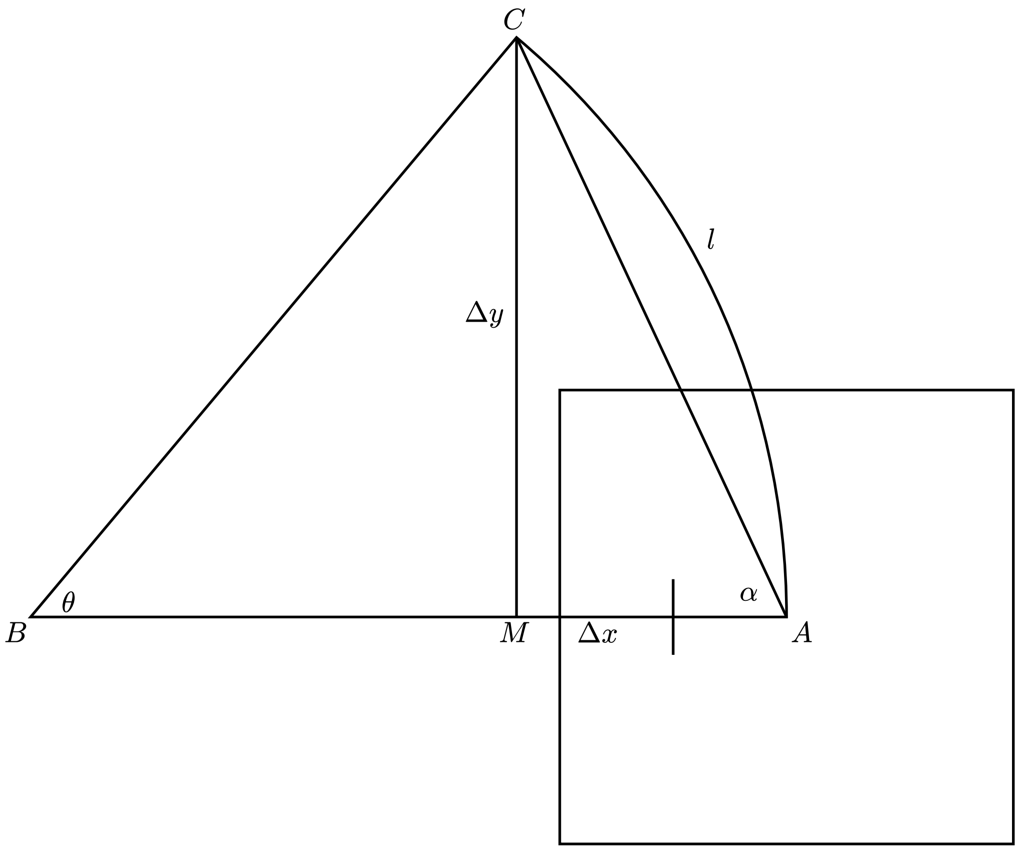

Given the measures of l and θ; AC is an arc; find Δx and Δy

The measures of l and θ and AC is an arc because they are given

c is a radius by the definition of a radius

$c \cong r$ by the reflexive property

$c = r$ by the definition of $\cong$ segments

$l = r\theta$ by the arc length formula in radians

$l = c\theta$ by substitution

$\frac{l}{\theta} = c$ by division

$\sin(\theta) = \frac{\text{opposite}}{\text{hypotenuse}}$ by the definition of sine in right angle trigonometry

$\cos(\theta) = \frac{\text{adjacent}}{\text{hypotenuse}}$ by the definition of cosine in right angle trigonometry

$\overline{AB} \cong c$ because radii $\cong$

$\Delta x \cong \overline{MA}$ by the reflexive property

$AB = c$ and $MA = \Delta x$ by the definition of $\cong$ segments

$AB = BM + MA$ by the sement addition postulate

$AB - MA = BM$ by subtraction

$c - \Delta x = BM$ by substitution

$\frac{l}{\theta} - \Delta x = BM$ by substitution

Δy is an opposite side to $\angle\theta$ by the definition of an opposite side.

$\overline{BM}$ is an adjacent side to $\angle\theta$ by the definition of an adjacent side

c is the hypotenuse of $\triangle\, BMC$ by as the side opposite to the right $\angle$ of a $\triangle$ is the hypotenuse

$\Delta y \cong \Delta y$, $\overline{BM} \cong \overline{BM}$, and $c \cong c$ by the reflexive property

$\Delta y = \Delta y$, $BM = BM$, and $c = c$ by the definition of congurent segments

$\Delta y =$ opposite, $BM =$ adjacent, and $c =$ hypotenuse by substitution

$\sin(\theta) = \frac{\Delta y}{c}$, $\cos(\theta) = \frac{BM}{c}$ by substitution

$\sin(\theta) = \frac{\Delta y}{\frac{l}{\theta}}$, $\cos(\theta) = \frac{c - \Delta x}{c}$ by substitution

$\left(\frac{l}{\theta}\right)\sin(\theta) = \Delta y$, $c\cos(\theta) = c - \Delta x$ by multiplication

$c\cos(\theta) - c = -\Delta x$ by substraction

$-c\cos(\theta) + c = \Delta x$ by division

$-c(\cos(\theta) + 1) = \Delta x$ by substitution

$-\left(\frac{l}{\theta}\right)(\cos(\theta) + 1) = \Delta x$ by substitution

$\left(\frac{l}{\theta}\right)(\cos(\theta) + 1) = \Delta x$ by the magnitude of $\overline{BA}$