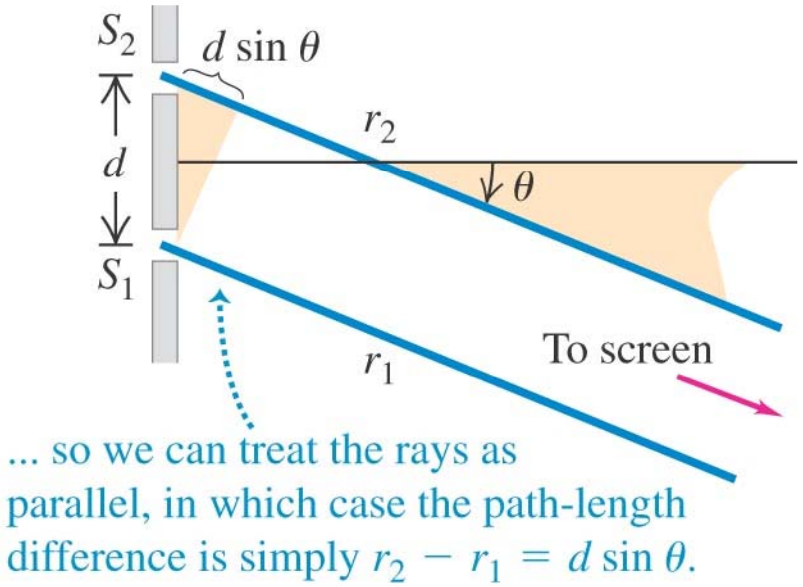
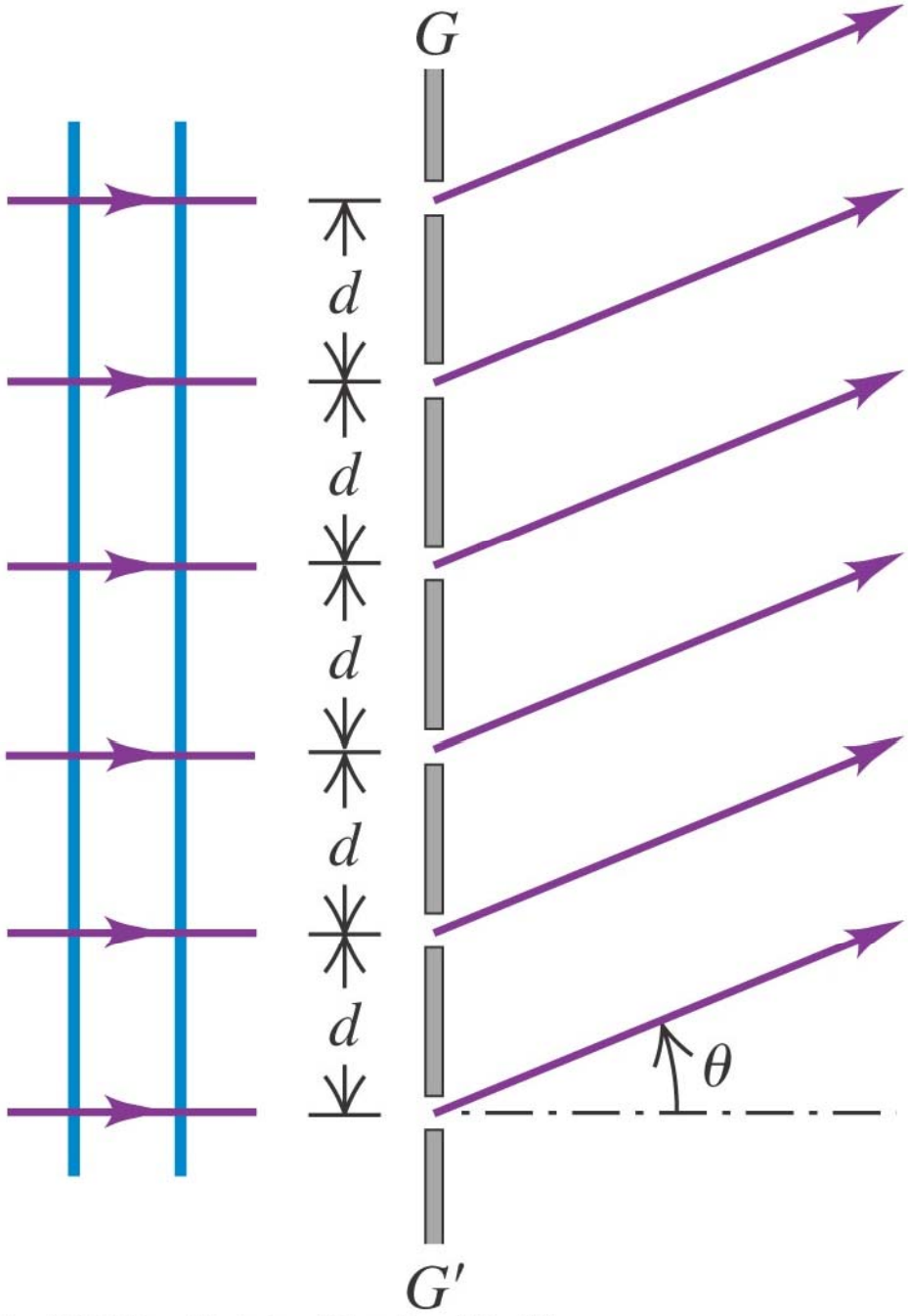
(c) Approximate geometry



