① Write in index notation: $\log_3\left(\frac{1}{9}\right) = -2$

$$3^{-2} = \frac{1}{9}$$

② Write in log notation: $25^{\frac{1}{2}} = 5$

$$\log_{25}(5) = \frac{1}{2}$$

③ Express as a single logarithm: $2\log_3(4) + \frac{1}{2}\log_3(36)$

$$\log_3(4^2) + \log_3(36^{\frac{1}{2}})$$
$$= \log_3(16) + \log_3(6) = \log_3(96)$$

④ Solve the following for the unknown:

$$\log_5(3x+2) = 2$$
$$5^2 = 3x + 2$$
$$25 = 3x + 2$$

$$25 - 2 = 3x$$
$$\frac{23}{3} = x$$
$$x = 7.6\dot{}$$

⑤ Evaluate (Calculate the answer) of the following without using a calculator

a) $\log_2 40 - \log_2 5 = \log_2\left(\frac{40}{5}\right) = \log_2 8 = 3$

b) $\dfrac{\log_2 16}{\log_2 8} = \dfrac{4}{3}$

c) $5\log_4(2) - \log_4(2) = \log_4(2^5) - \log_4(2)$
$$= \log_4\left(\frac{2^5}{2}\right)$$
$$= \log_4(2^4)$$
$$= \log_4(16) = 2$$

⑥ If $\log_6 5 = 0.898$ and $\log_6 4 = 0.774$
find values for:

a) $\log_6 20 = \log_6(5) + \log_6(4)$
$$= 0.898 + 0.774$$

b) $\log_6 1.25 = \log_6(5) - \log_6(4)$

$= 1.672$

$= 0.898 - 0.774$

$= 0.124$