

6.

$a = \log_2 x$

$b = \log_2(x + 8)$

Express in terms of a and/or b

(a) $\log_2 \sqrt{x}$

(1)

(b) $\log_2(x^2 + 8x)$

(2)

(c) $\log_2\left(8 + \frac{64}{x}\right)$

Give your answer in simplest form.

(3)

$$\underline{\text{(a)}} \quad \log_2 x^{\frac{1}{2}} = \frac{1}{2} \log_2 x = \frac{1}{2} a$$

$$\underline{\text{(b)}} \quad \log_2(x^2 + 8x) = \log_2(x(x+8))$$

$$= \log_2 x + \log_2(x+8) = a + b$$

$$\underline{\text{(c)}} \quad \log_2\left(8 + \frac{64}{x}\right) = \log_2\left(\frac{8x+64}{x}\right)$$

$$= \log_2(8x+64) - \log_2 x$$

$$= \log_2(8(x+8)) - \log_2 x$$

$$= \log_2 8 + \log_2(x+8) - \log_2 x$$

$$= 3 + b - a$$

because $2^3 = 8$