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



Q36.1

If I change the slide from 600 lines/mm to 100 lines/mm, how will the spacing of the bright dots change?

A. They will get a little closer.

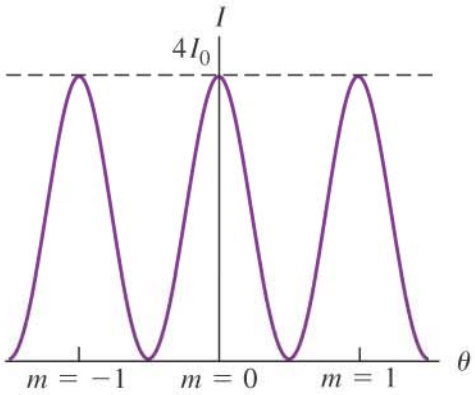
B. They will get a little farther apart

C. They will get a lot closer

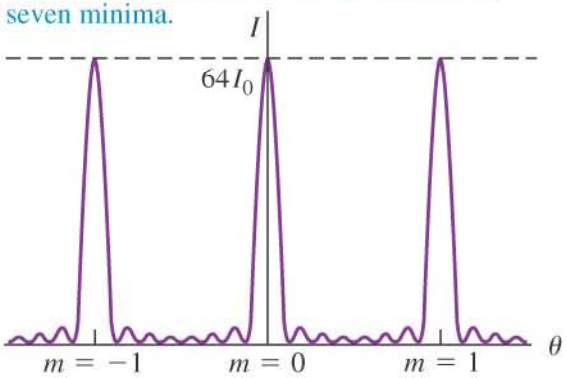
D. They will get a lot farther apart

E. The spacing won't change

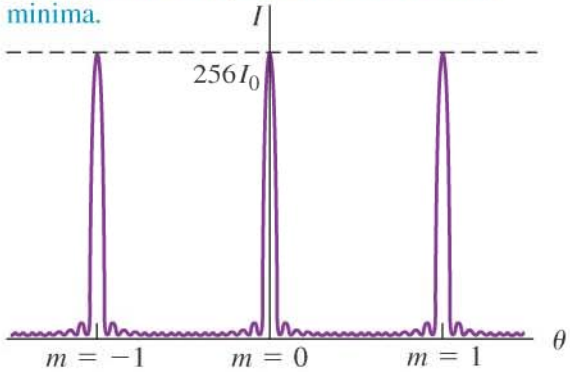
(a) $N = 2$: two slits produce one minimum between adjacent maxima.

