3.3

Date: 10/4/23

Objective: I can factor difference of squares and sum or difference of cubes.

A) Fill out the table below using the following steps:

Row 1: Write numbers 1-15

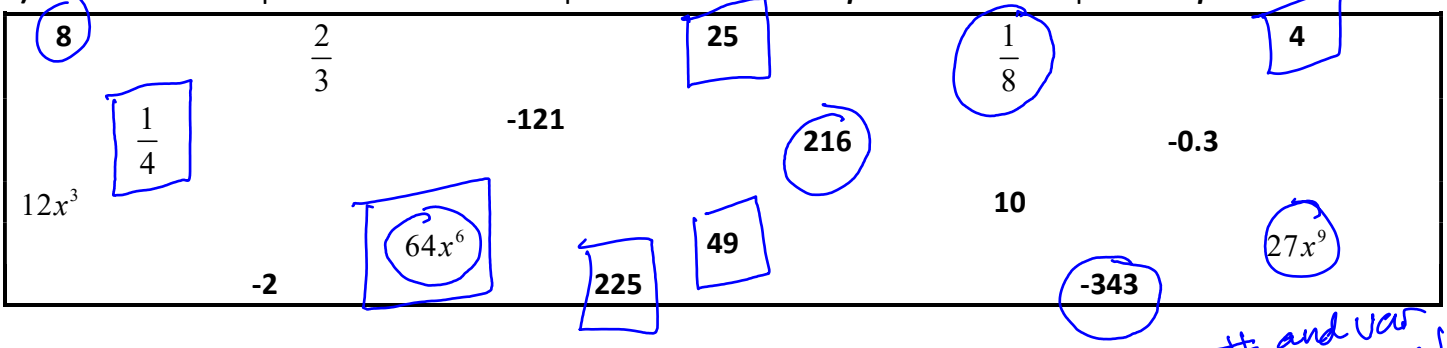
Row 2: Square the numbers from row 1

Row 3: Cube the numbers from row 1

																	20	25
Row 1	**Natural Numbers**	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15		
Row 2	**Perfect Squares**	1	4	9	16	25	36	49	64	81	100	121	144	169	196	225	400	625
Row 3	**Perfect Cubes**	1	8	27	64	125	216	343	512	729	1000							

B) 1. $2^3 =$ 8 2. $(-2)^3 =$ -8 3. $x^3 =$ x^3 4. $(-x)^3$ $-x^3$ 5. $2x^2 =$ $2x^2$ 6. $(-2x)^2 =$ $4x^2$

C) In the box below put a ***circle*** around the perfect ***cubes*** and a ***square*** around the perfect ***squares***.



D) Multiply the following. Which one is **not** a perfect square? Which ones are conjugates? → # and var are same but opp signs

1. $(x-5)(x+5)$	**2.** $(x+2)(x+2)$	**3.** $(2x-3)(2x+3)$
x^2-25	x^2+4x+4	$4x^2-9$

E) Answer the following questions as a class.

1) If $a^2-b^2=2^2-3^2$ then $a=$ 2 and $b=$ 3 ?	**2)** If $a^2-b^2=4-9$ then $a=$ 2 and $b=$ 3 ?	**3)** If $a^2-b^2=x^2-25$ then $a=$ x and $b=$ 5 ?
4) If $a^2-b^2=(2x)^2-(3y)^2$ then $a=$ 2x and $b=$ 3y ?	**5)** If $a^2-b^2=4x^2-9y^2$ then $a=$ 2x and $b=$ 3y ?	**6)** If $a^2-b^2=-64c^2+d^2$ then $a=$ ___ and $b=$ ___ ? d^2-64c^2 → a=d b=8c $-(64c^2-d^2)$ → a=8c b=d

F) Sum of Squares: a^2+b^2 → does not factor to real numbers

x^2+4 = prime

Difference of Squares: $a^2-b^2=(a+b)(a-b)$ memorize

G) Answer the following questions as a class. 2^3+3^3

1) If $a^3+b^3=2^3+3^3$ then $a=$ 2 and $b=$ 3 ?	**2)** If $a^3+b^3=8+27$ then $a=$ 2 and $b=$ 3 ?	**3)** If $a^3-b^3=x^3-4^3$ then $a=$ x and $b=$ 4 ?
4) If $a^3-b^3=x^3-64$ then $a=$ x and $b=$ 4 ?	**5)** If $a^3+b^3=(2x)^3+(3y)^3$ then $a=$ 2x and $b=$ 3y ?	**6)** If $a^3+b^3=8x^3+27y^3$ then $a=$ 2x and $b=$ 3y ?
7)) If $a^3+b^3=125+8x^3$ then $a=$ 5 and $b=$ 2x ? $3\sqrt{125}$ $\sqrt[3]{8x^3}$ $125=$	**8)** If $a^3-b^3=y^6-216$ then $a=$ y^2 and $b=$ 6 ? $y^2\cdot y^2\cdot y^2=$	**9)** If $a^3-b^3=-64c^3-d^3$ then $a=$ 4c and $b=$ d ? $-(64c^3+d^3)$

H) Sum of Cubes: $a^3+b^3=(a+b)(a^2-ab+b^2)$

Difference of Cubes: $a^3-b^3=(a-b)(a^2+ab+b^2)$

Same
Opposite
Always
Positive

I) Examples: Identify the type of factoring. Then factor completely.

1) $1-9x^2$ dif of sq. $(1+3x)(1-3x)$	**2)** $16x^2+25$ sum of sq. prime	**3)** $16x^2-25$ dif of sq. $a=4x$ $b=5$ $(4x+5)(4x-5)$	**4)** $-100x^4+36$ $-4(25x^4-9)$ $-4(5x^2+3)(5x^2-3)$
5) $1-x^3$ dif of cubes $(1-x)(1+x+x^2)$	**6)** m^3+8 sum of cubes $(m+2)(m^2-2m+4)$	**7)** $343-125x^3$ dif of cubes $(7-5x)(49+35x+25x^2)$	**8)** $27a^6+8$ sum of cubes $(3a^2+2)(9a^4-6a^2+4)$
9) $-125u^3+64$	**10)** $27x^4+8x$	**11)** $343t^3-u^3$	**12)** $-27a^6-y^6$ $-(27a^6+y^6)$ sum of cubes $-(3a^2+y^2)(9a^4-3a^2y^2+y^4)$