IIT Madras

ONLINE DEGREE

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In this question we have 3 polynomials, $P(x), Q(x)$ and $R(x)$ and their degrees are given to be 2, 3 and 4 respectively. Which are the most suitable, although not necessarily exact representation of $h(x)$ where $h(x)$ is a polynomial in x and it is given as $\frac{P(x) \times Q(x) - Q(x) \times R(x) + R(x) \times P(x)}{P(x) + P(x)Q(x)}$. So, what we need to do here is to identify the degree of the numerator and the denominator.

Numerator degree $P(x) \times Q(x)$ will give $2 + 3 = 5$ that would be the degree of $P(x) \times Q(x)$, the degrees will add up and when we look at $-Q(x) \times R(x)$, then again the degrees will add up which will give us $3 + 4 = 7$, so this is from $-Q(x) \times R(x)$ and then $R(x) \times P(x)$ gives $2 + 4 = 6$. This is $R(x) \times P(x)$ degree.

And in the denominator $P(x)$ anyway has degree of 2 and $P(x) \times Q(x)$ we have seen has degree of 5. So, since we are adding all these polynomials together, the degree of the entire numerator is the maximum which is 7. So, we have 7 as a degree of the numerator and 5 as the degree of the denominator. Since it is a division, the powers will have to subtract, so degree of $h(x) = 7 - 5 = 2$. So, $h(x)$ is a quadratic and that would indicate B and C are possibly the curves because these look like quadratic curves. A and D are definitely straight lines.