Introduction to logarithms

Student name: _____ Score: _____

1. Write an equivalent logarithmic statement for:

(a) $2^6 = 64$

(b) $7^3 = 343$

(c) $3^4 = 81$

d) $10^{-2} = 0.01$

(e) $8^2 = 64$

2. Write an equivalent exponential statement for:

(a) $\log_2 8 = 3$

(b) $\log 10\,000 = 4$

(c) $\log_3 243 = 5$

(d) $\log_5 625 = 4$

(e) $\log_a c = b$

3. Without using a calculator, find:

(a) log 100

(b) log 1

(c) log 0.1

(d) log 0.001

(e) $\log_3 81$

4. Use a calculator to find the following:

(a) log 41

(b) log 128

(c) log 7

(d) log 1330

(i) give your answers correct to 4 decimal places
(ii) write each number as a power of 10

5. Use a calculator to find the following:

(a) ln 41

(b) ln 128

(c) ln 7

(d) ln 1330

(i) give your answers correct to 4 decimal places
(ii) write each number as a power of e

6. Without using a calculator find:

(a) $\ln e^2$

(b) $\ln e^3$

(c) ln 1

(d) $\ln\left(\frac{1}{e}\right)$

(e) $\log_2 32$

7. Find the value of b if $\log_b 4 = \frac{1}{3}$

8. Given that $m = \log_p 6$ and $n = \log_p 4$, express the following in terms of m and/or n.

(a) $\log_p 24$

(b) $\log_p 2$

(c) $\log_p 16$

(d) $\log_p 1.5$

(e) $\log_p 3$

Introduction to logarithms

Student name: _____ANSWERS_____ Score: _____

1. Write an equivalent logarithmic statement for:

(a) $2^6 = 64$ $\log_2 64 = 6$

(b) $7^3 = 343$ $\log_7 343 = 3$

(c) $3^4 = 81$ $\log_3 81 = 4$

(d) $10^{-2} = 0.01$ $\log_{10} 0.01 = -2$

(e) $8^2 = 64$ $\log_8 64 = 2$

2. Write an equivalent exponential statement for:

(a) $\log_2 8 = 3$ $2^3 = 8$

(b) $\log 10\,000 = 4$ $10^4 = 10\,000$

(c) $\log_3 243 = 5$ $3^5 = 243$

(d) $\log_5 625 = 4$ $5^4 = 625$

(e) $\log_a c = b$ $a^b = c$

3. Without using a calculator, find:

(a) log 100 2

(b) log 1 0

(c) log 0.1 -1

(d) log 0.001 -3

(e) $\log_3 81$ 4

4. Use a calculator to find the following:

(a) log 41 (*i*) 1.6128 (*ii*) $41 = 10^{1.6128}$

(b) log 128 (*i*) 2.1072 (*ii*) $128 = 10^{2.1072}$

(c) log 7 (*i*) 0.8451 (*ii*) $7 = 10^{0.8451}$

(d) log 1330 (*i*) 3.1239 (*ii*) $1330 = 10^{3.1239}$

(i) give your answers correct to 4 decimal places
(ii) write each number as a power of 10

5. Use a calculator to find the following:

(a) ln 41 (*i*) 3.7136 (*ii*) $41 = e^{3.7136}$

(b) ln 128 (*i*) 4.8520 (*ii*) $128 = e^{4.8520}$

(c) ln 7 (*i*) 1.9460 (*ii*) $7 = e^{1.9460}$

(d) ln 1330 (*i*) 7.1929 (*ii*) $1330 = e^{7.1929}$

(i) give your answers correct to 4 decimal places
(ii) write each number as a power of e

6. Without using a calculator find:

(a) $\ln e^2$ 2

(b) $\ln e^3$ 3

(c) ln 1 0

(d) $\ln\left(\frac{1}{e}\right)$ -1

(f) $\log_2 32$ 5

7. Find the value of b if $\log_b 4 = \frac{1}{3}$ 64

8. Given that $m = \log_p 6$ and $n = \log_p 4$, express the following in terms of m and/or n.

(f) $\log_p 24$ $m + n$

(g) $\log_p 2$ $\frac{1}{2}n$

(h) $\log_p 16$ $2n$

(i) $\log_p 1.5$ $m - n$

(j) $\log_p 3$ $m - \frac{1}{2}n$