



## Week 3: Partial Fractions, Exponentials, Logarithms

Try these exercises now, do not use a calculator, and try to solve the exercises without help

Express in terms of partial fractions:

1.  $\frac{4x+5}{(x+3)(2x-1)}$

2.  $\frac{s+2}{(s+1)^2}$

3.  $\frac{3x+1}{(x^2+x+10)(x-1)}$

4.  $\frac{x^2+4x-3}{x^2+2x-3}$  What had to be done before this expression could be written in partial fractions?

5. Use the  $e^x$  button on a calculator to find the values of the functions  $\cosh(x) = \frac{e^x + e^{-x}}{2}$  and  $\sinh(x) = \frac{e^x - e^{-x}}{2}$  for  $x = 1, 0$  and  $-1$

6. Which of the following expressions are equivalent?

$$a = x^b \quad b = x^a \quad x = a^b \quad \log_x(a) = b \quad \log_a(x) = b \quad \log_x(b) = a$$

7. Write  $\ln(c) = d$  in exponential form.

8. Simplify (without using a calculator)  $\log_{10}\left(\frac{1}{10}\right) - \log_{10}\left(\frac{10}{27}\right) + \log_{10}(1000)$

9. Simplify (without using a calculator)  $2 \ln(3) + \ln(4) - 2 \ln(6)$

10. Simplify  $a^{\log_a x}$  and  $e^{\ln x}$

11. Solve for  $n$  by taking logs of both sides of the equation  $1.04^n = 2$