7.38 (a) Using the data given and Equation 7.9 (taking $n = 2$), we may set up two simultaneous equations with d_0 and K as unknowns; thus

$$(5.6 \text{ x } 10^{-2} \text{ mm})^2 - d_0^2 = (40 \text{ min})K$$

$$(8.0 \text{ x } 10^{-2} \text{ mm})^2 - d_0^2 = (100 \text{ min})K$$

Solution of these expressions yields a value for d_0, the original grain diameter, of

$$d_0 = 0.031 \text{ mm},$$

and a value for K of $5.44 \text{ x } 10^{-5} \text{ mm}^2/\text{min}$

(b) At 200 min, the diameter d is computed using a rearranged form of Equation 7.9 as

$$d = \sqrt{d_0^2 + Kt}$$

$$= \sqrt{(0.031 \text{ mm})^2 + (5.44 \text{ x } 10^{-5} \text{ mm}^2/\text{min})(200 \text{ min})} = 0.109 \text{ mm}$$