1-1. With reference to Fig. 1-1, show that the theoretical discharge of the open-channel flow may be expressed by

$$Q = A_2 \sqrt{\frac{2g(\Delta y - h_f)}{1 - (A_2/A_1)^2}} \qquad (1\text{-}12)$$

where A_1 and A_2 are the cross-sectional areas of the flow at sections 1 and 2, respectively, and Δy is the drop in water surface between the sections.

2-3. Construct curves similar to those shown in Fig. 2-1, for a square channel section.

2-4. Construct curves similar to those shown in Fig. 2-1 for an equilateral triangle with one side as the channel bottom.