1

To resolve a line pair, at least three rows of sensors are needed.

$$\frac{7}{1024} \times 4 = 0.0273 \text{ mm}$$

This means the line pair on the chip has a width of 0.0205 mm. On the Object, the width of the line pair is:

$$\frac{35\ mm}{0.0273\ mm} = \frac{0.5m\ -\ 35mm}{W}$$

$$\text{W} = 0.3627 \text{ mm}$$

Therefore, the camera can resolve $\frac{1}{W} \approx 2.757$ line pairs per mm.

The running command for question 3:

```
% neareset neighbour
y = Nearest_11510478('rice.tif' ,[461,461]); % 461 =
round(256*1.8)
imwrite(y, 'Enlarged_11510478.tif');
y = Nearest_11510478('rice.tif' ,[205,205]); % 205 =
round(256*0.8)
imwrite(y, 'Shrinked_11510478.tif');
```