A bright fringe in Young's double slit experiment is 1.5 cm from the center of the pattern. The light has a wavelength of 612 nm and falls on a screen 1.4m from the slits that have a separation of 0.40 mm.

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How many dark fringes are between the center bright fringe and the bright fringe at 1.5cm?

$d \sin\theta = m\lambda$

$L \tan\theta_m = y_m$

Use small angle approximation

$\sin\theta \approx \tan\theta \approx \theta$

$d\theta = m\lambda$

$L\theta = y_m$

$$m = \frac{d\theta}{\lambda}$$

$$\theta = \frac{y_m}{L}$$

$$m = \frac{d\left(\frac{y_m}{L}\right)}{\lambda} = \frac{0.40E\text{-}3\,m \left(\frac{1.5E\text{-}2m}{1.4m}\right)}{612E\text{-}9\,m} = 7.00$$

7 fringes