1.2b The Factor Theorem

Note Title 11/09/2012

Determine the remainder when $3x^4+7x^3-x^2+14x-3$ is divided by

a) $x-1$

$3(1)^4+7(1)^3-(1)^2+14(1)-3$

$= 20$

(NOT A FACTOR)

b) $x+3$

$3(-3)^4+7(-3)^3-(-3)^2+14(-3)-3$

$= 0$

(IS A FACTOR)

The factor theorem:

If $P(a)=0$ then $x-a$ is a factor.

54

2 27

3 9

3 3

Once we have a factor we can divide it out to find other factors.

Factor fully.

$2x^3-3x^2-3x+2$ Try factors of 2 ($\pm 1, \pm 2$)

$2(-1)^3-3(-1)^2-3(-1)+2$

$= 0$

So $x+1$ is a factor

-1	2	-3	-3	2
		-2	5	-2
	2	-5	2	0

$2x^2-5x+2$

So $2x^3-3x^2-3x+2=(x+1)(2x^2-5x+2)$

Now factor $2x^2-5x+2$

$2x^2-4x-x+2$

$2x(x-2)-1(x-2)$

$(x-2)(2x-1)$

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

* Can check by expanding :)

Factor fully.

$$2x^3 + 3x^2 - 11x - 6$$

Try $\pm 1, \pm 2, \pm 3, \pm 6$