Open Channel Hydraulics Practice Problems:

Exercises 2.7 on page 34 of textbook (Problems 1-5)

Additional Problems

1. You are asked to design a rectangular channel that has the minimum wetted perimeter and that conveys flow in critical conditions. Find the relationship between the critical depth and the channel width.
   Answer: $Y_c = (3/4)\ B$

2. Show that the following relationship is satisfied between the alternate depths and the critical depth for a rectangular channel:
$$\frac{2y_1^2 y_2^2}{y_1 y_2} = y_c^3$$

3. A trapezoidal channel has a side slope Z = 0.75 and conveys a flow discharge of 1 m^3/s. For a given specific energy the alternate depths are 1.2 m and 0.234 m. Find the critical depth.
   Answer: $Y_c = 0.46$ m

4. A road ditch has a longitudinal slope of 0.0035 and has the cross-section shown below. If the flow discharge is 2.36 m^3/s, find (a) the critical depth and (b) the Manning's roughness coefficient in such a way that the flow is normal and at the same time critical.

   Answer: $Y_c = 1$ m, $n = 0.014$