

$$5. (i) 5^{x+2} = 2^x \quad 3 \text{ d.p.}$$

$$\log 5^{x+2} = \log 2^x$$

2nd law 2nd law

$$\therefore (x+2) \log 5 = (x) \log 2$$

$$(x+2) 0.699 = (x) 0.301$$

$$= 0.699x + 1.398 = 0.301x$$

$$= 0.699x - 0.301x = 1.398$$

$$= 0.398x = \frac{1.398}{0.398}$$

$$x = \frac{1.398}{0.398}$$

$$x = 3.513$$

$$(ii) \log(x+2) + \log(x+3) = 2 \log(x+1)$$

$$\log(x+2) + \log(x+3) = 2 \log(x+1)$$

1st 2nd law

$$\cancel{\log}(x+2)(x+3) = \cancel{\log}(x+1)^2$$

$$(x+2)(x+3) = (x+1)(x+1)$$

$$x^2 + 5x + 6 = x^2 + 2x + 1$$

$$\cancel{x^2} + 5x + 6 = \cancel{x^2} + 2x + 1$$

$$5x + 6 = 2x + 1$$

$$5x - 2x = 1 - 6$$

$$3x = -5 \quad \therefore x = -\frac{5}{3}$$

$$x = -\frac{5}{3} \quad \text{or} \quad x = -1.67$$