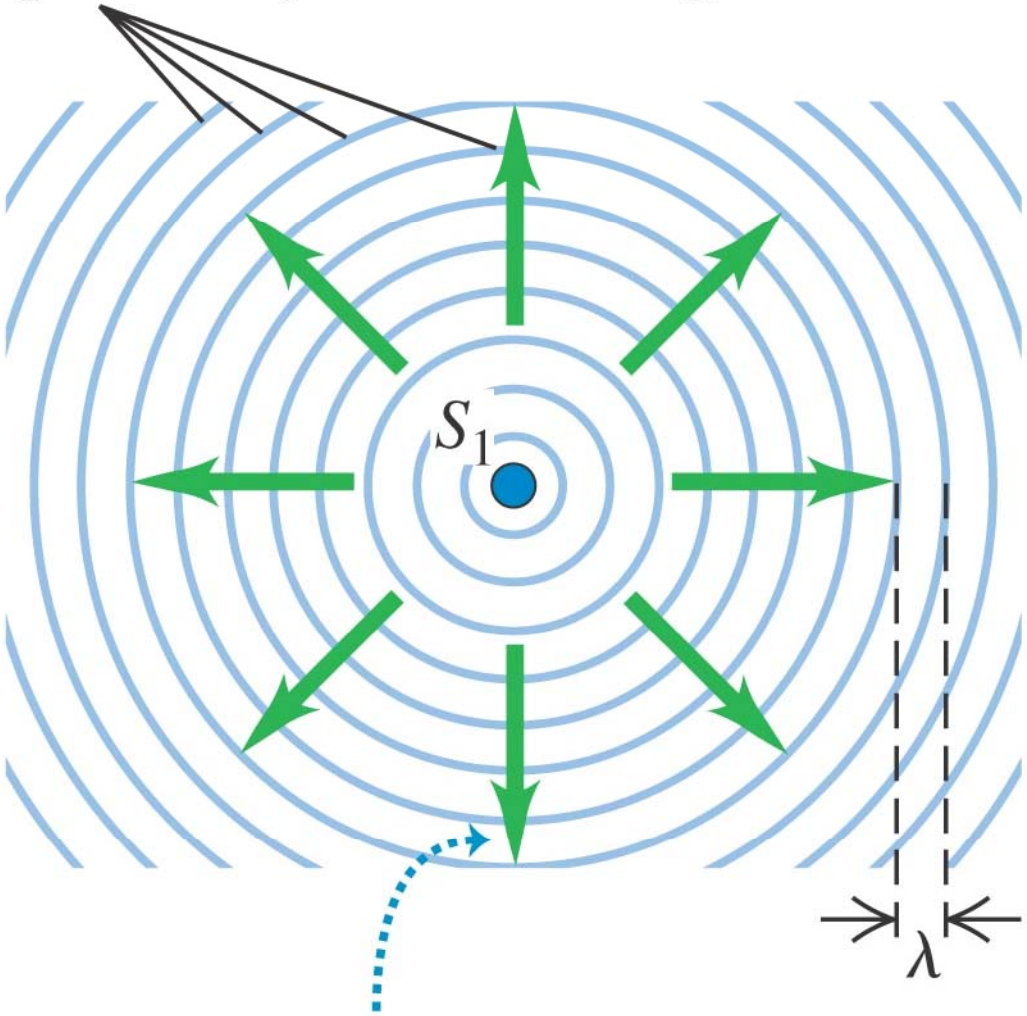
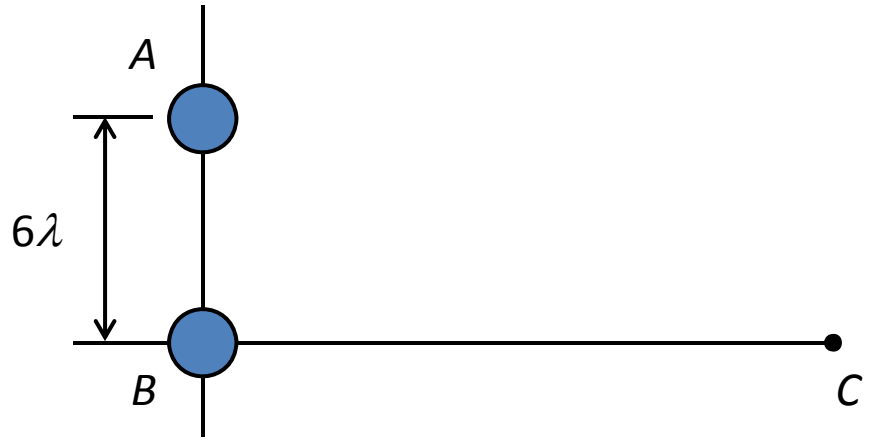
Wave fronts: crests of the wave (frequency f) separated by one wavelength λ



The wave fronts move outward from source S_1 at the wave speed $v = f\lambda$.

