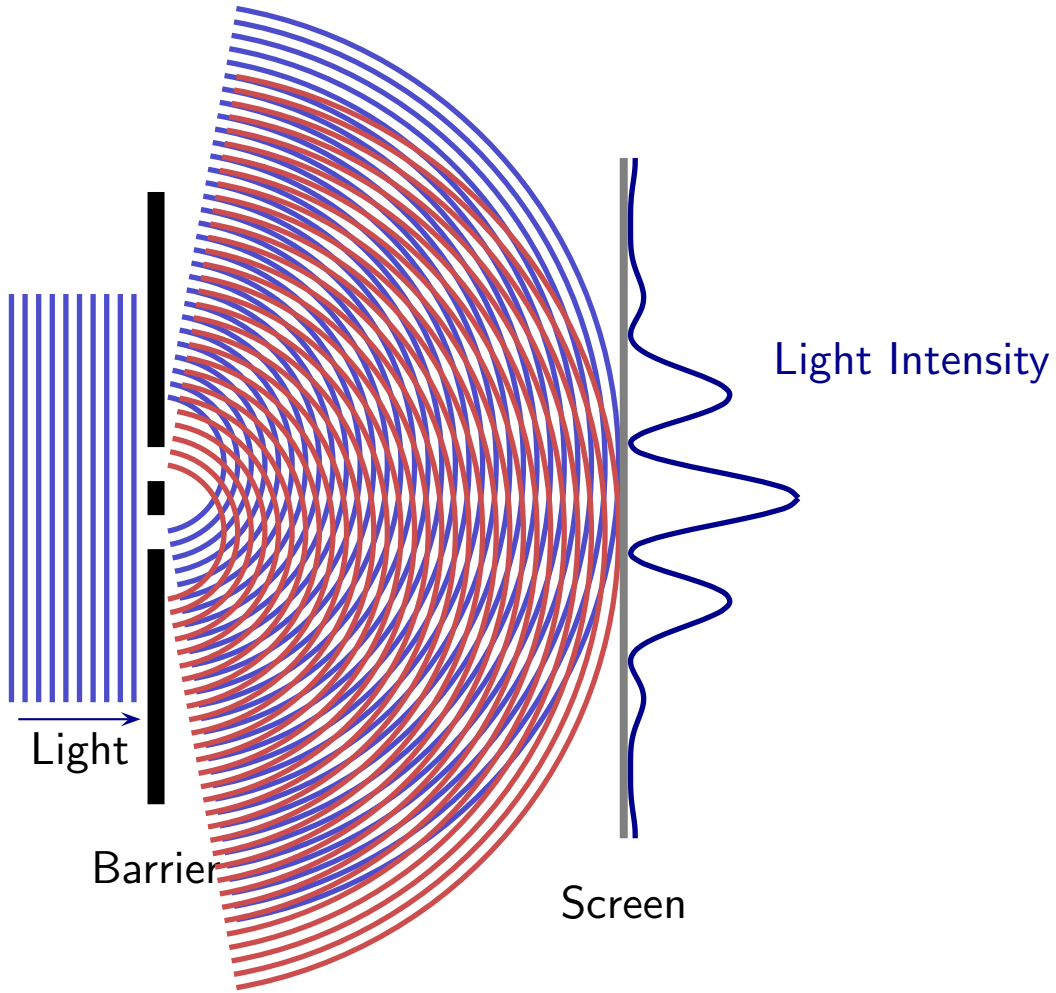
Warm Up Question 1

Light is incident upon two narrow slits. Consider possibilities for how the light might pass beyond a slit. Suppose that it traveled as rays, not spreading as they pass through the slits. Would the pattern of Fig 33.4 occur if this were true? Explain your answer.

