4.36 This problem asks that we determine the ASTM grain size number if 25 grains per square inch are measured at a magnification of 75. In order to solve this problem we make use of Equation 4.17—viz.

$$N_M \left(\frac{M}{100} \right)^2 = 2^{n-1}$$

where N_M = the number of grains per square inch at magnification M, and n is the ASTM grain size number. Solving the above equation for n, and realizing that $N_M = 25$, while $M = 75$, we have

$$n = \frac{\log N_M + 2 \log \left(\dfrac{M}{100} \right)}{\log 2} + 1$$

$$= \frac{\log 25 + 2 \log \left(\dfrac{75}{100} \right)}{\log 2} + 1 = 4.8$$