Q35.5

Two radio antennas radiating in phase are located at points *A* and *B*, which are 6 wavelengths apart. A radio receiver is moved along a line from point *B* to point *C*.



At what distances from point *B* will the receiver detect an intensity *maximum?*

A. 4.5λ

B. 8λ

C. 9λ

D. both A. and B.

E. all of A., B. and C.

Q35.1

Two sources S_1 and S_2 oscillating in phase emit sinusoidal waves.

Point *P* is 7.3 wavelengths from source S_1 and 4.3 wavelengths from source S_2. As a result, at point *P* there is

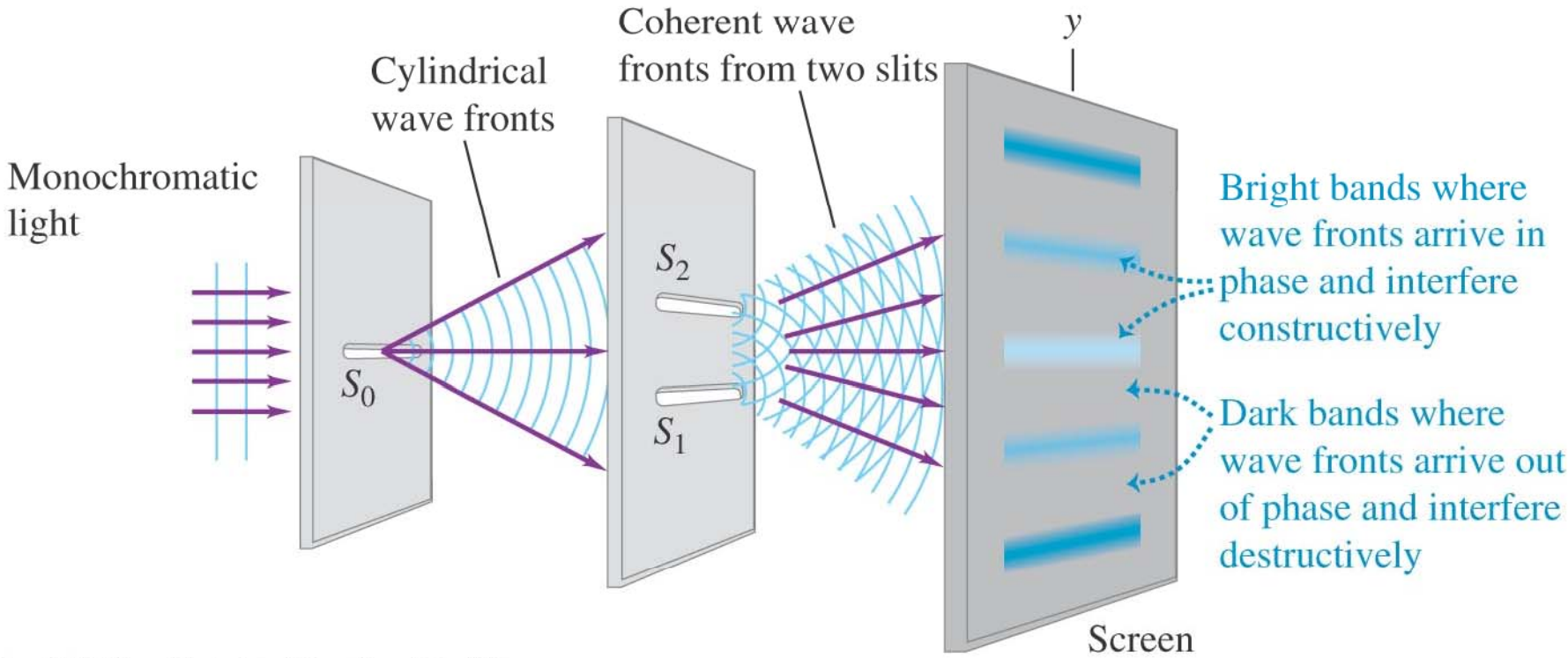
A. constructive interference.

