

MATH 110 - SECTION 8

Quiz #3

Solutions

1. Use the fact that $x = 2$ is a zero of $x^3 - 2x^2 - x + 2$ to factor it completely.

$$\begin{array}{r} x^2 \quad - 1 \\ x - 2 \overline{) x^3 - 2x^2 - x + 2} \\ \underline{-x^3 + 2x^2} \\ -x + 2 \\ \underline{x - 2} \\ 0 \end{array}$$

So $x^3 - 2x^2 - x + 2 = (x - 2)(x^2 + 1) = (x - 2)(x + 1)(x - 1)$ and $x = 2, -1, 1$.

2. Give an example of a polynomial of degree n with less than n roots.

Solution 1: Let $f(x) = x^2 + 1$. This is a degree 2 polynomial, but it has no roots at all.

Solution 2: Let $f(x) = (x + 42)^n$, then this is a degree n polynomial for n we choose, but it only has 1 zero.

3. Give an example of a polynomial with no turning points.

Solution 1: Let $f(x) = x$. A straight line has no turning points.

Solution 2: Let $f(x) = x^3$. As we can see from graphing it, it slows around down around $x = 0$ but never switches from increasing to decreasing.