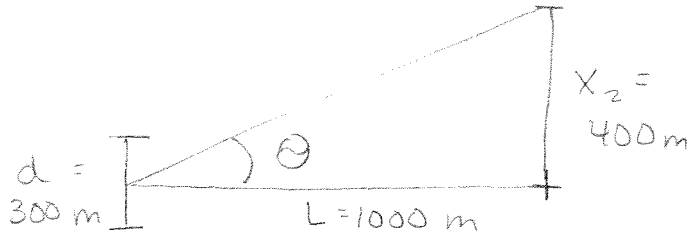
P#7

Ch 24 - pg 774

a) $d = 300\ m$
$L = 1000\ m$
$x_2 = 400\ m$
$m = 2$



Find θ: (Avoid small θ appx)

$$\tan\theta = \frac{x}{L} \qquad \tan\theta = \frac{(400\ m)}{(1000\ m)}$$

$$\theta = 21.8°$$

Find λ:

$$m \cdot \lambda = d \cdot \sin\theta$$
$$(2)\cdot(\lambda) = (300\ m)\cdot \sin 21.8°$$

$$\boxed{\lambda = 56\ m}$$

b) $\lambda = 56\ m$
$L = 1000\ m$
$d = 300\ m$
$m = 2\frac{1}{2}$ (for next minimum)

Find θ: (Avoid small θ appx)

$$m \cdot \lambda = d \cdot \sin\theta$$
$$(2\frac{1}{2})\cdot(56\ m) = (300\ m)\cdot \sin\theta$$

$$\theta = 27.7°$$

Find $x_{2\frac{1}{2}}$:

$$\tan\theta = \frac{x}{L} \qquad \tan 27.7° = \frac{x}{1000\ m}$$

$$x_{2\frac{1}{2}} = 524\ m$$

Find Δx:

$$\Delta x = x_{2\frac{1}{2}} - x_2$$
$$= 524\ m - 400\ m$$

$$\boxed{\Delta x = 124\ m}$$