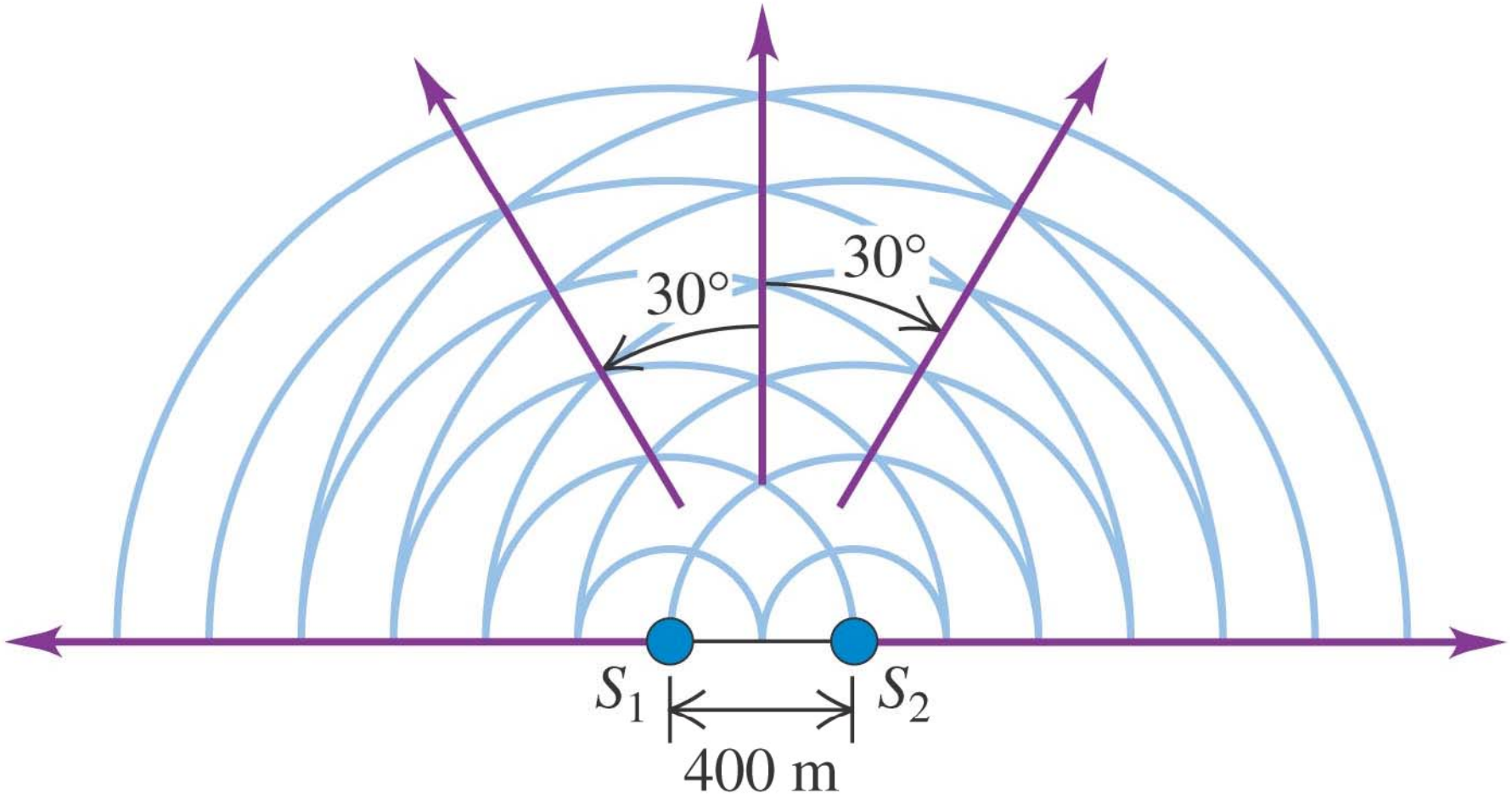
B. destructive interference.

