1.2a The Remainder Theorem

Note Title 10/09/2012

Review:

Factor fully $2x^3-3x^2-14x$

$x(2x^2-3x-14)$

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

$x[2x(x+2)-7(x+2)]$

$x(x+2)(2x-7)$

So if you divide $2x^3-3x^2-14x$ by x, $x+2$ or $2x-7$ you should get a remainder of zero

If you divide by anything that isn't a factor you get a nonzero remainder

For $P(x)=2x^3-3x^2-14x$, evaluate

a) $P(0)$

$=2(0)^3-3(0)^2-14(0)$

$=0$

b) $P(-2)$

$=2(-2)^3-3(-2)^2-14(-2)$

$=-16-12+28$

$=0$

c) $P(1)$

$=2(1)^3-3(1)^2-14(1)$

$=2-3-14$

$=-15$

The Remainder Theorem:

When $P(x)$ is divided by $x-a$, the remainder is $P(a)$

Using the division statement:

$P(x)=Q\times\boxed{D}+R$

$\Rightarrow P(x)=Q(x-a)+R$

$P(a)=\cancel{Q(a-a)}+R$
$\quad\quad\; 0$

$\therefore P(a)=R$

$\Rightarrow$ means implies

$\therefore$ means therefore

Find the remainder when $3x^3-4x^2+2x-1$ is divided by $x+2$.

$P(-2)=3(-2)^3-4(-2)^2+2(-2)-1$

$=-24-16-4-1$

$=-45$