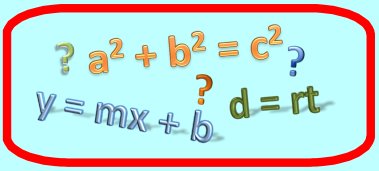
Math 115

Spring 2018

Lecture 17



Expression: Combination of variables (Letters), numbers, and operations

$4x+3$, $2x^2-5x+1$, $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$, $\frac{\sqrt{x}-1}{x-1}$

No equal Signs

1) We can evaluate expressions.

Evaluate $4x-13$ for $x=-2$.

$4(-2)-13 = -8-13 = \boxed{-21}$

Evaluate $\sqrt{x^2+y^2}$ for $x=6$ & $y=-8$.

$\sqrt{x^2+y^2} = \sqrt{(6)^2+(-8)^2} = \sqrt{36+64} = \sqrt{100} = \boxed{10}$

Evaluate

① $\frac{x+5}{x-3}$ for $x=3$, and $x=-5$.

$\frac{x+5}{x-3} = \frac{3+5}{3-3} = \frac{8}{0}$ undefined

$\frac{x+5}{x-3} = \frac{-5+5}{-5-3} = \frac{0}{-8} = \boxed{0}$

② $\frac{-b+\sqrt{b^2-4ac}}{2a}$ for $a=2$, $b=-3$, and $c=-5$.

$$\frac{-b+\sqrt{b^2-4ac}}{2a} = \frac{-(-3)+\sqrt{(-3)^2-4(2)(-5)}}{2(2)} = \frac{3+\sqrt{9+40}}{4}$$

$$= \frac{3+\sqrt{49}}{4} = \frac{3+7}{4} = \frac{10}{4} = \boxed{\frac{5}{2}}$$

③ $\frac{|x-6|}{x+3}$ for $x=-4$

$$\frac{|x-6|}{x+3} = \frac{|-4-6|}{-4+3} = \frac{|-10|}{-1} = \frac{10}{-1} = \boxed{-10}$$

④ $\sqrt{(x_1-x_2)^2+(y_1-y_2)^2}$ for $x_1=3$, $x_2=-3$, $y_1=0$, $y_2=8$.

$$= \sqrt{(3-(-3))^2+(0-8)^2}$$

$$= \sqrt{(3+3)^2+(-8)^2} = \sqrt{6^2+(-8)^2} = \sqrt{100} = \boxed{10}$$

We can also Simplify expressions by Combining like terms.

Same variable & Same exponent

$4x^2$, $-3x^2$, $\frac{1}{2}x^2$, $\frac{-3}{5}x^2$

$5x^3y^2$ $\quad$ $-2x^2y^3$

Same variables but not same exponent $\Rightarrow$ unlike terms.

Simplify

① $7x^2 - 3x^2 + 6x^2 = (7-3+6)x^2$

$= 10x^2$

② $-12x^3 + 8x^2 + 15x^3 - 5x^2$

$= 3x^3 + 3x^2$

③ $7x^2y^3 + 8xy - 6x^2y^3 + 12xy$

$= 1x^2y^3 + 20xy = x^2y^3 + 20xy$

Distribute & Simplify

$4(2x-3)+6(3x+2)$

$= 8x - 12 + 18x + 12$

$= \boxed{26x}$

$-3(5x^2-6x+1)+8(2x^2-3x-1)$

$= -15x^2 + 18x - 3 + 16x^2 - 24x - 8$

$= 1x^2 - 6x - 11 = \boxed{x^2-6x-11}$

Translate, then Simplify

Twice the Sum of [square of some number] and -5, [reduced by] 3 times the difference of [10] and [twice the number.]

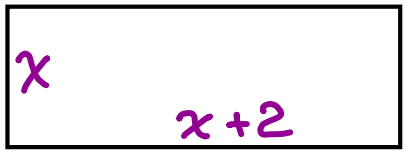
$2(x^2 + -5) - 3(10 - 2x)$

$= 2x^2 - 10 - 30 + 6x = \boxed{2x^2+6x-40}$

Descending order

Dimensions of a rectangle are two cons. odd integers.

1) Draw & label such rectangle



2) Find an expression in simplest form for its perimeter.

$P = 2L + 2W$

$= 2(x+2) + 2(x)$

$= 2x + 4 + 2x$

$P = 4x + 4$