1.7 Literal Equations (aka Formulas)

A Literal Equation is an equation that involves several unknown variables. This type of equation is referred to as a Formula.

To transform or Solve literal equations; use the same processes of solving an equation but solve for the specified variable. (Inverse Operations)

Example 1: Solve for specified variable.

a.) $3y - 6x = 9$, solve for y (isolate "y")

$+6x \quad +6x$ ← Not like terms

$\frac{3y}{3} = \frac{6x}{3} + \frac{9}{3}$

$y = 2x + 3$

Slope-Intercept Form

b.) $S = C + rC$, solve for r

$-C \quad -C$

$\frac{S-C}{C} = \frac{rC}{C}$

$\frac{S}{C} - 1 = r$

c.) $A = \frac{1}{2}bh$, solve for h (Area of a △)

$(2)A = 2(\frac{1}{2}bh)$

$\frac{2A}{b} = \frac{bh}{b}$

$\frac{2A}{b} = h$

d.) $C = \frac{5}{9}(F - 32)$, solve for F

multiplied by the reciprocal!

$(\frac{9}{5})C = (\frac{9}{5})\frac{5}{9}(F-32)$

$\frac{9}{5}C = F - 32$

$+32 \quad +32$

$\frac{9}{5}C + 32 = F$

e.) $v^2 = \frac{GM}{r}$, solve for M

$(r)v^2 = \frac{GM}{r}(r)$

$\frac{rv^2}{G} = \frac{GM}{G}$

$\frac{rv^2}{G} = M$

f.) $\frac{a-b}{c} = \frac{d}{3}$, solve for a ← Proportion!

$3(a-b) = cd$

$\frac{3(a-b)}{3} = \frac{cd}{3}$

$a - b = \frac{cd}{3}$

$+b \quad +b$

$a = \frac{cd}{3} + b$

g.) $C = 2\pi r$, solve for r

$\frac{C}{2\pi} = \frac{2\pi r}{2\pi}$

$\frac{C}{2\pi} = r$

h.) $q = p(r+s)$, solve for p

$\frac{q}{(r+s)} = \frac{p(r+s)}{(r+s)}$

$\frac{q}{r+s} = p$

i.) $A = \frac{h(b_1+b_2)}{2}$, solve for b_1 (Area of a trapezoid)

$(2)A = \frac{h(b_1+b_2)}{2}(2)$

$\frac{2A}{h} = \frac{h(b_1+b_2)}{h}$

$\frac{2A}{h} = b_1 + b_2$

$-b_2 \quad -b_2$

$\frac{2A}{h} - b_2 = b_1$

Example 2: Solve each word problem.

* Read the problem completely before trying to solve it.
* Highlight or underline key information in the problem.
* Write down any FORMULAS needed.
* Define the variables.
* Draw a picture to aid in understanding or solve the problem.
* Don't forget the units of measure.
* Write your solution as a statement.

a.) The length of a rectangle is 3 more than twice the width. The perimeter of the rectangle is 36 inches. What are the width and length of the rectangle?

The width is 5in and the length is 13in.

b.) The sum of two consecutive integers is 45. Find the integers. (Consecutive means next (in order))

n = 1st integer → $n+(n+1)=45$

$n+1$ = 2nd integer

$2n+1=45$

$-1 \quad -1$

$2n=44$

$n=22$

$n+1=?$

$22+1=23$

↑ No fractions
No Decimals

The two integers are 22 and 23.

c.) Find three consecutive even integers such that the sum of the smallest and 3 times the largest is 76.

d.) Kelly is planning a trip to Florida. She has locked in a round-trip airfare, including all taxes and fees, of $250. She has a hotel rate of $80 per day, including taxes. She estimates an average of $50 per day for food and has allowed a total of $200 for miscellaneous items (souvenirs, clothes, etc.). Kelly has a budget of $1600, what is the maximum number of days Kelly can spend in Florida?

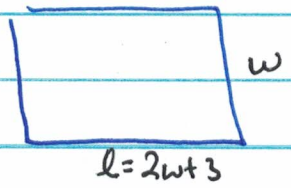
e.) In Myrtle Beach, there are two companies that rent out bikes. Company A charges a security deposit fee of $21 and $4 per hour for each hour spent riding the bike. Company B charges a security deposit fee of $5 and $8 per hour for each hour spent riding the bike. How many hours will the cost be the same?

f.) You are riding a bike at 21 minutes per 5 miles. If you continue at this rate, how long will it take you to go 12 miles?

FdM1 1.7 Notes

Example 2:

$P = 2l + 2w$



a) $P = 36$

$l = 2w + 3$

$w = w$

$36 = 2(2w+3) + 2w$

$36 = 4w + 6 + 2w$

$36 = 6w + 6$

$-6 \quad -6$

$\frac{30}{6} = \frac{6w}{6}$

$w = 5$ inches

only the width, need to find the length!

Find the length!

$l = 2w + 3$

$l = 2(5) + 3$

$l = 10 + 3$

$l = 13$ in

b)

n = 1st integer

$n+1$ = 2nd integer

1st Number, 2nd Number

$n + (n+1) = 45$

$2n + 1 = 45$

$-1 \quad -1$

$\frac{2n}{2} = \frac{44}{2}$

$n = 22$

This is the first integer! Find the second integer

$n+1$ = 2nd integer

$(22)+1$ = 2nd integer

23 = 2nd integer