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Log Equation | Past Paper Question | C2 Edexcel Jan2013 Q6

Given that $2\log_2(x+15) - \log_2 x = 6$

(a) Show that $x^2 - 34x + 225 = 0$

$$2\log_2(x+15) - \log_2 x = 6$$

$$\therefore \log_2(x+15)^2 - \log_2 x = 6$$

$$\therefore \log_2 \frac{(x+15)^2}{x} = 6$$

$$\therefore \frac{(x+15)^2}{x} = 2^6$$

$$\log a - \log b \equiv \log \frac{a}{b}$$

$$n \log a \equiv \log a^n$$

$$\log_c a = N \Rightarrow a = c^N$$

$$\therefore (x+15)^2 = 64x$$

$$\therefore x^2 + 30x + 225 = 64x$$

$$\therefore x^2 - 34x + 225 = 0$$

(b) Hence, or otherwise, solve the equation $2\log_2(x+15) - \log_2 x = 6$

$$\therefore x^2 - 34x + 225 = 0$$

$$\therefore (x-25)(x-9) = 0$$

$$\therefore x-25=0 \text{ or } x-9=0$$

$$\therefore x=25 \text{ or } x=9$$

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