Substitution of Square Root Expression

- $p(x) = ax^2 + bx + c$ then, $x_{1,2} = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$, if $a \neq 0 \wedge b^2 - 4ac \geq 0$
- $x_{1,2}$ has the form $\frac{u+q\sqrt{r}}{s}$: $u = -b$, $q = \pm 1$, $r = b^2 - 4ac$ and $s = 2a$
- Example: $p(x) = yx^2 + x$

$$(yx^2 + x = 0)[\frac{-1 + \sqrt{1-8y}}{2y}/x]$$

$$\iff y(\frac{-1 + \sqrt{1-8y}}{2y})^2 + (\frac{-1 + \sqrt{1-8y}}{2y}) = 0$$

$$\iff \frac{\overbrace{(64y^2 - 14y - 1)}^{u'} + \overbrace{2}^{q'} \sqrt{1-8y} \longrightarrow r}{\underbrace{2y}_{s'}} = 0 \iff \frac{u' + q'\sqrt{r}}{s'}$$