End Material Test

All multiple choice questions

- 7 Multiple Questions worth 6 points each
- 1 Free Question worth 8 points
  (already in grade)

Topics from End Material including

- Reflection and refraction
- Concave and convex mirrors
- Lenses
- Double and single slit interference
- Diffraction
- Thin films

Final Exam

All problems with topics from entire course

- 40 points from topics that could have been on Exam I
- 40 points from topics that could have been on Exam II
- 40 points from topics that could have been on Exam III
- 80 points from End Material

Example: A pencil placed 30cm from a spherical mirror yields a real image 6cm from the mirror. (a) Is the mirror concave or convex? (b) Is the image erect or inverted? (c) Determine the radius of curvature of the mirror. (d) Determine the magnification.

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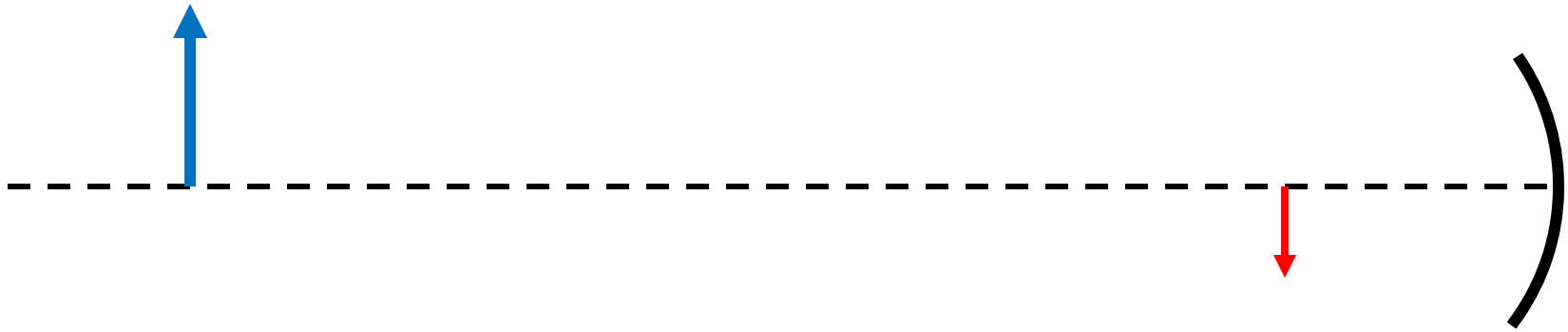

Example: An image of a 20.0cm tall object is to be projected on a screen 5.00m from the object. It is important that the image be 2.50m tall. Determine the location, focal length and type of thin lens to use.

Example: A student wants to create a interference pattern on a screen with bright spots separated by a distance of 25cm. She uses a 580nm laser normally incident on a pair of slits separated by a distance of 0.02mm. How far in front of the screen should she place the slits?

Example: A diffraction grating has 800lines/mm. A pair of lasers with wavelengths of $\lambda_A = 594.7\text{nm}$ and $\lambda_B = 594.1\text{nm}$ are incident upon a diffraction grating with 800lines/mm. How many lines must be illuminated to resolve the lasers in first order?

Example: The lasers from the previous problem, ($\lambda_A = 594.7\text{nm}$ and $\lambda_B = 594.1\text{nm}$) are normally incident on a single slit with a width of $2.50\mu\text{m}$. What is the angular separation of the second dark fringes due to the two lasers?

Example: 480nm light is incident on a thin film on the surface of a glass plate. The film has an index of refraction $n_f = 1.2$. The glass plate has an index of refraction $n_g = 1.5$. Determine the minimum film thickness to maximize transmission.