1. Yes.
2. No. There would just be two bright areas.

Overlapping Waves from a Double Slit

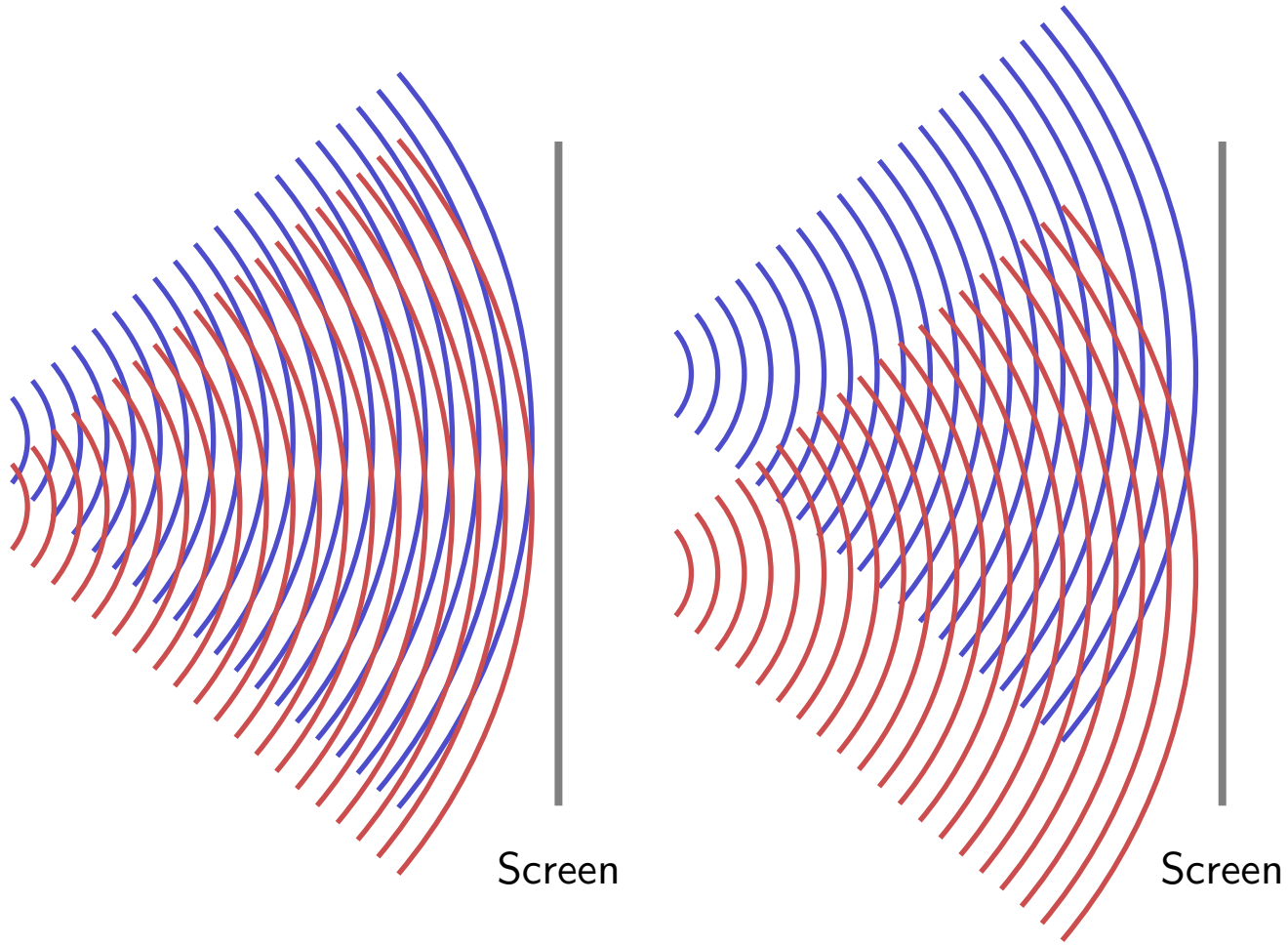


Warm Up Question 2

Fig. 33.3 illustrates interference between two sources. The antinodal lines correspond to waves of peak intensity. Suppose the distance between the sources is increased. Do the antinodal lines separate further apart, become closer or stay in the same place? Explain your answer.

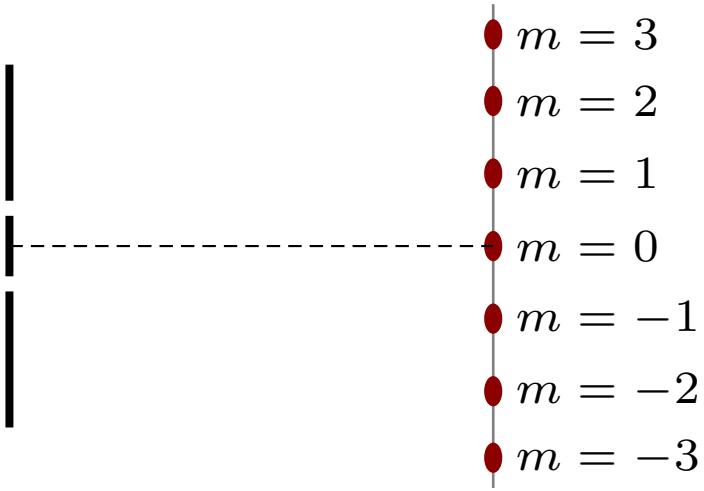
1. They separate more. Everything spreads out.
2. Stay the same. Wavelength stays the same.
3. The lines become closer. An equation predicts this.

