Logarithms

Find, giving your answer to 3 significant figures where appropriate, the value of x for which

(*a*) $3^x = 5$,

(3)

(*b*) $\log_2 (2x + 1) - \log_2 x = 2$.

(4)

Solve

(*a*) $5^x = 8$, giving your answers to 3 significant figures,

(3)

(*b*) $\log_2 (x + 1) - \log_2 x = \log_2 7$.

(3)

(i) Write down the value of $\log_6 36$.

(1)

(ii) Express $2 \log_a 3 + \log_a 11$ as a single logarithm to base a.

(3)

Solve the equation $5^x = 17$, giving your answer to 3 significant figures.

(3)

(*a*) Find, to 3 significant figures, the value of x for which $8^x = 0.8$.

(2)

(*b*) Solve the equation

$$2 \log_3 x - \log_3 7x = 1.$$

(4)

Given that a and b are positive constants, solve the simultaneous equations

$$a = 3b,$$

$$\log_3 a + \log_3 b = 2.$$

Give your answers as exact numbers.

(6)

(*a*) Find, to 3 significant figures, the value of x for which $5^x = 7$.

(2)

(*b*) Solve the equation $5^{2x} - 12(5^x) + 35 = 0$.

(4)

Given that $0 < x < 4$ and

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

find the value of x.

(6)

(*a*) Find the value of y such that

$$\log_2 y = -3.$$

(2)

(*b*) Find the values of x such that

$$\frac{\log_2 32 + \log_2 16}{\log_2 x} = \log_2 x.$$

(5)

(*a*) Find the positive value of x such that

$$\log_x 64 = 2.$$

(2)

(*b*) Solve for x

$$\log_2 (11 - 6x) = 2 \log_2 (x - 1) + 3.$$

(6)

(*a*) Given that

$$2 \log_3 (x - 5) - \log_3 (2x - 13) = 1,$$

show that $x^2 - 16x + 64 = 0$.

(5)

(*b*) Hence, or otherwise, solve $2 \log_3 (x - 5) - \log_3 (2x - 13) = 1$.

(2)

(*a*) Sketch the graph of $y = 7^x$, $x \in \mathbb{R}$, showing the coordinates of any points at which the graph crosses the axes.

(2)

(*b*) Solve the equation

$$7^{2x} - 4(7^x) + 3 = 0,$$

giving your answers to 2 decimal places where appropriate.

(6)

Find, giving your answer to 3 significant figures where appropriate, the value of x for which

(*a*) $5^x = 10$,

(2)

(*b*) $\log_3 (x - 2) = -1$.

(2)