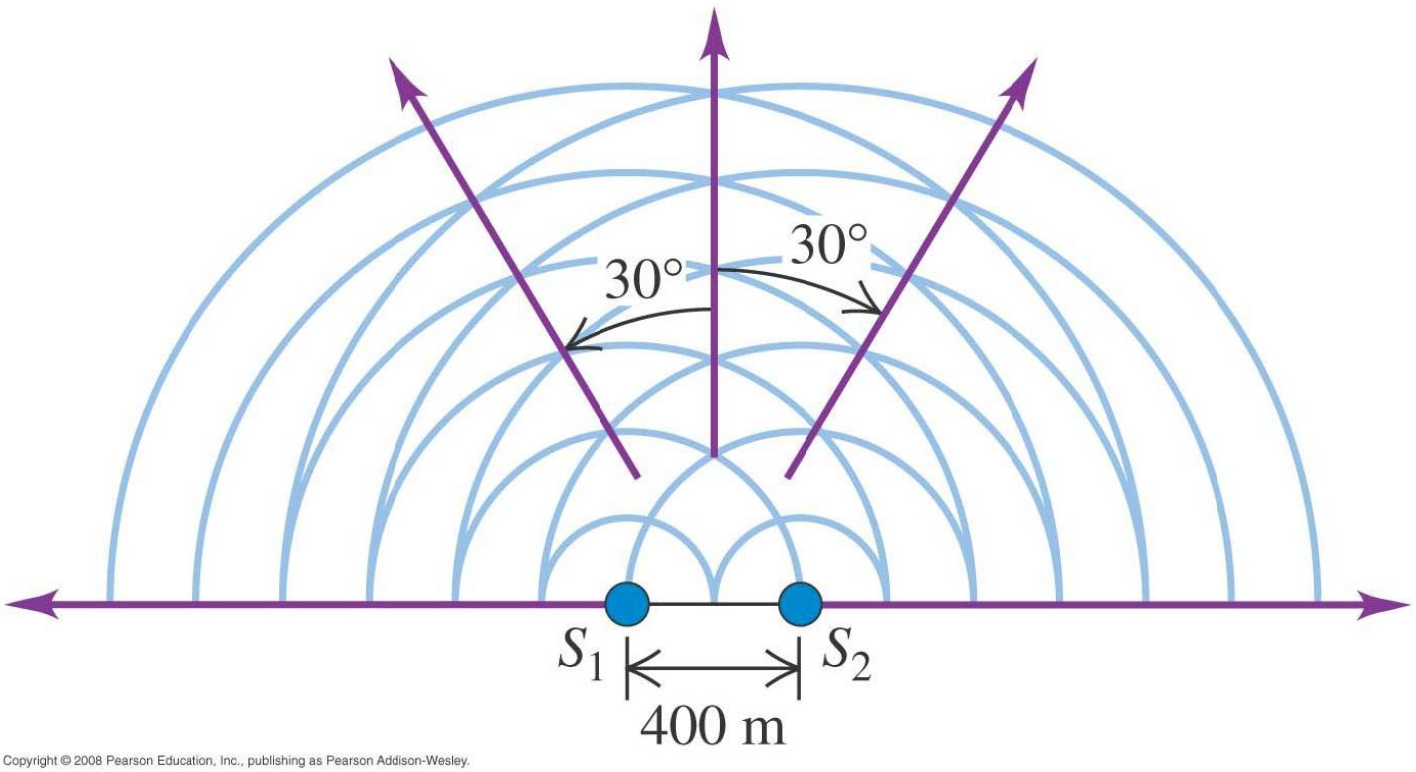
C. neither constructive nor destructive interference.

D. not enough information given to decide.

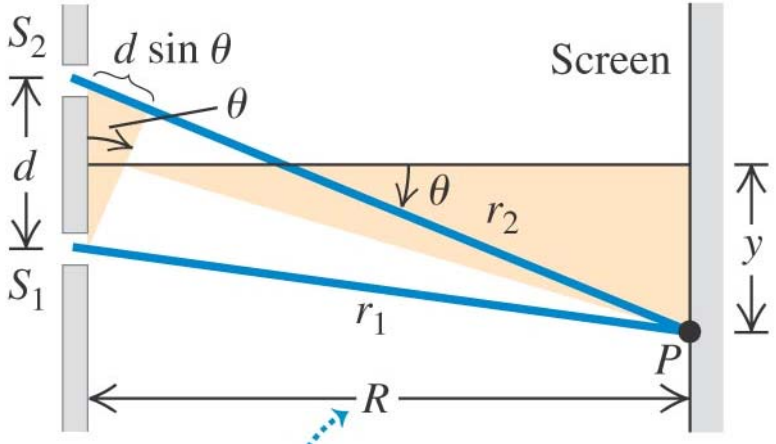
(a) Interference of light waves passing through two slits





