A simple movie projector consists of a single converging lens placed 50 cm in front of the film. The focal length of the lens is 49 cm.

film   lens (*f* = 49 cm)   screen

50 cm
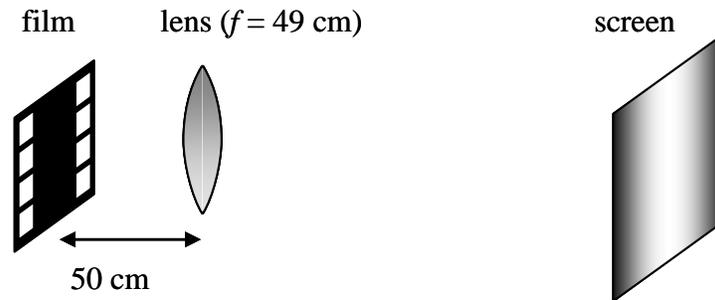
(a) How far away from the projector lens should the screen be placed?

(b) Should the film be oriented right-side-up or upside-down in the projector?
Did you make a ray-trace diagram in part (a)? If so, this question is a snap. ☺

(c) The movie screen has actually been placed 30 m away from the projector lens, which causes the picture to be out of focus. To correct this, you decide to add a second lens right after the first one.   (The lenses are so small that you can assume they are at the same position). What focal length must your second lens have? Is it diverging or converging?
This may be a bit tricky … you know where you want the image to be, but where's the object? Well, the object for your *second* lens is simply the image created by the first lens. Now think carefully about sign conventions … (you might want to read the summary sheet)

(d) That's a very long focal length you found in part (c) ... does that mean that your correcting lens is <u>strong</u> or <u>weak</u>? What would an *infinite* focal length mean?