WORKSHEET

Logarithmic functions assignment

Part A (10 marks)

1 Write $a^m = x$ as a logarithmic statement:

$$\log_{\square} \square = \square.$$

2 Simplify $\log_2 7 + \log_2 3$.

3 Evaluate $\log_5 125$ without a calculator.

4 Write $\log_8 64 = 2$ in index form.

5 Write $\log_{12} 8$ in index form with base 6.

6 Evaluate $\log_6\left(\frac{1}{36}\right)$ without a calculator.

7 Solve $3^{2x} = 27$.

8 Expand $3\log_5\left(\frac{4x}{7}\right)$.

9 Simplify $\frac{\log_x 7}{\log_x 343} + x$.

10 Solve $2^{x+7} - 2^x = 508$.

Part B (20 marks)

11 Determine the x-intercept of the graph of $y = \log_a x + 10$.

12 Solve $8^{3x+1} - 16^{2x-1} = 0$.

13 Sketch the graph of $y = \log_4(x + 3) + 1$ and label all important features.

14 Solve $\log_{10}(10x + 10) = 3$.

15 Expand $\log_c \frac{\sqrt{2x+7}}{4x}$.

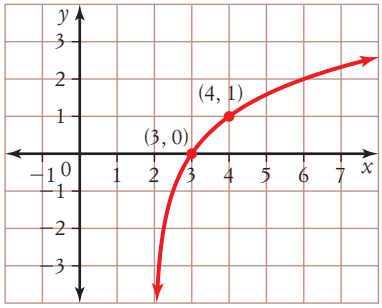
16 Solve $\log_7(3x) + \log_7 4 = 2\log_7(2x)$.

17 Write the equation of the function produced when $y = \log_{10} x$ is translated 3 units left.

18 Evaluate $6^{-2\log_6 2}$ without a calculator.

19 Solve $3^{2m+2} + 9^m = 20$.

20 Find the equation for the function $f(x)$ graphed below.



CHALLENGE (bonus 3 marks)

Solve $\log_a 2 + \log_a (x-1) + \log_a 3 = \log_a x$.

Answers

1 $\log_a x = m$

2 $\log_2 21$

3 3

4 $8^2 = 64$

5 $\dfrac{\log_6 8}{\log_6 12}$

6 -2

7 $x = \dfrac{3}{2}$

8 $3\log_5 4 + 3\log_5 x - 3\log_5 7$

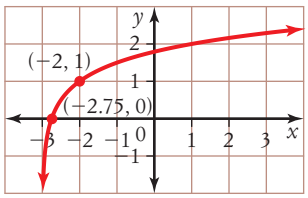
9 $\dfrac{1}{3} + x$

10 $x = 2$

11 a^{-10}

12 $x = -1$

13



14 $x = 99$

15 $\dfrac{1}{2}\log_c(2x+7) - \log_c(4x)$

16 $x = 3$

17 $y = \log_{10}(x+3)$

18 $\dfrac{1}{4}$

19 $m = \dfrac{1}{4}$

20 $f(x) = \log_2(x-2)$

Challenge $x = \dfrac{3}{8}$