

## Logarithms Worksheet – YEAR 10

(A) Solve for  $x$ :

(i)  $10^x = 1000$

(ii)  $10^{2x-5} = 100$

(iii)  $4^x = 32$

(B) Solve for  $x$ :

(i)  $10^x = 300$

(ii)  $10^{2x-3} = 666$

(iii)  $10^{2-x} = 0.5$

(iv)  $5^{2x} = 88$

(C) Solve for  $x$ :

(i)  $\log_{10}(x) = 3$

(ii)  $\log_{10}(2x-3) = 2$

(iii)  $\log_2(3x+2) = 5$

(iv)  $\log_5(4x-1) = 2$

(D) Make  $x$  the subject of the following equations:

(i)  $10^x = y$

(ii)  $\log_b(x+a) = y$

(iii)  $5a^{x-b} = 15$

(E) Evaluate:

(i)  $\log_{10} 100 =$

(ii)  $\log_2 16 =$

(iii)  $\log_{10} 1 =$

(iv)  $\log_5 5 =$

(v)  $\log_8 16 =$

(vi)  $\log_5 0.04 =$

(F) Use the log laws to simplify the following:

(i)  $\log x + \log x + \log x =$

(ii)  $\log x + 2 \log y =$

(iii)  $\log ab - \log 2b =$

(iv)  $4 \log x + 3 \log y =$

(v)  $\log a^2 + 2 \log b - 3 \log a =$

(vi)  $\log(x^2 - 1) - \log(x + 1) =$

(vii)  $2 \log x + \log(x + 1) =$

(viii)  $\log \frac{1}{b} - 2 \log \frac{1}{a} =$

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**ANSWERS:**

(A) i)  $x = 3$  ii)  $x = 3.5$  iii)  $x = 2.5$  (B) i)  $x = 2.477$  ii)  $x = 2.912$  iii)  $x = 2.301$

iv)  $x = 1.391$  (C) i)  $x = 1000$  ii)  $x = 51.5$  iii)  $x = 10$  iv)  $x = 6.5$

(D) i)  $x = \log_{10} y$  ii)  $x = b^y - a$  iii)  $x = b + \log_a 3$

(E) i) 2 ii) 4 iii) 0 iv) 1 v)  $\frac{4}{3}$  vi) -2

(F) i)  $\log x^3$  ii)  $\log(xy^2)$  iii)  $\log\left(\frac{a}{2}\right)$  iv)  $\log(x^4 y^3)$  v)  $\log\left(\frac{b^2}{a}\right)$

vi)  $\log(x - 1)$  vii)  $\log(x^3 + x^2)$  viii)  $\log\left(\frac{a^2}{b}\right)$