Math 115

Spring 2017

Lecture 15

Multiplying $(ax+b)(cx+d)$ by FOIL method:

F → First ones

O → outside ones

I → Inside ones

L → Last ones

Multiply

$(x+4)(x+6)$

$= x\cdot x + 6\cdot x + 4\cdot x + 4\cdot 6$

$= \boxed{x^2 + 10x + 24}$

Multiply:

$(3x+2)(4x-1) = 3x\cdot 4x - 3x\cdot 1 + 2\cdot 4x - 2\cdot 1$

$= \boxed{12x^2 + 5x - 2}$

Multiply:

$(5x-3)(2x-4)$

$= 5x \cdot 2x - 5x \cdot 4 - 3 \cdot 2x + 3 \cdot 4$

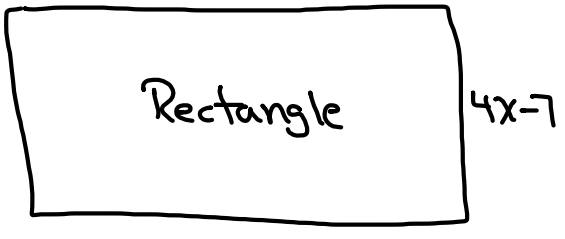
$= \boxed{10x^2 - 26x + 12}$

Use ~~extended~~ FOIL to multiply

$(x+2)(x^2-2x+4)$

$= x \cdot x^2 - x \cdot 2x + 4x + 2x^2 - 2 \cdot 2x + 2 \cdot 4$

$= \boxed{x^3 + 8}$



$P = 2L + 2W$

$= 2(4x+7) + 2(4x-7)$

$= 8x + 14 + 8x - 14$

$\boxed{P = 16x}$

$A = LW$

$= (4x+7)(4x-7)$

$= 4x \cdot 4x - 4x \cdot 7 + 7 \cdot 4x - 7 \cdot 7$

$= 16x^2 - 28x + 28x - 49 \Rightarrow \boxed{A = 16x^2 - 49}$

Start looking/working on SG 12 – 15

Finish the problems that look familiar.

Mixture Problems:

%	+	%	=	%

% · Amount + % · Amount = % · Amount

How many liters of 25% Salt Solution must be added to 20 liters of 12% Solution to obtain a new Solution that is 20% Salt?

25% Salt	+	12% Salt	=	20% Salt
x liters		20 L		y

$$\begin{cases} x + 20 = y \\ \frac{25}{100}\cdot x + \frac{12}{100}\cdot 20 = \frac{20}{100}\cdot y \end{cases} \quad \cdot 100$$

$$\begin{cases} x + 20 = y \\ 25x + 12\cdot 20 = 20y \end{cases} \quad \div 5$$

$$\begin{cases} x + 20 = y \\ 5x + 48 = 4y \end{cases}$$

Use Subs. method

$$\begin{cases} x + 20 = y \\ 5x + 48 = 4y \end{cases}$$

$5x + 48 = 4(x+20)$

$5x + 48 = 4x + 80$

$5x - 4x = 80 - 48$

$\boxed{x = 32} \rightarrow y = 32 + 20$

$\boxed{y = 52}$

32 L of 25% Salt Soln. must be added to 20L of 12% Salt Solm. to obtain 52 L of 20% Salt Soln.

we need 50 pounds of a metal at 50% Silver.

we have two metals, one @ 35% Silver, and another one @ 65% Silver. How many pounds of each?

35% Silver	+	65% Silver	=	50% Silver
x pounds		y pounds		50 pounds

$$\begin{cases} x + y = 50 \\ \frac{35}{100}\cdot x + \frac{65}{100}\cdot y = \frac{50}{100}\cdot 50 \end{cases} \quad \begin{matrix} \\ \times 100 \end{matrix}$$

$$\begin{cases} x + y = 50 \\ 35x + 65y = 2500 \end{cases} \quad \div 5$$

$$\begin{cases} x + y = 50 \\ 7x + 13y = 500 \end{cases} \xrightarrow{\cdot(-7)} \begin{cases} -7x - 7y = -350 \\ 7x + 13y = 500 \end{cases}$$

$$6y = 150$$

$$y = 25$$

$$x + 25 = 50$$

$$x = 25$$

25 pounds of each.

we have unlimited supply of Pure butter & 70% butter, but we need 60 tablespoon butter at 80% rate. How many tablespoon of each?

Pure butter "100%"	+	70% butter	=	80% butter
x		y		60

$$\begin{cases} x + y = 60 \\ \frac{100}{100} \cdot x + \frac{70}{100} \cdot y = \frac{80}{100} \cdot 60 \end{cases} \xrightarrow{\cdot 100} \begin{cases} x + y = 60 \\ 100x + 70y = 80 \cdot 60 \end{cases}$$

$$-7\begin{cases} x + y = 60 \\ 10x + 7y = 480 \end{cases} \Rightarrow \begin{cases} -7x - 7y = -420 \\ 10x + 7y = 480 \end{cases}$$

$$3x = 60$$

$$\boxed{x = 20}$$

20 table spoon of Pure butter and 40 table spoon of 70% butter to obtain 60 table spoon of 80% butter.

WP 10 due Monday.

%	+	%	=	%
% · Amount		% · Amount		% · Amount

P_1%	+	P_2%	=	P_3%
x		y		Total Amount

$$\begin{cases} x + y = \text{Total} \\ P_1\% \cdot x + P_2\% \cdot y = P_3\% \cdot \text{Total} \end{cases}$$