Student No.:	Date: / /	Score:
Student Name:		/23

Revision of Logarithmic Functions (I)

Exercises

1. Evaluate the following and express the answers in exact value.

(a) $\log_{81} 243$

(b) $\log_{64} \dfrac{1}{4096}$

(c) $\log_5 25 + 5\log_2 16$

(d) $\dfrac{1}{2}\log 16 + 2\log 5 + \log 10$

(e) $\dfrac{\log_7 216^{-1}}{\log_7 1296}$

(f) $\log_2 \sqrt{128} + \log_3 135 - \dfrac{1}{2}\log_2 64 - \log_3 5$

2. Simplify the following expressions where $x > 0$, $y > 0$ and $x \neq 1$.

(a) $\dfrac{\log_4 x^3}{\log_4 x\sqrt{x^3}}$

(b) $\dfrac{\log_{\frac{1}{3}} \sqrt[4]{y^3} - \log_{\frac{1}{3}} y^5}{\log_{\frac{1}{3}} y^2}$

(c) $\log_2 16x + \log_2 3x^4 - \log_2 192x^5$

(d) $\log_x \sqrt{x} - 2\log_x \sqrt[5]{x} + \log_x \sqrt[3]{x^4}$

3. Given that $\log 5 = x$ and $\log 6 = y$, express $\log \dfrac{1}{15}$ in terms of x and y.

4. Given that $\log 4 = x$ and $\log 24 = y$, express $\log 3$ in terms of x and y.

5. Simplify the following expressions $x > 0$, $y > 0$ and $x \neq 1$.

(a) $\dfrac{\frac{1}{2}\log 256 + 2\log x^2 + 8\log y}{\log(2x) + 4\log\sqrt{y}}$

(b) $\dfrac{\log_x y^3 - \log_x \sqrt{y}}{\log_x \sqrt[3]{y} + \log_x y}$

(c) $\left(\log_x y^2\right)\left(\log_y \sqrt{x}\right)$

6. Solve the following equations. *(Give the answers correct to 3 significant figures if necessary.)*

(a) $4^x \cdot 5^x = 7$

(b) $3^x = 4^{x-3}$

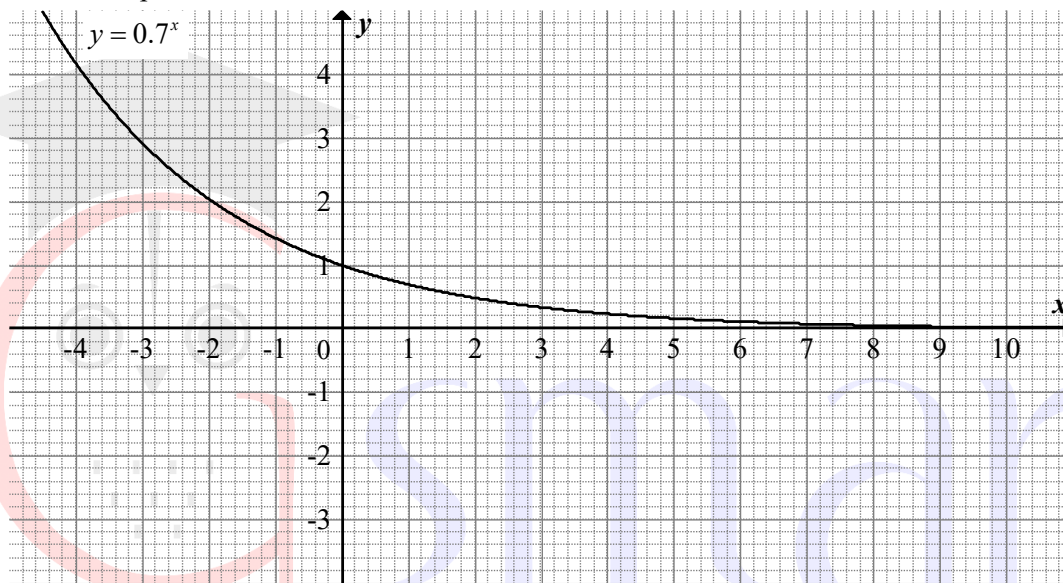**(c)** $\log(3x - 3) = -3$

(d) $4\log 4 - \log x = \log 32$

(e) $\log_5(7x+13) - \log_5(x+1) = 2$ **(f)** $\log_7(2x+1) + \log_7(3x-2) = 2\log_7 5$

7. According to the given graph, sketch the required graph of $y = \log_{0.7} x$ on the same rectangular coordinate plane.
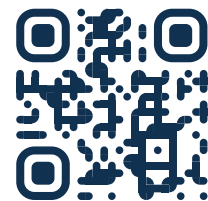

8. The following are the measurements of the sound of two clips of thunder:

The intensity of the sound for the first clap of thunder was 1.2 units, and the loudness of the sound for the second clap of thunder is 125 dB, which one is louder?

[The relation between the loudness D (in dB) of a sound and its intensity (I units) can be expressed as

$D = 10\log(10^{12} I)$.]