

$$4. \quad xy = 4$$

$$A = 0 \quad B = 1 \quad C = 0$$

$$\textcircled{1} \quad \cot(\theta) = \frac{A-C}{B}$$

$$\cot(\theta) = \frac{0-0}{1}$$

$$\cot(\theta) = 0$$

$$\cot 90^\circ = 0$$

$$\theta = 90^\circ$$

$$\theta = 45^\circ$$

$\textcircled{2}$ COME UP WITH SUBSTITUTIONS

$$X = X' \cos \theta - y' \sin \theta \quad y = X' \sin \theta + y' \cos \theta$$

$$\cot \theta = \frac{X}{Y} \quad X = X' \cos 45^\circ - y' \sin 45^\circ \quad y = X' \sin 45^\circ + y' \cos 45^\circ$$

$$X = \frac{\sqrt{2}}{2} X' - \frac{\sqrt{2}}{2} y' \quad y = \frac{\sqrt{2}}{2} X' + \frac{\sqrt{2}}{2} y'$$

$$X = \frac{\sqrt{2}}{2} (X' - y') \quad y = \frac{\sqrt{2}}{2} (X' + y')$$

$$\text{LET } P = X' \quad Q = y'$$

$$X = \frac{\sqrt{2}}{2} (P - Q) \quad y = \frac{\sqrt{2}}{2} (P + Q)$$

$$\textcircled{3} \quad xy = 4$$

$$\frac{\sqrt{2}}{2} (P - Q) \cdot \frac{\sqrt{2}}{2} (P + Q) = 4$$

$$\frac{2}{4} (P^2 - Q^2) = 4$$

$$\frac{1}{2} (P^2 - Q^2) = 4$$

$$\frac{1}{2} P^2 - \frac{1}{2} Q^2 = 4$$

$$\frac{1}{4} \cdot \frac{1}{2} P^2 - \frac{1}{4} \cdot \frac{1}{2} Q^2 = \frac{1}{4} \cdot 4$$

$$\frac{1}{8} P^2 - \frac{1}{8} Q^2 = 1$$

$$\frac{P^2}{8} - \frac{Q^2}{8} = 1$$

NOW PLUG $P = X'$ AND $Q = y'$ BACK IN

$$\frac{X'^2}{8} - \frac{y'^2}{8} = 1$$