

1) in a 100×100 image in grayscale how many bytes

Answer: $100 \cdot 100 = 10 \text{ k Bytes}$

2) $G = 1000 \text{ mm}$ $g = 10000 \text{ mm}$ $B = 1 \text{ mm}$

Answer: $b = 10 \text{ mm}$

$$\frac{b}{B} = \frac{g}{G}$$

3) See markdown document

4) sensor dimensions $w = 6.4 \text{ mm}$ $h = 4.8 \text{ mm}$ $d = 8 \text{ mm}$ $\text{Lens}/f = 5 \text{ mm}$

$$\text{FOV}_x = 2 \cdot \arctan\left(\frac{6.4}{5.2}\right) = 65.2^\circ$$

$$\text{FOV}_y = 2 \cdot \arctan\left(\frac{4.8}{5.2}\right) = 51.3^\circ$$

$$\text{FOV}_d = 2 \cdot \arctan\left(\frac{8}{5.2}\right) = 77.3^\circ$$

5) Shutter Speed

6) Mathias has done