

Math 1513 - College Algebra

Quiz #11 - 2008.11.13

Solutions

Plot the function $f(x) = -2x^4 - x^3 + 4x^2 + 3x$ using all the tools we have discussed in class.

First, notice that we can factor a $-x$ out of the whole expression:

$$\begin{aligned} f(x) &= -2x^4 - x^3 + 4x^2 + 3x \\ &= -x(2x^3 + x^2 - 4x - 3) \end{aligned}$$

Next, we notice that $x = -1$ is a root of $2x^3 + x^2 - 4x - 3$, so we do some long division:

$$\begin{array}{r} - x - 3 \\ x+1 \overline{) 2x^3 + x^2 - 4x - 3} \\ \underline{-2x^3 - 2x^2} \\ -x^2 - 4x \\ \underline{x^2 + x} \\ -3x - 3 \\ \underline{3x + 3} \\ 0 \end{array}$$

So now $f(x) = -x(x+1)(2x^2 - x - 3)$. We can factor the quadratic without too much trouble so we finally write $f(x)$ in fully factored form as $f(x) = -x(x+1)^2(2x-3)$.

So we have roots at $x = 0$, $x = -1$ and $x = \frac{3}{2}$ with multiplicity 1, 2 and 1 respectively. We also get that the function is large negative for both large negative values of x and large positive values of x .

We also have that the y -intercept is zero since $x = 0$ is a root.

We now put all this together in a coherent picture on the next page!

The Graph of $f(x)$

