

Involutes

For the homework, you can take the involute of a curve $\mathbf{r}(t) = (x(t), y(t))$ to be defined as

$$\mathbf{i}(t) = \mathbf{r}(t) - s(t) \frac{\mathbf{r}'(t)}{\|\mathbf{r}'(t)\|}$$

where $s(t) = \int_a^t \|\mathbf{r}'(t)\| dt$. You can choose any starting point a that you like when constructing involutes as it just offsets the string by a constant. That is, one could account for this offset by using an arbitrary constant l in the formula and write the involute as:

$$\mathbf{i}(t) = \mathbf{r}(t) - (s(t) + l) \frac{\mathbf{r}'(t)}{\|\mathbf{r}'(t)\|}$$