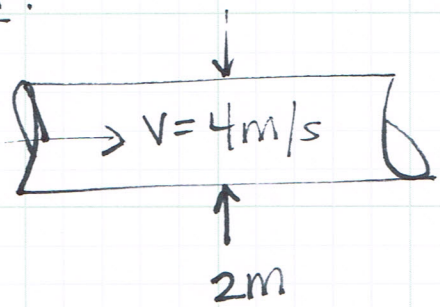
5.9) A pipe with a 2 m diameter carries water having a velocity of 4m/s. What is the discharge in cubic meters per second and in cubic feet per second?

SKETCH:



KNOWN

Dia = 2m
V = 4m/s

GOVERNING EQN.

$Q = VA$

UNKNOWN

$Q = ?$ (ft^3/s) & (m^3/s)

SOLUTION

$$Q = VA = 4\,m/s\left(\frac{\pi(2m)^2}{4}\right) = \boxed{12.56\,m^3/s = Q}$$

$$\frac{12.56\,m^3}{s} * \left(\frac{3.28\,ft}{1m}\right)^3 = \boxed{443.2\,ft^3/s = Q}$$