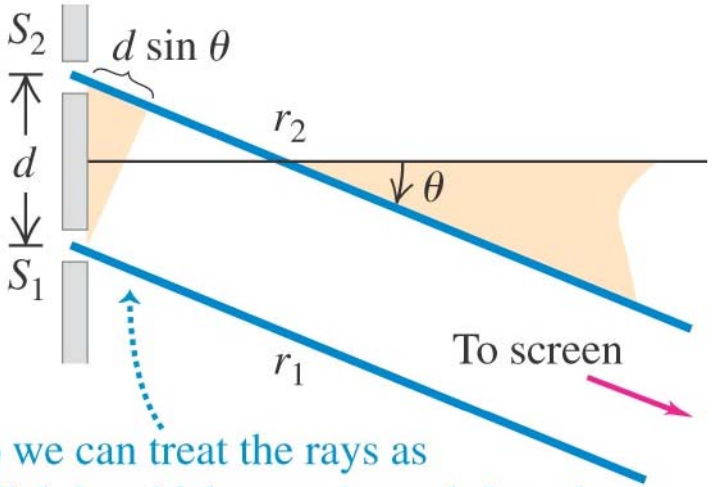


(b) Actual geometry (seen from the side)

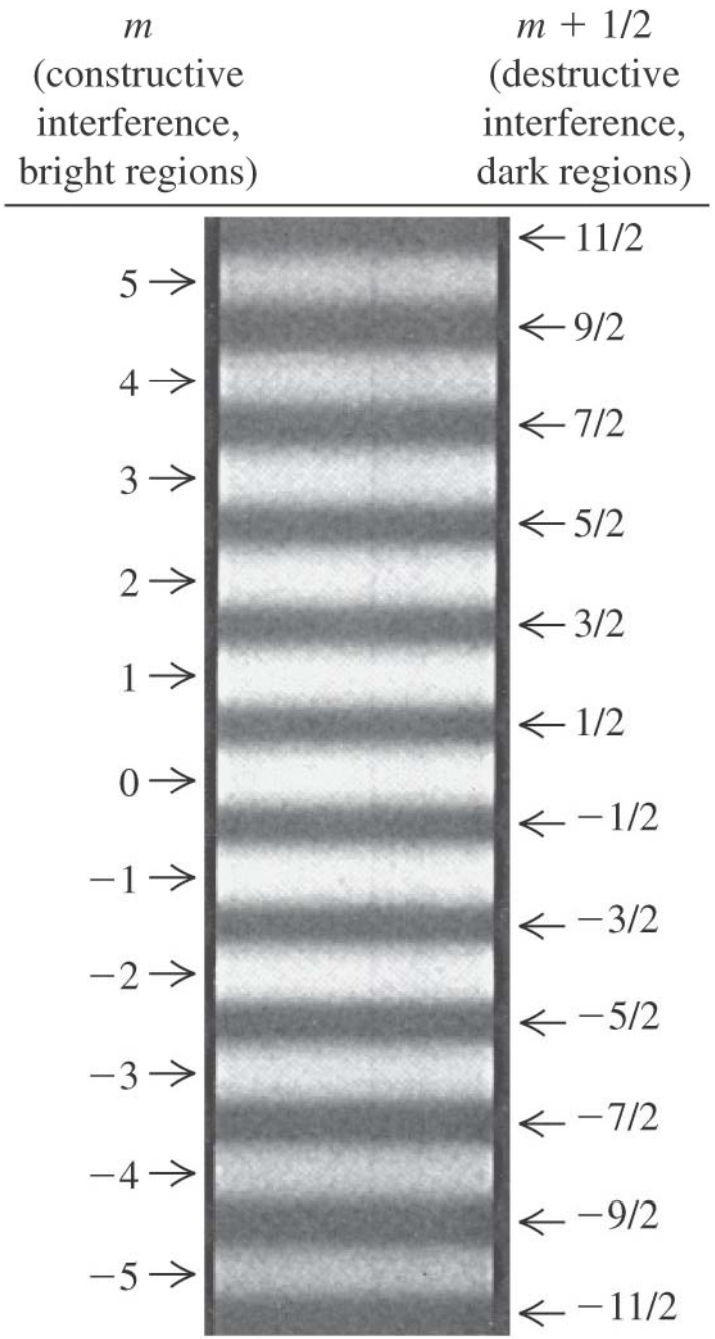


In real situations, the distance R to the screen is usually very much greater than the distance d between the slits ...

(c) Approximate geometry



... so we can treat the rays as parallel, in which case the path-length difference is simply $r_2 - r_1 = d \sin \theta$.



(a) Interference of light waves passing through two slits