WORKSHEET

Logarithms review

1 Evaluate each expression.

a $\log_{10}1000$ _____ **b** $\log_2256$ _____ **c** $\log_5125$ _____ **d** $\log_749$ _____

e $\log_6\left(\frac{1}{6}\right)$ _____ **f** $\log_8\left(\frac{1}{64}\right)$ _____ **g** $\log_93$ _____ **h** $\log_31$ _____

2 Write each equation in logarithmic form.

a $4^3 = 64$ _____ **b** $5^2 = 25$ _____ **c** $2^r = 32$ _____ **d** $y^6 = z$ _____

3 Write each equation in index form.

a $\log_{10}100 = 2$ _____ **b** $\log_28 = 3$ _____ **c** $\log_3b = 7$ _____ **d** $\log_a16 = 2$ _____

4 Simplify and evaluate each expression.

a $\log_33^5$ _____ **b** $\log_432 + \log_42$ _____

c $\log_{10}900 - \log_{10}9$ _____ **d** $3\log_62 + \log_627$ _____

e $\log_515 + \log_52 - \log_56$ _____ **f** $3\log_{10}5 - \log_{10}2 + \log_{10}16$ _____

g $\log_912 - 2\log_92$ _____ **h** $2\log_24 + \log_220 - \frac{1}{2}\log_225$ _____

5 Simplify each expression.

a $\log_a5 + \log_a6$ _____ **b** $\log_a25 - \log_a5$ _____

c $\log_a6 + \log_a8 - \log_a4$ _____ **d** $\log_a4a^2$ _____

e $\log_a20 - (\log_a5 + \log_a4)$ _____ **f** $\log_a6a^2 - \log_a2a^4$ _____

g $\frac{1}{2}\log_a16a$ _____ **h** $\log_a3c + \frac{1}{3}\log_ad - 2\log_ae$ _____

6 Expand each expression.

a $\log_a(xy)$ _____ **b** $\log_a(x^n)$ _____ **c** $\log_a\left(\frac{pq}{r}\right)$ _____

d $\log_a(4s^2)$ _____ **e** $\log_a\sqrt{xy}$ _____ **f** $\log_a\left(\frac{c}{d^2}\right)$ _____

7 If $\log_n4 = x$, $\log_n6 = y$ and $\log_n10 = z$, express each of the following in terms of x, y and z.

a $\log_n40$ _____ **b** $\log_n2$ _____ **c** $\log_n160$ _____ **d** $\log_n15$ _____

8 If $\log_{10}6 = 0.7782$, find the value of each expression.

a $\log_{10}36$ _____ **b** $\log_{10}\frac{1}{6}$ _____ **c** $\log_{10}60$ _____

d $\log_{10}0.6$ _____ **e** $\log_{10}360$ _____ **f** $\log_{10}\sqrt{6000}$ _____

9 Solve each equation, correct to two decimal places where necessary.

a $4^x = 4096$ _____ **b** $6^x = 1\,679\,616$ _____ **c** $5^x = 120$ _____

d $2^x + 2 = 3264$ _____ **e** $4^x - 3 = 1984$ _____ **f** $3^{4-x} = 300$ _____

10 Solve each equation.

a $\log_3 x = 4$ _____ **b** $\log_5 x = 5$ _____ **c** $\log_4 x = \frac{1}{2}$ _____

d $\log_x 36 = 2$ _____ **e** $\log_x \frac{1}{10} = -1$ _____ **f** $\log_x 64 = 3$ _____

Answers

1 **a** 3 **b** 8 **c** 3 **d** 2
e -1 **f** -2 **g** $\frac{1}{2}$ **h** 0

2 **a** $\log_4 64 = 3$ **b** $\log_5 25 = 2$ **c** $\log_2 32 = r$ **d** $\log_y z = 6$

3 **a** $10^2 = 100$ **b** $2^3 = 8$ **c** $3^7 = b$ **d** $a^2 = 16$

4 **a** 5 **b** 3 **c** 2 **d** 3
e 1 **f** 3 **g** $\frac{1}{2}$ **h** 6

5 **a** $\log_a 30$ **b** $\log_a 5$ **c** $\log_a 12$ **d** $\log_a 4 + 2$
e 0 **f** $\log_a 3 - 2$ **g** $\log_a 4 + \frac{1}{2}$ **h** $\log_a\left(\frac{3c\sqrt[3]{d}}{e^2}\right)$

6 **a** $\log_a x + \log_a y$ **b** $n\log_a x$ **c** $\log_a p + \log_a q - \log_a r$
d $\log_a 4 + 2\log_a 5$ **e** $\frac{1}{2}\log_a x + \frac{1}{2}\log_a y$ **f** $\log_a c - 2\log_a d$

7 **a** $x + z$ **b** $\frac{1}{2}x$ **c** $2x + z$ **d** $y + z - x$

8 **a** 1.5564 **b** -0.7782 **c** 1.7782
d -0.2218 **e** 2.5564 **f** 1.8891

9 **a** $x = 6$ **b** $x = 8$ **c** $x \approx 2.97$
d $x \approx 9.67$ **e** $x \approx 8.48$ **f** $x \approx -1.19$

10 **a** $x = 81$ **b** $x = 3125$ **c** $x = 2$
d $x = 6$ **e** $x = 10$ **f** $x = 4^x$