

Essential Knowledge Milestones		Teaching Points	
<ul style="list-style-type: none"> <li>be able to integrate rational expressions by using partial fractions that are linear in the denominator;</li> <li>be able to simplify the expression using laws of logarithms.</li> </ul>		<ul style="list-style-type: none"> <li>Revise the simplification of rational expressions into partial fractions. We have already seen that this technique is useful in binomial expansions.</li> <li>Often the first part of an integration question of this sort will ask students to split the fraction into two (or more) partial fractions.</li> <li>The next part will then ask for the integration to be carried out. For example: Integrate <math>\int \frac{5}{(x-1)(3x+2)} dx</math>.</li> <li>This will lead to <math>\int \frac{5}{(x-1)(3x+2)} dx = \int \left( \frac{1}{x-1} - \frac{3}{3x+2} \right) dx = \ln(x-1) - \ln(3x+2) + c</math></li> <li>It is sometimes sufficient to leave the answer in this form, but 'Show that' questions will influence the further simplification using laws of logs.</li> </ul>	
Assumed Prior Knowledge/ Links / Interleaving			
<ul style="list-style-type: none"> <li>AS: Knowledge of <math>e^x</math> and <math>\ln x</math></li> <li>AS: Laws of logarithms</li> <li>AS: Trigonometry</li> <li>AS: Differentiation and integration</li> </ul>			
Potential Barriers to Access/Misconceptions			
<ul style="list-style-type: none"> <li>Partial fractions questions are generally done well though some students attempt to integrate the numerator and denominator separately without using partial fractions.</li> </ul>			
Questions & Prompts		Opportunities for Reasoning/Problem Solving/Proofs	
<ul style="list-style-type: none"> <li>Include a question that has a denominator of <math>(x-2)^2</math> to ensure they do Not log this in their answer</li> <li>These integrals will sometimes be tested via a differential equation later in the course and laws of logs will form a vital role in finding the general solution. .</li> </ul>		<ul style="list-style-type: none"> <li>Although the specification states 'linear in the denominator', you may want to cover repeated factors, which will lead to, for example, <math>(x-2)^2</math> in the denominator, which will not be a log integral.</li> </ul>	
Key Mathematical Vocabulary	Integral, inverse, differential, coefficient, index, power, negative, reciprocal, natural logarithm, $\ln  x $ , coefficient, exponential, identity, sin, cos, tan, sec, cosec, cot, $e^x$ .		
Personal Development	Notes	Resources	
Pupils to show integrity and respect each other's opinion when peer marking each other's work against mark schemes			