| Question Number | Scheme | Marks |
|---|---|---|
| **2.** | (a) $\frac{2\log_2 x}{\log_2 4}-\log_2 y=3$ *or* $2\log_4 x-\frac{\log_4 y}{\log_4 2}=3$ | M1 |
| | $\Rightarrow \frac{2\log_2 x}{2}-\log_2 y=3$ $\quad$ $2\log_4 x-\frac{\log_4 y}{\frac{1}{2}}=3$ | |
| | $\Rightarrow \log_2 x-\log_2 y=3$ $\quad$ $2\log_4 x-2\log_4 y=3$ | |
| | $\Rightarrow \log_2 \frac{x}{y}=3$ $\quad$ $\log_4 \frac{x}{y}=\frac{3}{2}$ | M1dep |
| | $\Rightarrow \frac{x}{y}=2^3$ $\quad$ $\frac{x}{y}=4^{\frac{3}{2}}$ | M1dep |
| | $\Rightarrow x=8y$ * $\quad$ $x=8y$ * (as $x$ and $y$ positive) | A1 |
| | (b) $\log_5(3\times 8y+y)=4$ | |
| | $25y=5^4$ | M1 |
| | $y=25$ $\quad$ $x=200$ | A1 A1 (7) |

**Notes for Question 2**

**Question 2**

(a)

M1 for changing base on either (or both) logs so that all logs in the equation have the same base (can be any base). Assume base 10 if log written with no base

M1dep for obtaining a single log = a number. Base 2 or 4 shown on MS.

Alt: $\log_p\left(\frac{8y}{x}\right)=0$ or $\log_p\left(\frac{x}{8y}\right)=0$, where $p$ is any number (so could be done with a letter for the base)

M1dep for "undoing" the log dependent on **both** previous M marks

A1cso for $x=8y$ * (as $x$ and $y$ positive need not be stated)

(b)

M1 for eliminating $x$ or $y$ from $\log_5(3x+y)=4$ **and** "undoing" the log

A1cao for either $x=200$ or $y=25$

A1cao for the second correct