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Solve Quadratic Equation | Past Paper Question | C1 OCR June 2012 Q7

Solve the equation $x - 6x^{\frac{1}{2}} + 2 = 0$, giving your answers in the form $p \pm q\sqrt{r}$,

where p , q and r are integers.

$$\text{let } t = x^{\frac{1}{2}}. \therefore t^2 - 6t + 2 = 0$$

$$\therefore t = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(2)}}{2(1)}$$

$$= \frac{6 \pm \sqrt{28}}{2}$$

$$= \frac{6 \pm \sqrt{4(7)}}{2}$$

$$= \frac{6 \pm 2\sqrt{7}}{2}$$

$$= 3 \pm \sqrt{7}$$

$$\therefore x = (3 + \sqrt{7})^2$$

$$= (3 + \sqrt{7})(3 + \sqrt{7})$$

$$= 9 + 6\sqrt{7} + 7$$

$$= \underline{16 + 6\sqrt{7}}$$

$$\text{or } x = (3 - \sqrt{7})^2$$

$$= (3 - \sqrt{7})(3 - \sqrt{7})$$

$$= 9 - 6\sqrt{7} + 7$$

$$= \underline{16 - 6\sqrt{7}}$$

$$ax^2 + bx + c = 0$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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