54. *(a)* Given that $x > 0, y > 0$, show that

$$\log_a xy = \log_a x + \log_a y.$$

[3]

(b) Solve the equation

$$2^{3-5x} = 12.$$

Show your working and give your answer correct to three decimal places. [3]

(c) (i) Express

$$\log_9(3x-1) + \log_9(x+4) - 2\log_9(x+1)$$

as a single logarithm.

(ii) Hence solve the equation

$$\log_9(3x-1) + \log_9(x+4) - 2\log_9(x+1) = \frac{1}{2}.$$

[5]

Jan 2012

55. *(a)* Given that $x > 0$, show that

$$\log_a x^n = n \log_a x.$$

[3]

(b) Solve the equation

$$9^{\frac{x}{2}-3} = 6.$$

Show your working and give your answer correct to three decimal places. [3]

(c) Solve the equation

$$\log_a(x-2) + \log_a(4x+1) = 2\log_a(2x-3).$$

[4]

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56. *(a)* Given that $x > 0, y > 0$, show that

$$\log_a \frac{x}{y} = \log_a x - \log_a y.$$

[3]

(b) Solve the equation

$$6^{2x+5} = 7.$$

Show your working and give your answer correct to three decimal places. [3]

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