Syllabus (1) bCourse
(2) math.berkeley.edu/~mshea/teaching.html

Precalculus: A prelude to calculus, 3rd ed.
Axler

Grade:

Homework	10%	
Quizzes	20%	
M1	20%	(Feb 25)
M2	20%	(April 13)
Final	30%	

OH: M 2-3 (1/24 OH 4-5)
F 10-11

Ch 0.2.

Commutativity = order of numbers when we add or multiply doesn't matter

$$\begin{cases} a+b=b+a, \quad ab=ba \\ a, b \text{ real numbers} \end{cases}.$$

Ex. $3+5 = 5+3$

$8 \quad 8$

T/F? $3-5 \stackrel{?}{=} 5-3$ DOES NOT WORK FOR SUB!!

$3+(-5) = (-5)+3$

Associativity = group doesn't matter in addition or multiplication

$(a+b)+c = a+(b+c)$, $(ab)c = a(bc)$

a, b, c real numbers

Ex. $3(8x) = (3\cdot 8)x$

$= 24x$

Ex. $10-2\cdot 4 = 10-8$

$= 2$

addition of $\ominus$ number

Rule 1. mult ($\div$ div) before add ($\div$ sub).

mult by a fraction

PEMDAS

Never use ÷ !!

Rule 2. evaluate (inner most) parentheses first.

Ex $3+2(10-4) = 3+2(6)$
$= 3+12$
$= 15$

$[\ ]\ \{\ \}$

Ex. $2(4+2(1+1)) = 2(4+2(2))$
$= 2(4+4)$
$= 2(8) = 16$

Exercise. $(3+1)(2+3(6-4)) = (4)(2+3(2))$
$= (4)(2+6)$
$= 4 \cdot 8 = 32$

Distributive property. converts a product w/ a sum into a sum of two products

$a(x+y) = ax+ay$, $(a+b)x = ax+bx$
a, b, x, y real numbers.

Ex. Simplify $3(2x+1)-x = 3(2x)+3(1)-x$

$= 6x+3-x$

$= 5x+3$

Ex. Expand $(a+b)(x+y)$ (FOILING)

$= a(x+y)+b(x+y)$

$= ax+ay+bx+by$

Exercise expand $(3x+1)(x-3)$

$= 3x^2-9x+x-3$

$= 3x^2-8x-3$

Exercise expand $(a+b)^2 = (a+b)(a+b)$ (split up)

$(a+b)x = ax+bx$

$= a(a+b)+b(a+b)$

$= a^2+ab+ba+b^2$

$= a^2+2ab+b^2$

Additive inverse $a+(-a)=0$

Ex $5+(-5)=0$

$\pi+(-\pi)=0$

Ex. Expand $(x+y)(x-y) = (x+y)(x+(-y))$

difference of sums

$= x(x+(-y)) + y(x+(-y))$

$= x^2 - xy + yx - y^2$

$= x^2 - y^2$

Multiplicative inverse. ~~of~~ a non-zero real number b is $\frac{1}{b}$

$$b\left(\frac{1}{b}\right) = 1$$

Ex. $3\left(\frac{1}{3}\right) = 1$ $\frac{1}{3}$ is the mult. inv. of 3.

Mult of fractions $\frac{a}{b}\left(\frac{c}{d}\right) = \frac{ac}{bd}$

Ex. $\frac{3}{8} \cdot \frac{x}{2} = \frac{3x}{16}$

$\left(\frac{1}{3} = \frac{3}{9}\right)$ $\frac{3}{9} = \frac{3(1)}{3(3)}$

Cancellation. $\frac{ac}{ad} = \frac{c}{d}$

Ex. $\frac{1}{x+2}\left(\frac{3(x+2)}{5}\right) = \frac{3(x+2)}{5(x+2)} = \frac{3}{5}$

Ex. Simplify $\frac{x^2}{2}\left(\frac{x+1}{3x}\right) = \frac{x^2(x+1)}{6x} = \frac{x(x+1)}{6}$

($x^2 = x \cdot x$)