PRE-ALGEBRA & ALGEBRA CONCEPTS

Homework:
Pre-algebra:
- Percentages: pg521-1D: all & pg522-1E: 6,7,8
- Ratios: pg 524-1F:2,3,7

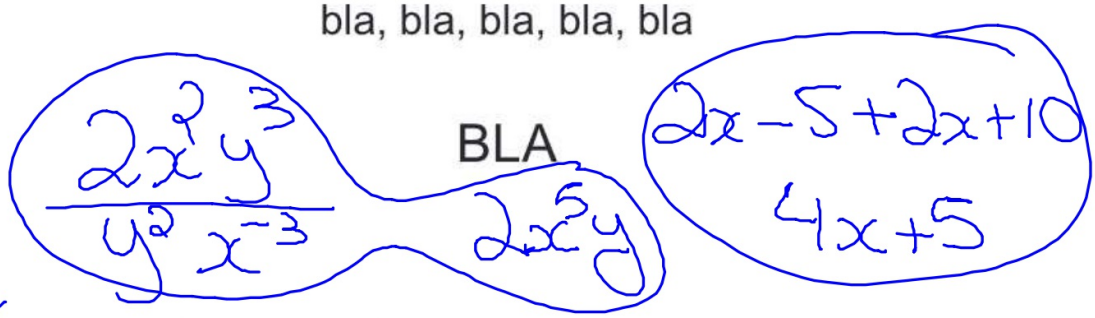
Algebra:
- Distributive: pg526-2A:all
- Rearranging Formulas: pg526-2B:all
- Substituting into a Formula: You already have done that. So this is optional: pg527-2C
- Linear Equations: pg 529-2D:all

How did math started? (its building blocks, so of speak)

1. Numbers:
2. Variable: x, y, l, p, q
3. Expression: Simplify, Evaluate
   x, or $x+2$; x^2+2; 2^x, 2^{x-10}; $\sin 2x$
4. Equations: $x+2=10$; $x^2=4$; $2^x=8$; $\sin 2x=\frac{1}{2}$
5. Functions $f(x)=x+2$; $f(x)=x^2+2$; $f(x)=2^x$; ~~$f(x)=\sin 2x$~~

SIMPLIFYING

bla, bla, bla, bla, bla



- ☑ Order of Operations
- ☑ Like Terms (Polynomials)
- ☑ Distributive Property
- ☑ Exponents (Radical) Rules

Index Laws

Order of Operations: WHY?

$6-4\times5$

-14

$6-4\times5$

10

We need RULES!
THUS Oder of Operations

Order of operations

- BEDMAS or PEMDAS

1. ( ) or [ ]
2. exp. or √
3. Multiplication & Division
4. Addition & Subtraction

} always inner, then out

} Always from left to right

Example:

$$15-\left[(50-25)\times 8^2-4\right]$$

$$15-\left[25\times 8^2-4\right]$$
$$15-\left[25\times 64-4\right]$$
$$15-\left[1600-4\right]$$
$$15-1596$$
$$-1581$$

Like Terms (name the different parts of a polynomial)

$$4x^3-2x^2-3x^1+10$$

Cubic

- ☑ Degree of Polynomial — Linear → 1, Quadratic → 2
- ☑ Number of Terms
- ☑ Term
- ☑ Variable x
- ☑ Coefficient i.e. 4; −2; −3
- ☑ Independent term or constant

Like Terms

- You can only add & subtract like terms
- So what are they? variable and its degree

$$2x^3 - 5x + 10x^2 + 25 - 3x^2 + 2x^3 - 1 + 3x + 2 + 4x^2$$

$6x^3 + 11x^2 - 2x + 26$

4 COLORS THEREFORE 4 TERMS

Like Terms

$$2xy + 3x - 3xy + 2y + 4xy - 10$$

$3xy + 3x + 2y + 10$

SEE 4 COLORS THEREFORE 4 TERMS

Note: Like Term refers to adding and subtracting

- What happens when you are multiplying/dividing?

$(2x)(-3x)$

$-6x^2$

$(5xy)(4xy)$

$20x^2y^2$

$(2x)(-5y)$

$-10xy$

$(-8x)(-2xy)$

$16x^2y$

$(2x)(-5xy)$

$-10x^2y$

$\frac{(-4x)}{(-2y)}$

$\frac{2x}{y}$ Keep the y in the denominator

Distributive Property

$2(x-6)$

$2x-12$

$-3(u+10)$

$\frac{2}{5}\left(\frac{3}{4}-\frac{6}{3}\right)$

$\frac{1}{3}(2x+10)$

$5-2(y+1)$

$5-2y-2$

$10x+(3x+1)$

$10x+3x+1$

$10x-(3x+1)$

$10x-3x-1$

Solving equations

Don't use "Guess & Check"

- What does it mean?

$2x+5=15$

$2x=10$

$x=5$

linear

- 3 possibilites: 1 solution, No solution, Infinite Solutions

Note: I have never seen a "no solution" and "infinite solutions" in Math Studies, but still, it is good to know.

$2(x+1)=2x+5$

$2x+1=2x+5$

$2x-2x=5-1$

$0=4$

$2(x+3)=2x+6$

$2x+6=2x+6$

$2x-2x=6-6$

$0=0$

Linear Equations

- 1-step, 2-steps….

Use your method to solve equations.
However, I recommend to first simplify each side of the "equal"

i.e.

$2x-3(x+1)=10-2x+4$

$2x-3x-3=14-2x$

$-x-3=14-2x$

NOW START SOLVING

$-x+2x=14+3$

$x=17$

Linear equations

- Proportions

$$\frac{x}{3}=\frac{1}{2}$$
$$2x=3$$
$$x=\frac{3}{2}$$

Tricky…. Put the (….)

$$\frac{(x+2)}{7}\quad\frac{(x-1)}{4}$$

$$4(x+2)=7(x-1)$$
$$4x+8=7x-7$$

Percentages

① What % is 12 of 215?

$$\frac{?}{100}\times\frac{12}{215}$$
$$?\times 215=12\times 100$$
$$?=5.58\%$$

② ~~what~~ % of ?

what # is 10% of 225? $\frac{10}{100}=\frac{?}{225}$

③ 12 is 10 % of what number?

$$\frac{10}{100}=\frac{12}{?}$$

Percentages and "how many"?

① Total

If there are 28 boys in Math Studies or 8 %, how many students are in total in Math Studies?

$$\frac{28}{\text{Total}} = \frac{8}{100}$$
$$\text{Total} = \frac{2800}{8}$$
$$\text{Total} = 350\text{students}$$

② A portion

Ex:
If 4.8% of the 500 high school students are swedish, how many swedish students are there?

$$\frac{\text{swedish}}{500} = \frac{4.8}{100}$$
$$\text{swedish} = \frac{4.8 \times 500}{100}$$
$$\text{Swedish} = 24$$

Ratios:

- Where do you see them?

- 1:5 or $\frac{1}{5}$ or $1/5$