

THIRD MIDTERM

Name (print) ZHANG, TIAN Name (signed) _____

Discussion Instructor (circle): Condella Guilkey Leong Nott Paul Zhang

Discussion Section # _____

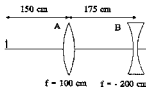
SHOW ALL WORK!!!!

REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!

Use the conversion constants and data given on the front page.

For the lens system shown, the object is 150 cm to the left of lens A.

- (a) Find the position of the final image, as a distance to the right or left (specify) of LENS A.
(b) Calculate the magnification, including sign.
(c) Is the image real or virtual?
(d) Is the image erect or inverted?



$$a) \quad S_A = 150 \text{ cm} \quad \frac{1}{S_A} + \frac{1}{S'_A} = \frac{1}{f_A} \quad S'_A = \frac{f_A S_A}{S_A - f_A} = \frac{100 \cdot 150}{50} = 300 \text{ cm}$$

$$S'_A - 175 = 125 \text{ cm} \quad \text{so } S_B = -125 \text{ cm}$$

$$\frac{1}{S_B} + \frac{1}{S'_B} = \frac{1}{f_B} \quad S'_B = \frac{f_B S_B}{S_B - f_B} = \frac{(-200)(-125)}{75} = 333 \text{ cm}$$

$$D_A = S'_B + 175 = 508 \text{ cm (Right of Lens A)}$$

$$b) \quad M = M_A M_B = \left(-\frac{S'_A}{S_A}\right) \left(-\frac{S'_B}{S_B}\right) = \left(-\frac{300}{150}\right) \left(-\frac{333}{-125}\right) = -5.33$$

c) real ($S'_B > 0$)

d) inverted ($M < 0$)