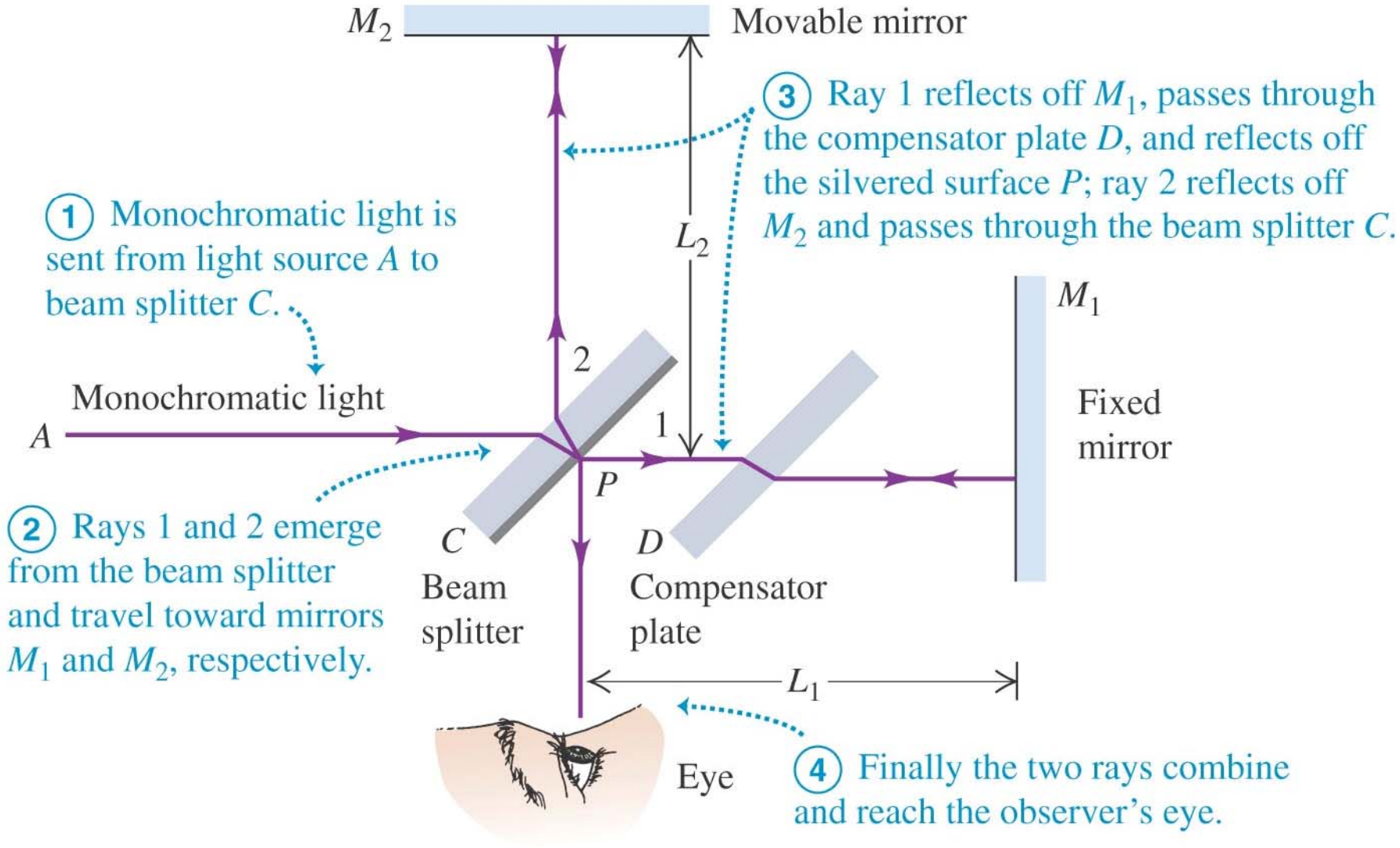


(b) $N = 8$: eight slits produce taller, narrower maxima in the same locations, separated by seven minima.



(c) $N = 16$: with 16 slits, the maxima are even taller and narrower, with more intervening minima.



