DAY 2

Properties of Exponents

- Open interactive journal to notes

EX) Simplify expression $(a^0 b^3 c^{-1})^5$

→ product of a power property: $a^0 b^{15} c^{-5}$

→ $a^0 = 1$; so... $\boxed{b^{15}c^{-5}}$ OR $\boxed{\frac{b^{15}}{c^5}}$

EX) What is the value of expression $\frac{6^{-3}}{2^{-1}}$?

$$\frac{6^{-3}}{2^{-1}} = \frac{2^1}{6^3}$$

$$= \frac{2}{216}$$

$$= \boxed{\frac{1}{108}}$$

EX) $\frac{8^5 x^3}{8^7 x^{-4}}$ (subtract)

$$= 8^{-2} x^7$$

$$= \frac{x^7}{8^2} = \boxed{\frac{x^7}{64}}$$

Factor Polynomials

- Open to notes in interactive journal

Remember: factored out a GCF
"slide & divide"
Difference of squares
Sum/diff. of cubes

EX) Factor $4x^2 - 9$ Think: $4x^2 = (2x)^2$, $9 = (3)^2$

$(2x)^2 - (3)^2$ → diff. of squares

$\boxed{(2x-3)(2x+3)}$

You are used to... $x^2 - 25$

$(x-5)(x+5)$

EX) $x^2 - x - 20$

① Write list factors of 20 →
~~20 × 1~~
~~10 × 2~~
5 × 4

one must be negative, so... -5 & 4

$-5 \cdot 4 = -20$

$-5 + 4 = -1$

$(x-5)(x+4)$

• If you are asked to solve, then you must set factors equal to zero & solve for x.

$x - 5 = 0$ OR $x + 4 = 0$

$x = 5$ OR $x = -4$

solutions

FACTORS

EX) $x^6 + 8y^3$

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

$8y^3 = (2y)^3$

$(x^2)^3 + (2y)^3$ ← "sum of cubes"

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

SOFAS

$$\boxed{(x^2+2y)(x^4-2x^2y+4y^2)}$$

EX) $2z^4 - 250z$ GCF

$2z(z^3 - 125)$ "diff. of cubes"

$2z((z)^3 - (5)^3)$

$2z(z-5)(z^2 + 5z + 25)$

SOFAS

$$\boxed{2z(z-5)(z^2+5z+25)}$$

Do not forget!

EX) $16x^2 - 8x + 1$

"Slide & Divide"

$x^2 - 8x + 16$

- Factors of 16...
  - 16×1
  - 8×2
  - 4×4
- both + or both −

$(x-4)(x-4)$

$\frac{1}{4}$ $\frac{1}{4}$

$(4x-1)(4x-1)$

$$\boxed{(4x-1)^2}$$

If asked to solve, solution would be...

$$\boxed{x = \frac{1}{4}}$$

DAY 2

Systems of Linear Equations

Ex) $\begin{cases} 2x + 3y = z + 2 \\ -x + 2y + 2z = 18 \\ x - 7y + 3z = 12 \end{cases}$

"make it beautiful!"

$$\begin{cases} 2x+3y-z=2 \\ -x+2y+2z=18 \\ x-7y+3z=12 \end{cases}$$

$AX = B$ A^{-1} "use matrix equation"

$$\begin{bmatrix} 2 & 3 & -1 \\ -1 & 2 & 2 \\ 1 & -7 & 3 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 2 \\ 18 \\ 12 \end{bmatrix}$$

matrix A
3×3 matrix
(coefficient matrix)

matrix B
3×1 matrix
(constant matrix)

$[A]^{-1} * [B]$

$$\begin{bmatrix} 2 \\ 2 \\ 8 \end{bmatrix}$$

$x = 2$
$y = 2$
$z = 8$

EX) $\begin{cases} 5x - 2y = 8 \quad (-2) \\ 3x - 4y = 2 \end{cases}$

What other ways?
- Substitution
- Elimination
- Graphing

$$\begin{array}{r} -10x + 4y = -16 \\ +\ 3x - 4y = 2 \\ \hline \frac{-7x}{-7} = \frac{-14}{-7} \end{array}$$

$$\boxed{x = 2}$$

$5(2) - 2y = 8$

$10 - 2y = 8$

$-2y = -2$

$\boxed{y = 1}$

Solution: $(2, 1)$

Systems of Linear Inequalities

EX) $\begin{cases} x + y > 7 \\ 3y \geq 2x - 6 \end{cases}$ → solve for y → $y > -x + 7$, $y \geq \frac{2x-6}{3}$

Graph: $y > -x + 7$

Graph: $y \geq \frac{2}{3}x - 2$

Solution is overlapping shaded region