Solving Equations Using Logarithms

Specification: AQA 7357: F4, F5 · Edexcel 9MA0: 6.4, 6.5

HOMEWORK Consolidation

1 Solve $9^x = 120$, to 3 s.f.
AQA F5 · Edexcel 6.5

2 Solve $2^{5x+2} = 600$, to 3 s.f.
AQA F5 · Edexcel 6.5

3 Use the change of base formula to find $\log_7 90$ to 4 s.f.
AQA F5 · Edexcel 6.5

4 Solve $4^x = 3^{x+1}$, to 3 s.f.
AQA F4, F5 · Edexcel 6.4, 6.5

5 Find the exact solution of $5^x = 2^{x+1}$, then give it to 4 d.p.
AQA F4, F5 · Edexcel 6.4, 6.5

6 Solve $3^{2x} - 12(3^x) + 27 = 0$.
AQA F5 · Edexcel 6.5

7 Solve $2^{2x} + 2^{x+1} - 8 = 0$.
AQA F5 · Edexcel 6.5

8 A population is modelled by $N = 50 \times 1.06^t$, where t is in years. After how many whole years does it first exceed 200?
AQA F5, F7 · Edexcel 6.5, 6.7

9 Solve $\log_2 x + \log_2 3 = 5$.
AQA F4, F5 · Edexcel 6.4, 6.5

10 Explain why the solution of $a^x = b$ is negative when $a > 1$ and $0 < b < 1$.
AQA F5 · Edexcel 6.5

11 *Edexcel-style*.
(a) Solve $3^{x-2} = 45$, giving your answer to 3 s.f. [2 marks]
(b) Solve $4^{2x} - 9(4^x) + 8 = 0$, giving exact answers. [4 marks]
AQA F5 · Edexcel 6.5 · Edexcel-style

12 *AQA-style*.
(a) Show that the solution of $2^{x+1} = 5^{x-1}$ is $x = \dfrac{\log 10}{\log 2.5}$. [4 marks]
(b) Hence find x to 3 s.f. [1 mark]
AQA F4, F5 · Edexcel 6.4, 6.5 · AQA-style