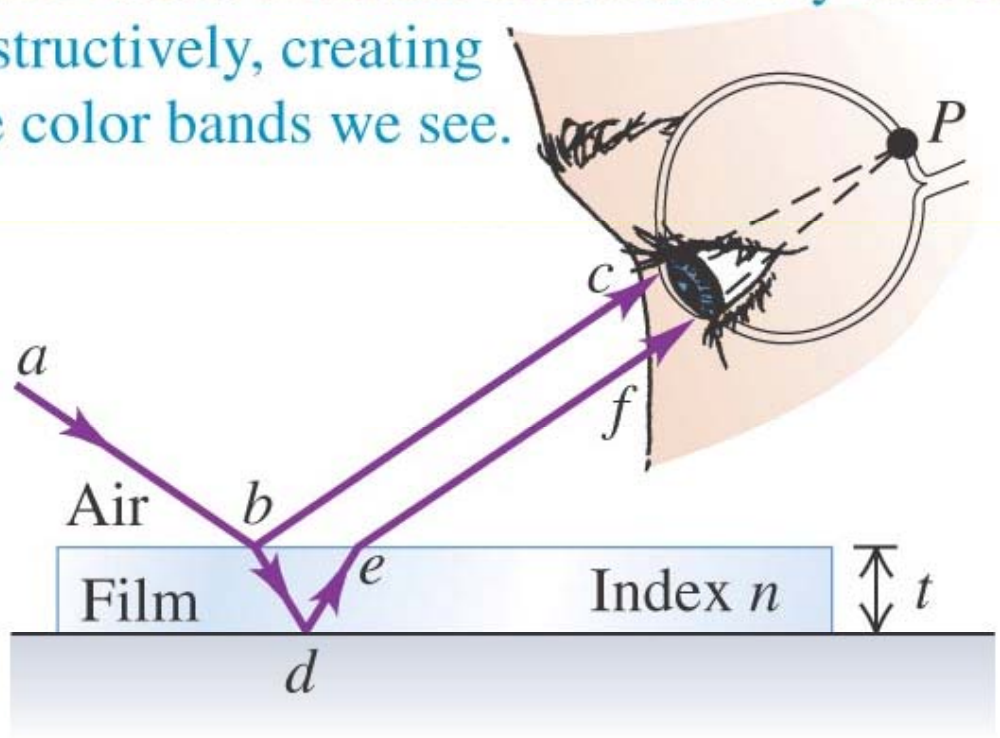


(b) The rainbow fringes of an oil slick on water

(a) Interference between rays reflected from the two surfaces of a thin film

Light reflected from the upper and lower surfaces of the film comes together in the eye at *P* and undergoes interference.

Some colors interfere constructively and others destructively, creating the color bands we see.



Q36.1

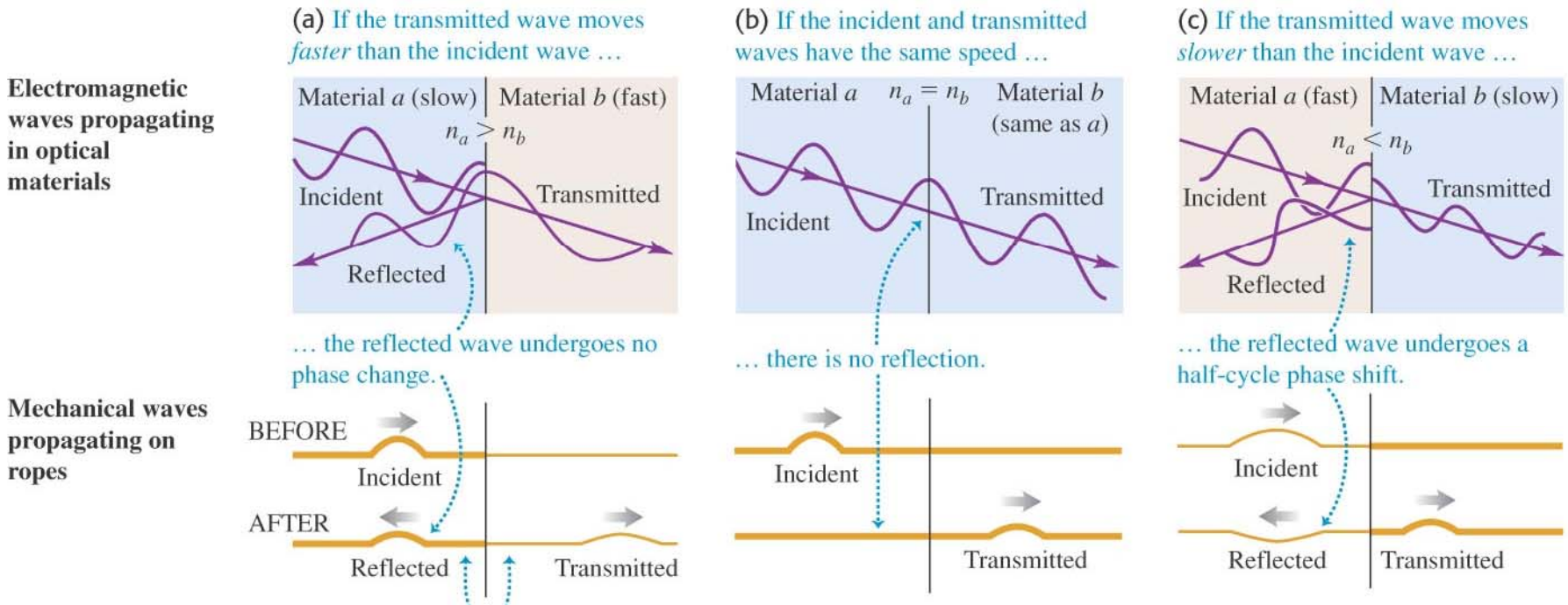
When the glass slab is inserted on the left, how will the point where there is constructive interference of the two pulses change?

A. It will move to the right.

B. It will move to the left.

C. It will stay halfway between the two sources.

D. We would need more information (including n and thickness of the glass slab) to decide.



Destructive interference occurs when

- the film is about $\frac{1}{4}\lambda$ thick and
- the light undergoes a phase change at both reflecting surfaces,

so that the two reflected waves emerge from the film about $\frac{1}{2}$ cycle out of phase.