Logs 3 : Answers

54) a) Book Work

b) $2^{3-5x} = 12$

$\ln 2^{3-5x} = \ln 12$

$(3-5x)\ln 2 = \ln 12$

$3-5x = \frac{\ln 12}{\ln 2}$

$3 - \frac{\ln 12}{\ln 2} = 5x$

$-0.58496 = 5x$

$-0.117 = x$

c) (i) $\log_q(3x-1) + \log_q(x+4) - 2\log_q(x+1)$

$= \log_q(3x-1) + \log_q(x+4) - \log_q(x+1)^2$

$= \log_q \frac{(3x-1)(x+4)}{(x+1)^2}$

(ii) $\log_q \frac{(3x-1)(x+4)}{(x+1)^2} = \frac{1}{2}$

$\therefore \quad q^{1/2} = \frac{(3x-1)(x+4)}{(x+1)^2}$

$3(x+1)^2 = (3x-1)(x+4)$

$3x^2+6x+3 = 3x^2+11x-4$

$7 = 5x$

$\frac{7}{5} = x$

$1.4 = x$

55) a) Book Work

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

$\ln 9^{x/2-3} = \ln 6$

$\left(\frac{x}{2}-3\right)\ln 9 = \ln 6$

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

$\frac{x}{2} = \frac{\ln 6}{\ln 9} + 3$

$\frac{x}{2} = 3.8155$

$x = 7.631$ to 3 d.p.

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

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

$(x-2)(4x+1) = (2x-3)^2$

$4x^2 - 7x - 2 = 4x^2 - 12x + 9$

$5x = 11$

$x = \frac{11}{5}$

$x = 2.2$

56) a) Book Work

b) $6^{2x+5} = 7$

$\ln 6^{2x+5} = \ln 7$

$(2x+5)\ln 6 = \ln 7$

$2x + 5 = \frac{\ln 7}{\ln 6}$

$2x = \frac{\ln 7}{\ln 6} - 5$

$2x = -3.91397$

$x = -1.957$ to 3 d.p.