Sample Paper 7: Paper 1

Question 4 (25 marks)

Using the lining up method, a cubic equals a quadratic by a linear.

$x^3+3px^2+3qx+r=(x^2-px+q)(x+t)$

$x^3+3px^2+3qx+r=x^3+tx^2-px^2-ptx+qx+qt$

$x^3+3px^2+3qx+r=x^3+(t-p)x^2+(q-pt)x+qt$

Question 4 (a)

Lining up the coefficients gives you three equations. Replace t from equation (**1**) in the other equations.

$3p=t-p.....(\mathbf{1})$	$3q=q-pt.....(\mathbf{2})$	$r=qt.....(\mathbf{3})$
$4p=t$	$3q=q-p(4p)$	$r=q(4p)$
	$2q=-4p^2$	$r=4pq$
	$q=-2p^2..(\text{i})$	

Question 4 (b)

Result (i) is proved under equation (**2**).

To prove result (ii) replace q under equation (**3**).

$r=4pq=4p(-2p^2)=-8p^3...(\text{ii})$

Question 4 (c)

$x^3+3px^2+3qx+r=(x^2-px+q)(x+4p)$

$\Rightarrow x^3+3px^2+3qx+r=(x^2-px-2p^2)(x+4p)=(x-2p)(x+p)(x+4p)=0$

$\therefore x=-4p,\ -p,\ 2p$