

Derivation of $s - r = c$:

$$A = sr$$

$$\frac{ab}{2} = \frac{r(a+b+c)}{2}$$

$$r = \frac{ab}{(a+b+c)}$$

$$r^2 = \frac{a^2b^2}{a^2+b^2+c^2+2(ab+bc+ac)}$$

$$= \frac{a^2b^2}{2(c^2+ab+bc+ac)}$$

$$a^2b^2 = (c^2 - b^2)(c^2 - a^2) = (c - a)(c - b)(c - a)(c + b)$$

$$r^2 = \frac{(c-a)(c-b)(c+a)(c+b)}{2(c+a)(c+b)}$$

$$r = \sqrt{\frac{(c-a)(c-b)}{2}}$$

$$= \frac{1}{2}(c - a)(c - b) = \frac{1}{2}(c^2 + ab - ac - bc)$$

$$= \left(\frac{1}{2}(a + b - c)\right)^2$$

$$r = \frac{a+b+c}{2} - c$$

$$r = s - c$$

$$s - r = c$$