Homework 15.1

Two points each; total

Exercises: 1, 2, 3, 5, 7, 8, 10, 11, 12, 13, 15
Problems: 1, 2, 4, 5

E.1 It is a real image of the circular sun itself.

E.2 The image would not be focused any longer. According to the lens equation $\frac{1}{o}+\frac{1}{i}=\frac{1}{f}$, if you change o, you also need to change i, for the image to be in focus again.

E.3 The 2.0-diopter lens has the shorter focal length.

E.5 The lens equation $\frac{1}{o}+\frac{1}{i}=\frac{1}{f}$ gives 0.5 cm as the focal length of the lens when the image and object distances are both 1.0 cm.

E.7 Their depths of focus are very small.

E. 8 You want the aperture as large as possible, and the shutter speed fast.

E.10 For this set-up the aperture is very small. This has two effects: 1) Little light passes through, which requires a long exposure time. 2) The depth of focus increases for small apertures.

E.11 Reducing the size of your eye's aperture increases its depth of focus.

E.12 A small iris means a small aperture, which increases the depth of focus.

E.13 In this case, the iris is large, thus, the aperture is large, and thus, there is a little depth of focus.

E.15 The lower magnification 2x glass has the longer focal length.

P.1 35 mm. Rays from far away objects (basically) come in parallel, so the rays get focused at the focal distance, f. Could also use lens equation, $\frac{1}{o}+\frac{1}{i}=\frac{1}{f}$ with o = ∞ (or very large number) → i= 35 mm.

P2. Lens equation: $\frac{1}{o}+\frac{1}{i}=\frac{1}{f}$ → i = 35.6 mm (convert m to mm).

P.4 Lens equation: $\frac{1}{o}+\frac{1}{i}=\frac{1}{f}$ → f = 15 cm.

P.5 Lens equation: $\frac{1}{o}+\frac{1}{i}=\frac{1}{f}$ → o = 5 m. (convert units).