Learning Goal Check!

Factory fully $f(x) = x^3 + 2x^2 - 5x - 6$

Questions from Homework?

Lesson 3.06 - Factoring Polynomials Day 2

Learning Goals:

- I can determine a factor of a polynomial.
- I can factor polynomials.
- I can state the Factor Theorem and the Remainder Theorem and apply it

$$
\begin{array}{r}
16x^2+16x+3 \\
x-1\,\overline{)\,16x^3+0x^2-13x-3} \\
\underline{16x^3-16x^2} \\
16x^2-13x \\
\underline{16x^2-16x} \\
3x-3 \\
\underline{3x-3} \\
0
\end{array}
$$

Rational Roots Theorem:

If P(x) is a polynomial with integer coefficients and if $\frac{p}{q}$ is a zero of P(x) ($P(\frac{p}{q}) = 0$), then p is a factor of the constant term of P(x) and q is a factor of the leading coefficient of P(x).

$3x^3 - 2x^2 + 5x - 20$

factors of 20 $\rightarrow \pm 1, 2, 4, 5, 10, 20$

factors of 3 $\rightarrow \pm 1, 3$

Example 1:

Factor fully $x^4 - 2x^3 - 7x^2 + 8x + 12$

possible roots

$\pm 1, \pm 2, \pm 3, \pm 4, \pm 6, \pm 12$

$x = -1 \rightarrow 1 + 2 - 7 - 8 + 12$

$= 0$

-1	1	-2	-7	8	12
		-1	3	4	-12
	1	-3	-4	12	0

$(x+1)(x^3 - 3x^2 - 4x + 12)$

$2^3 - 3(2)^2 - 4(2) + 12$

$= 0$

2	1	-3	-4	12
		2	-2	-12
	1	-1	-6	0

$(x+1)(x-2)(x^2 - x - 6)$

$\therefore (x+1)(x-2)(x+2)(x-3)$

Example 2:

Sketch $y = -2x^4 + 6x^2 + 4x$

$= -2x(x^3 - 3x - 2)$

$-1 \mid 1 \quad 0 \quad -3 \quad -2$

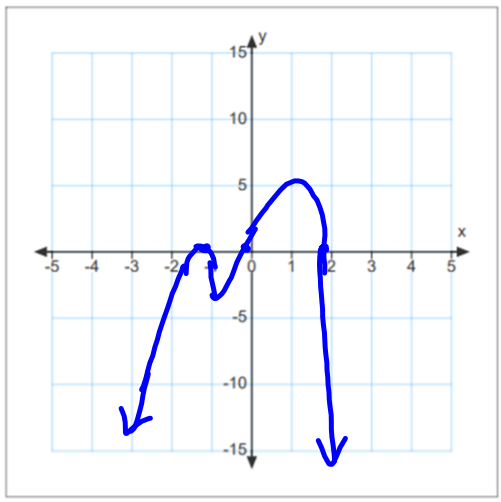
$\quad\quad -1 \quad 1 \quad 2$

$1 \quad -1 \quad -2 \quad 0$

$-2x(x+1)(x^2 - x - 2)$

$= -2x(x+1)(x-2)(x+1)$

$= -2x(x+1)^2(x-2)$



negative

degree 4

$x \to \infty, \; y \to -\infty$

$x \to -\infty, \; y \to -\infty$

roots: 0, -1 order 2, 2

y-int : $-2(0)(0+1)^2(0-2)$

$= 0$

Homework

Complete pg.177 #6de, 7e, 8e, 9, 10, 14, 16

Challenge Yourself! #17

Once the core work for today is done, for those of you who would like to be challenged...

http://courseware.cemc.uwaterloo.ca/8/assignments/279/0

Factor the following fully.