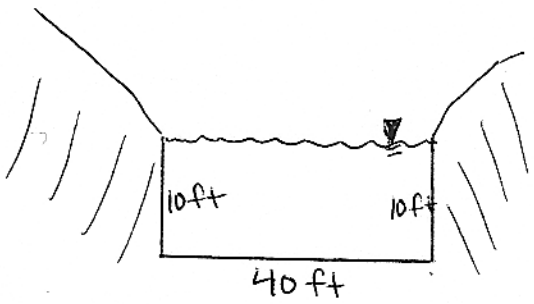
Example of Manning's Equation

Example 1: Find Q using manning's Equation if the stream slope, S, is 0.0003 and the channel bed is made of **firm gravel**.



$$Q = \frac{1.49}{n} \times A \times R^{0.667} \times S^{0.5}$$

STEP 1: We need to find n, A, R, and S.

S = 0.0003 This was given

A = 10ft x 40ft = 400ft² (Cross-sect area)

P = 10ft + 40ft + 10ft = 60ft (Wetted perimeter)

$$R = \frac{A}{P} = \frac{400\,ft^2}{60\,ft} = 6.67\,ft$$

n = 0.025 (Look up on Fig. 5)

STEP 2: Now plug in the values.

$$Q = \frac{1.49 * 400 \times (6.67)^{.667} \times (0.0003)^{0.5}}{0.025}$$

$$Q = \frac{1.49 * 400 * 3.5456 * 0.01732}{0.025}$$

$$\boxed{Q = 1464\ ft^3/s}$$