multiplicity of each. (You might not need all of the blanks provided.)

(a) \( f(x) = 4x^2(x - 5)^3(x + \frac{1}{3}) \)

\[ \begin{array}{cc}
0 & \text{is a zero of } f \text{ of multiplicity 2} \\
5 & \text{is a zero of } f \text{ of multiplicity 3} \\
-\frac{1}{3} & \text{is a zero of } f \text{ of multiplicity 1} \\
\end{array} \]

(b) \( g(x) = x^4 - 24x^2 - 25 \) ("quadratic type"

\[ = (x^2 - 25)(x^2 + 1) \]

\[ = (x - 5)(x + 5)(x - i)(x + i) \]

\[ \begin{array}{cc}
5 & \text{is a zero of } g \text{ of multiplicity 1} \\
-5 & \text{is a zero of } g \text{ of multiplicity 1} \\
i & \text{is a zero of } g \text{ of multiplicity 1} \\
-i & \text{is a zero of } g \text{ of multiplicity 1} \\
\end{array} \]

2. (14 points) Let \( f(x) = -\frac{1}{2}(x - 2)(x - 2)(x + 1) \).

(a) Determine the end behavior of the graph \( y = f(x) \).

Since \( f(x) = -\frac{1}{2}x^3 + \ldots \)

(b) Find the \( x \)-intercepts of \( y = f(x) \). Express each as an ordered pair.

\[ f(x) = 0 \]

\[ -\frac{1}{2} (x - 2)(x - 2)(x + 1) = 0 \]

\[ (x - 2)^2 = 0 \quad \text{or} \quad x + 1 = 0 \]

\[ x = 2 \quad \text{or} \quad x = -1 \]

\[ (2, 0) \quad (-1, 0) \]