

Logarithmic derivatives of polynomials

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$$\frac{p}{q} = \frac{u'}{u} \Rightarrow$$

$$\begin{aligned} \sum a_i &= u \\ \sum a_i &= u \\ \sum a_i &= u \end{aligned}$$

$$(vq)' = v'q$$

$$u = \prod (x - \lambda_i) \quad \log u = \sum \log(x - \lambda_i)$$

$$\frac{u'}{u} = \sum \frac{1}{x - \lambda_i} \stackrel{?}{=} \frac{f}{q}$$

$$\frac{p}{q} = \sum \frac{a_i}{x - \beta_i}$$