1. On the same axes sketch $y = 5^x$, $y = 1^x$ and $y = 0.2^x$.

2. Write 64 as a logarithm with a base of (a) 2. (b) 4, and (c) 8.

3. Find the value of
a. $\log_{10}10^3$
b. $\log_3243$
c. $\log_5625$
d. $\log_21024$
e. $\log_3\frac{1}{27}$
f. $\log_41$
g. $\log_88$
h. $\log_2\frac{1}{32}$
i. $\log_{125}\frac{1}{5}$
j. $\log_{16}\frac{1}{4}$

4. Write as a single logarithm:
a. $\log_27 + \log_25 – \log_23$
b. $2\log_55 – \log_53 – ½\log_5½$
c. $\log_39 + ½\log_525 – 2\log_24$
d. $\log_101 – \log_101000 – 2\log_100.1$
e. $\log_5\frac{1}{25} – \log\frac{3}{72}$
f. $\log2 + \log4 – \log8$

5. Expand fully writing in terms as log2 and log3
a. log6
b. $\log\frac{3}{2}$
c. log72
d. $\log12^5$
e. $\log(12a^2 + 1)$
f. $\log_{418}192$

6. Without a calculator, find x
a. $\log_525 = x$
b. $\log_2x = 6$
c. $\log_x 64 = 3$
d. $\log 9x = -3$
e. $\log_51 = 3x$
f. $\log_x9 = 1$
g. $\log_{10}12 = x^2$
h. $3\log_x7 = 1$
i. $\log_4x^2 = 1.5$
j. $\log_{2x}0.1 = -{}^1/_3$
k. $\log_8x + 1 = 0$

7. Solve for the value of x
a. $7 = 10^x$
b. $5^x = 243$
c. $(\frac{1}{2})^x = 12$
d. $24^x = 5$
e. $\frac{5}{12} = 7^{-x}$
f. $20 = (\frac{3}{4})^x$

8. Solve the following equations giving exact answers
a. $\log_3(2x+3) + \log_3(x+6) = 4$
b. $3^{2x+5} = 17$
c. $3 + 2\log_2x = \log_2(14x-3)$
d. $\log_5x + 6\log_x5 = 5$
e. $\log_2x + \log_x2 = {}^5/_2$
f. $105 = 3^{2x+1}$
g. $2^{2x+1} \times 3^{x-1} = 6x$
h. $3\log_2x – \log_x2 = 2$
i. $2^{2x+1} = 3(2^x) - 1$