Natural Logarithms

Specification: AQA 7357: F3, F4, F7 · Edexcel 9MA0: 6.3, 6.4, 6.7

HOMEWORK Consolidation

1 Solve $e^{4x} = 11$.
AQA F3 · Edexcel 6.3

2 Solve $\ln(2x - 1) = 3$.
AQA F3 · Edexcel 6.3

3 Solve $3e^{x+2} - 1 = 14$.
AQA F3 · Edexcel 6.3

4 Solve $\ln x - \ln 2 = 3$.
AQA F3, F4 · Edexcel 6.3, 6.4

5 Solve $e^{2x} - 8e^{x} + 15 = 0$.
AQA F3 · Edexcel 6.3

6 Solve $e^{x} - 2 - 8e^{-x} = 0$.
AQA F3 · Edexcel 6.3

7 Solve $(\ln x)^2 = 4$.
AQA F3 · Edexcel 6.3

8 Sketch $y = \ln(x + 3)$. Give the asymptote and the exact coordinates where it crosses the axes.
AQA F3, B9 · Edexcel 6.3, 2.9

9 A population $N = 400e^{kt}$ doubles every 5 years. Find k exactly and to 3 s.f.
AQA F3, F7 · Edexcel 6.3, 6.7

10 Simplify:
(a) $e^{2\ln 3}$
(b) $\ln(e^{5x})$
AQA F3, F4 · Edexcel 6.3, 6.4

11 *Edexcel-style*. Solve, giving exact answers:
(a) $e^{3x-7} = 2$ [2 marks]
(b) $2\ln(x + 1) - \ln x = \ln 4.5$ [4 marks]
AQA F3, F4 · Edexcel 6.3, 6.4 · Edexcel-style

12 *AQA-style*. An investment of £5000 grows according to $V = 5000e^{0.035t}$, where t is in years.
(a) Find the value after 10 years, to the nearest pound. [1 mark]
(b) Find, exactly and to 3 s.f., how long it takes for the investment to double. [3 marks]
(c) Explain why the doubling time does not depend on the £5000. [1 mark]
AQA F3, F7 · Edexcel 6.3, 6.7 · AQA-style