For $x^2 = \cancel{\text{tot}}\,2\lambda$, $(x = \pm 2\lambda)$ we can plugin this value of x in eqn (i) and get the below :-

$$4\lambda y - \lambda x - 1 = 0 \quad \text{— (ii)}$$

or $\lambda(4y - \sqrt{2\lambda}) = 1$

or $4\lambda y - \sqrt{2\lambda}\cdot\lambda = 1$

or $y = \dfrac{1 + \sqrt{2\lambda}\cdot\lambda}{4\lambda}$

Now, we replace these values of x & y in the constraint.

$x + 2y = 0$

or $\sqrt{2\lambda} + \cancel{2} \times \left(\dfrac{1 + \sqrt{2\lambda}\cdot\lambda}{{}_{2}\cancel{4}\lambda}\right) = 0$

or $2\cdot\lambda\cdot\sqrt{2\lambda} + 1 + \sqrt{2\lambda}\cdot\lambda = 0$

or $3\lambda\cdot\sqrt{2\lambda} = -1$

or $\lambda\cdot\sqrt{2\lambda} = -\dfrac{1}{3}$

or $\lambda^2 \times 2\lambda = \dfrac{1}{9}$

or $\lambda^3 = \dfrac{1}{18}$ or $\lambda = \sqrt[3]{\dfrac{1}{18}}$.

$$x = +\sqrt{2\lambda} = +\sqrt{2 \times \left(\frac{1}{18}\right)^{1/3}} = \sqrt{2 \times \frac{1}{3^{2/3} \times 2^{1/3}}}$$

$$= \sqrt{\left(\frac{2}{3}\right)^{2/3}}$$

$$= \left(\frac{2}{3}\right)^{\cancel{2}/3 \times \frac{1}{\cancel{2}}}$$

$$= \left(\frac{2}{3}\right)^{1/3}.$$

$y = \dfrac{1 + x\lambda}{} = +\text{ve}.$

For $x = \left(\frac{2}{3}\right)^{1/3}$, y is always +ve which means