Details

This assignment will be due in class on Wednesday, May 6.

- When you answer questions, please show your reasoning.
- When you answer multiple-choice questions, please show all of your work.
- Please answer problems in three steps, “Prepare”, “Solve” and “Assess”

Problems

Chapter 18: Ray Optics

Topic #1: Lenses, Mirrors, Images

Problems: 20, 28, 30, 32, 34, 72, 76

Chapter 19: Optical Instruments

Topic #2: Optical Instruments

Problems: 4, 6

Topic #3: Vision

Questions: 7, 8, 10, 14

Problems: 8, 52

Extra Problems:

Ex 1: My friend Lisa admitted that she needed reading glasses when her near point got to be 60 cm. What power lens, in diopters, would she need to be able to see clearly at a more comfortable distance of 25 cm?

Ex 2: A very myopic person has a near point of 8 cm, and a far point of 20 cm. What power lens does he need to see clearly at a distance? What is his new near point with this vision correction?

Past Exam Problem

Looking Sharp

The rod and cone cells in the central part of the retina—the fovea—are packed more closely, giving a more detailed view. This area of increased rod and cone density has a diameter of about 1.5 mm. When you read a book, you want the image of the text you are reading to fall on the fovea. If you hold a book 30 cm from your eyes, how wide is the spot on the page whose image just fills the fovea? That is, how wide an area do you see most clearly? Assume that the image on the retina forms 17 mm from the lens in the eye (which gives 1/s = 60.)

Grading

We will grade 2 items.

If we grade a question, we'll give it 0, 1 or 2 points. We’ll assign points as follows:

2 = essentially all correct; 1 = partially correct; 0 = mostly incorrect.

If we grade a problem, we'll give it 0, 1 or 2 points. We'll give 1 point for “Prepare” and 1 point for “Solve”. The “Assess” step will work as a fail safe. If you didn't get the solution quite right but your “Assess” step was thoughtful and well reasoned, you can still get the full 2 points.

We’ll assign 1 “Completeness Point” - with “Completeness” broadly interpreted. You need to make a serious effort on all the problems, do legible and complete work throughout, and staple your pages together.

Additional Practice

If you want additional practice, you can try the following problems:

Chapter 18:

Problems: 1, 11, 19, 23, 35, 41, 51, 57, 63

Chapter 19:

Problems: 1, 11, 19, 23, 35, 41, 51, 57, 63