EXPONENTIALS AND LOGARITHMS

1 Find, to 3 significant figures, the value of

a $\log_{10} 60$ **b** $\log_{10} 6$ **c** $\log_{10} 253$ **d** $\log_{10} 0.4$

2 Solve each equation, giving your answers to 2 decimal places.

a $10^x = 14$ **b** $2(10^x) - 8 = 0$ **c** $10^{3x} = 49$

d $10^{x-4} = 23$ **e** $10^{2x+1} = 130$ **f** $100^x - 5 = 0$

3 Show that $\log_a b = \dfrac{\log_c b}{\log_c a}$, where a, b and c are positive constants.

4 Find, to 3 significant figures, the value of

a $\log_2 7$ **b** $\log_{20} 172$ **c** $\log_5 49$ **d** $\log_9 4$

5 Solve each equation, giving your answers to 3 significant figures.

a $3^x = 12$ **b** $2^x = 0.7$ **c** $8^{-y} = 3$ **d** $4^{\frac{1}{2}x} - 0.3 = 0$

e $5^{t+3} = 24$ **f** $16 - 3^{4+x} = 0$ **g** $7^{2x+4} = 12$ **h** $5(2^{3x+1}) = 62$

i $4^{2-3x} = 32.7$ **j** $5^x = 6^{x-1}$ **k** $7^{y+2} = 9^{y+1}$ **l** $4^{5-x} = 11^{2x-1}$

m $4^{\frac{1}{2}x+3} - 5^{1-2x} = 0$ **n** $2^{3y-2} = 3^{2y+5}$ **o** $7^{2x+5} = 7(11^{3x-4})$ **p** $3^{2x} = 3^{x-1} \times 2^{4+x}$

6 Solve the following equations, giving your answers to 2 decimal places where appropriate.

a $2^{2x} + 2^x - 6 = 0$ **b** $3^{2x} - 5(3^x) + 4 = 0$ **c** $5^{2x} + 12 = 8(5^x)$

d $2(4^x) + 3(4^{-x}) = 7$ **e** $2^{2y+1} + 7(2^y) - 15 = 0$ **f** $3^{2x+1} - 17(3^x) + 10 = 0$

g $25^t + 5^{t+1} - 24 = 0$ **h** $3^{2x+1} + 15 = 2(3^{x+2})$ **i** $3(16^x) - 4^{x+2} + 5 = 0$

7 Sketch each pair of curves on the same diagram, showing the coordinates of any points of intersection with the coordinate axes.

a $y = 2^x$, $y = 5^x$ **b** $y = 3^x$, $y = (\frac{1}{3})^x$ **c** $y = 4^x$, $y = 4^x - 1$ **d** $y = 2^x$, $y = 2^{x+3}$

8 A curve has the equation $y = 2 + a^x$ where a is a constant and $a > 1$.

a Sketch the curve, showing the coordinates of any points of intersection with the coordinate axes and the equations of any asymptotes.

Given also that the curve passes through the point (3, 29),

b find the value of a.

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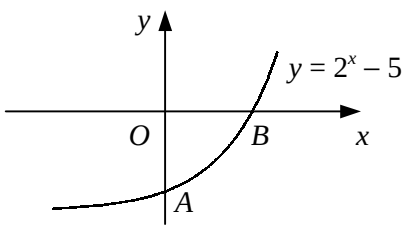

The diagram shows the curve with equation $y = 2^x - 5$ which intersects the coordinate axes at the points A and B. Find the length AB correct to 3 significant figures.