Overlapping Waves from a Double Slit: Slit Separation



Question 1

Monochromatic light (of just one wavelength) is incident upon a double slit with separation d.

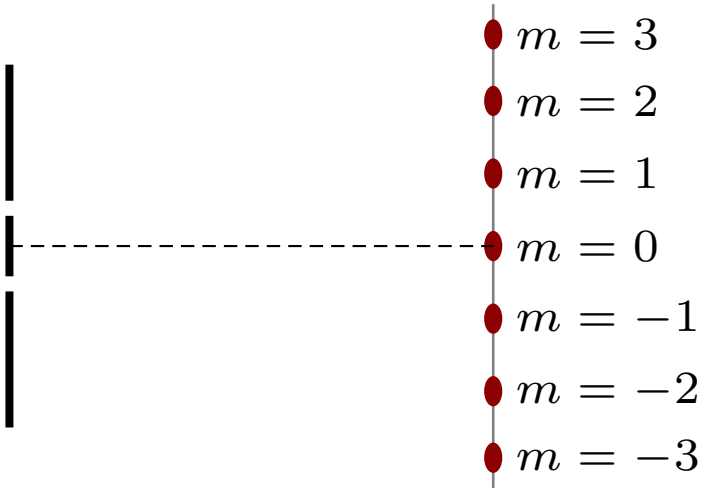


Let Δr be the difference between the "lower path distance" and the "upper path distance" to any point on the screen. Which of the following is true for the $m = 0$ bright fringe?

1. $\Delta r = 0$
2. $\Delta r = d$
3. $\Delta r = \lambda$
4. $\Delta r = \lambda - d$

Question 2

Monochromatic light (of just one wavelength) is incident upon a double slit with separation d.

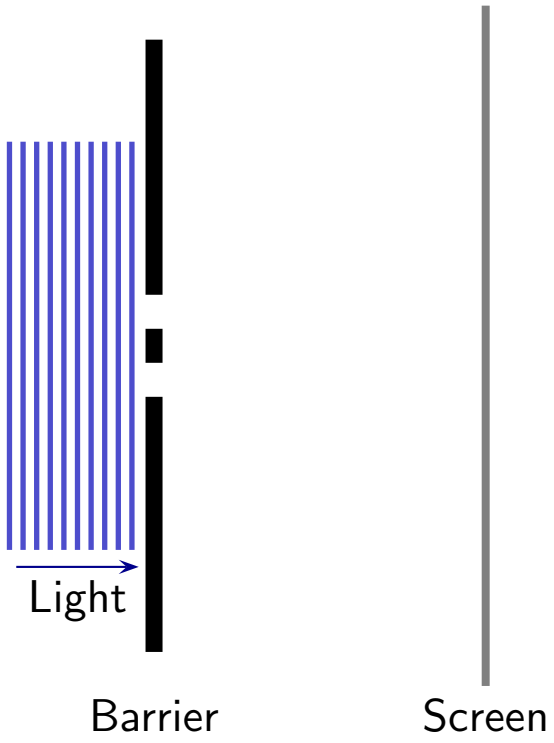


Let Δr be the difference between the "lower path distance" and the "upper path distance" to any point on the screen. Which of the following is true for the $m = 1$ bright fringe?

1. $\Delta r = 0$
2. $\Delta r = d$
3. $\Delta r = \lambda$
4. $\Delta r = 2\lambda$

Question 3

Monochromatic light (of just one wavelength) is incident upon a double slit.



The wavelength of the light increases. Which of the following describes what happens to the bright fringes?

1. Stay the same.
2. Spread out.
3. Squash together.
4. Stay in the same location but diminish in brightness.
5. Stay in the same location but increase in brightness.