Symbols and Constants

$\sum \rightarrow$ Summation Sign ; $\sum$ Forces = sum of the forces

$\bullet \rightarrow$ multiplication shorthand

$\pi = 3.14159$

log = logarithm base 10

ln = natural log - base e

e = 2.71828

$$a^p \bullet a^q = a^{p+q}$$

$$a^p \Big/ a^q = a^{p-q}$$

$$\left(a^p\right)^q = a^{p \bullet q}$$

$$\sqrt[n]{a} = a^{1/n}$$

$$\frac{1}{y^n} = 1 \bullet y^{-n}$$

Given the equation:

$F = m \bullet a$ if m=1.53
F=49.27

determine a.

Units Conversion

Given River Discharge = 100 ft^3 / sec

1 ft^3 = 7.48 gallons

1 min = 60 seconds

Solve for discharge in gallons / min

For the following equation solve for y

$$10y + 20y = 300$$

For the following equation, solve for x.

$$\left(x^3\right)^2 = 10{,}000$$

For the following equation, solve for y.

$$\frac{y^6}{y^2} = 450$$

Given the following equation,

$$v = \frac{1.49}{n} R^{2/3} S^{1/2}$$

$$n = 0.035,\ R = 6,\ s = .003$$

solve for v.

If the river slope is 0.003 ft/ft, what is the slope in ft/mile? (1mile=5280 ft)

If you have the following equation:

$$Fr = \frac{V}{\sqrt{gD}}$$

Fr = Froude Number
V = River Velocity
g = acceleration due to gravity
D = Hydraulic Depth

A) Determine Fr for a discharge measurement you just made where

Q = 100,000 cfs
T (top width) = 500 ft
Area = 20,000 ft^2
g = 32.2 ft / sec^2
Remember $V = \frac{Q}{A}$ and $D = \frac{A}{T}$

B) What are the units on Fr?

If you have the following equation:

$$F = \frac{1}{2} b y^2 \gamma$$

$$F = 100,\ b = 2,\ \gamma = 1$$

solve for y.

Determine the area of a circle of radius 2 feet.

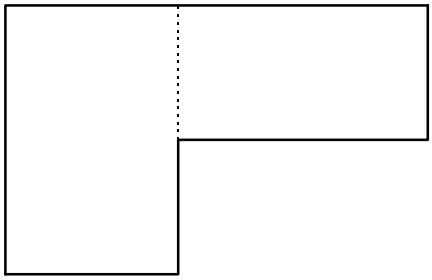
Trial and Error problem

If you have the following equation

$$4.24 = D + \frac{8.9441}{D^2}$$

Solve for D

Determine the Area of the following cross section:



For the cross section above, what is the depth in section A if the total area of the cross section was 1500?

Determine the $\log\left(\frac{ayx}{b}\right)$. $a = 10,\ y = 3,\ x = 6,\ b = 3$

Given

$3 = \log(4x)$

Determine x.

Determine x if $\ln 5.5 = x$.

Determine y if $3.2 = \ln(6y)$.

Math Refresher