

$$(a+b)^2 = (a+b)(a+b) = a^2 + 2ab + b^2$$

I think you get this.

$$\text{Now } \left(\sqrt{u} + \frac{3}{\sqrt{u}}\right)^2 =$$

$$\left(u^{\frac{1}{2}} + \frac{3}{u^{\frac{1}{2}}}\right)^2 = \left(u^{\frac{1}{2}} + 3u^{-\frac{1}{2}}\right)^2$$

$$= (u^{\frac{1}{2}})^2 + 2(u^{\frac{1}{2}})(3u^{-\frac{1}{2}}) + (3u^{-\frac{1}{2}})^2$$

$$= u^{\frac{1}{2}(2)} + 6u^{\frac{1}{2}-\frac{1}{2}} + 3^2(u^{-\frac{1}{2}})^2$$

$$= u^1 + 6u^0 + 9u^{-1}$$

$$= \boxed{u + 6 + \frac{9}{u}}$$

$[x + (6+x^2)][x - (6+x^2)]$  is of the form

$$[a+b][a-b] = a^2 - b^2, \text{ where}$$

$$a = x \text{ and } b = 6+x^2 \rightarrow$$

$$a^2 - b^2 = x^2 - (6+x^2)^2 = x^2 - (x^2+6)^2 \quad (\text{is easier for me})$$

$$(r+s)^2 = r^2 + 2rs + s^2 \quad r = x^2, s = 6$$

$$\begin{aligned} = x^2 - [(x^2)^2 + 2(x^2)(6) + 6^2] &= x^2 - [x^4 + 12x^2 + 36] \\ &= x^2 - x^4 - 12x^2 - 36 \\ &= -x^4 - 11x^2 - 36 \end{aligned}$$