Alg2

April 9, 2012

Get out your homework - pg 485

41) $6x^3 - 24x^2 - 42x + 60$

$= \cancel{2}\,6(x-5)(\ ?\ )(\ ?\ )$

5	3	−12	−21	30
		15	15	−30
	3	3	−6	0

$3x^2 + 3x - 6$

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

$= 3(x+2)(x-1)$

~~4/9~~ - Finding Rational Zeros

4/10

Yesterday, one factor or solution was given.
Today you will be finding ALL of them yourselves.

The Rational-Zero Test: Given a polynomial f(x) with integer coefficients, EVERY rational zero will be in the form

$$\frac{p}{q} = \frac{\text{factor of the constant}}{\text{factor of the leading coefficient}}$$

Find all possible rational zeros of the function.

$$f(x) = 3x^3 + 26x^2 - 36x + 9$$

$\pm 1, \pm 3$ $\qquad$ $\pm 1, \pm 3, \pm 9$

$\frac{p}{q} = \{\pm 1, \pm 3, \pm 9, \pm \frac{1}{3}\}$ $\qquad$ $\frac{p}{q} = \pm\{1, 3, 9, \frac{1}{3}\}$

Find all possible rational zeros for each function then find all the actual rational zeros.

$$f(x) = \overset{1,5}{5}x^3 + 21x^2 - 21x - \overset{1,5}{5}$$

$$\frac{p}{q} = \pm\left\{1, \frac{1}{5}, 5\right\}$$

1	5	21	-21	-5
		5	26	5
	5	26	5	0

$$\boxed{\left\{1, -\frac{1}{5}, -5\right\}}$$

$$5x^2 + 26x + 5 = 0$$

$$(5x+1)(x+5) = 0$$

$5x+1=0$
$-1 \quad -1$
$5x=-1$
$x=-\frac{1}{5}$

$x+5=0$
$-5 \quad -5$
$x=-5$

$$f(x) = 2x^3 - 5x^2 - 30x - 24$$

$\frac{p}{q} = \pm\{1, 2, 3, 4, 6, 8, 12, 24, \frac{1}{2}, \frac{3}{2}\}$

	2	−5	−30	−24
−2	2	−9	−12	0

only rational answer

$2x^2 - 9x - 12 = 0$

$(2x \quad)(x \quad) = 0$

does not factor so . . . these will not be rational.

−3	2	−5	−30	−24
		−6	33	−9
	2	−11	3	−33

alternating signs is a lower limit

$x = -2$

Find all possible rational zeros for each function then find all the actual zeros.

$$f(x) = x^3 - 9x^2 - 42x - 18$$

1, 2, 3, 6, 9, 18

	1	−9	−42	−18
3	1	−6	−60	−198
1	1	−8	−50	−68
−2	1	−11	−20	22
−6	1	−15	48	Really big neg.
−3	1	−12	−6	0

$x^2 - 12x - 6 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{12 \pm \sqrt{144 - 4(1)(-6)}}{2}$$

$$= \frac{12 \pm \sqrt{144 + 24}}{2}$$

$$= \frac{12 \pm \sqrt{168}}{2}$$

$$= \frac{12 \pm 2\sqrt{42}}{2}$$

$$= 6 \pm \sqrt{42}$$

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4 · 42

$$x = \{6 \pm \sqrt{42}, -3\}$$

$$f(x) = 2x^3 - 15x^2 + 23x + 10$$

Homework

Page 491 ~~#7-30 all~~

#7-26, 30 all

Due Wednesday

(Tomorrow)