1) Photographic camera

a) [10 points] The size of a standard 35 mm negative is actually 25×36 mm². If you use a 50 mm focal length lens, what would be the field of view at a distance of 5 m?

b) [15 points] Suppose you take a picture of a group of your friends standing at this distance of 5 m, with a lens opening of f/5.6 and shutter speed of 1/250 sec. Now you change the opening to f/16. What shutter speed should you use to keep the same exposure? What happens to the depth of focus in your picture?

a) Magnification is \( \approx \frac{5000\text{mm}}{50\text{ mm}} = 100 \)

Field is then \( 2500 \times 3600\text{ mm} = 2.5 \times 3.6 \text{ m} \)

b) \( f/5.6 \rightarrow f/16 \) is 3 stops

Shutter speed needs to be \( 1/32 \text{ sec} \)

Depth of focus increases.