Question 1

A diffraction grating is illuminated with yellow light (at normal incidence). The pattern seen on a screen behind the grating consists of three yellow spots, one at 0° (straight through) and one each at $\pm 45^\circ$.

You now add red light of equal intensity, coming in the same direction as the yellow light. Red light has a larger wavelength than yellow. The new pattern consists of:

1. red spots at 0° and 45°.
2. yellow spots at 0° and 45°.
3. orange spots at 0° and 45°.
4. an orange spot at 0°, yellow spots at 45°, and red spots slightly farther out.
5. an orange spot at 0°, yellow spots at 45°, and red spots slightly closer in.

Question 2

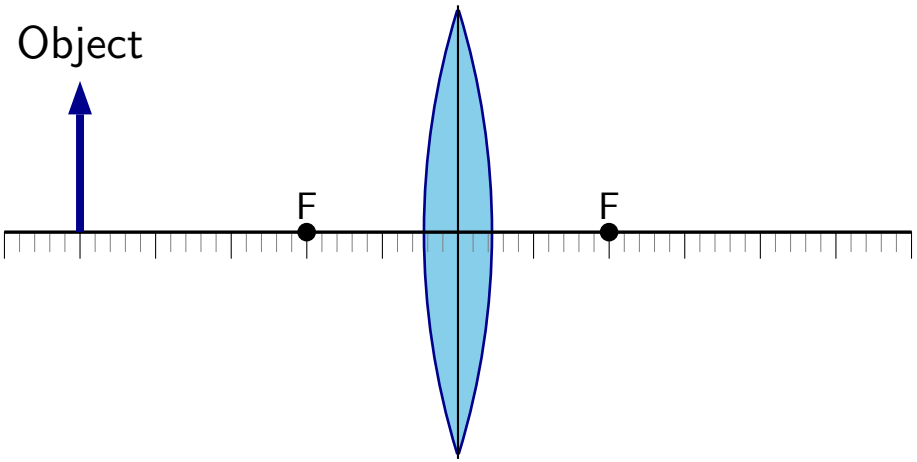
A string with length L is stretched between two fixed ends.

The tension in the string is increased and this increases the speed of waves on the string. Which of the following is the effect of the increased speed on the standing wave with one antinode?

1. Wavelength stays the same, frequency stays the same.
2. Wavelength stays the same, frequency increases.
3. Wavelength stays the same, frequency decreases.
4. Wavelength increases, frequency stays the same.
5. Wavelength increases, frequency decreases.
6. Wavelength decreases, frequency increases.

Question 3

An object is placed to the left of a convex lens and beyond the focal point as illustrated.



As the object is shifted closer toward the left focal point, which of the following is true?

1. The magnification stays constant.
2. The magnification decreases.
3. The magnification increases.