## MAT0028 ~ Lesson 35

Work the following examples as you listen to the recorded lecture.

## Factoring Binomials (Cubes)

Learn the cubes:

| Factor | 1 | 2 | 3 | 4 | 5 |
| :--- | :--- | :--- | :--- | :--- | :--- |
| Cube | 1 | 8 | 27 | 64 | 125 |

## Cubes:

Problem type: $a^{3}+b^{3}$ and $a^{3}-b^{3}$ (Where $a$ and $b$ are numbers or unknowns.) These are your formulas and sign rules:
Sum of Cubes:

$$
a^{3}+b^{3}=(a+b)\left(a^{2}-a b+b^{2}\right)
$$

Difference of Cubes: $\quad a^{3}-b^{3}=(a-b)\left(a^{2}+a b+b^{2}\right)$

## Notice: You have 3 signs.

1. The first sign matches the problem.
2. The second sign is the opposite of the problem.
3. The third sign is always positive.

| Example 1: $\quad x^{3}+8$ | Sum of Cubes problem $a^{3}+b^{3}=(a+b)\left(a^{2}-a b+b^{2}\right)$ |
| :---: | :---: |
| $1) 1$ | Step 1: Set signs for the factors. |
| $\begin{aligned} & a= \\ & b= \end{aligned}$ | Step 2: Find the cube root of $a^{3}$ and $b^{3}$. |
| $\begin{aligned} & a^{2}= \\ & b^{2}= \end{aligned}$ | Step 3: Square $a$ and b. |
| $a \cdot b=$ | Step 4: Multiply a times b. |
|  | Step 5: Fill in the fields for your formula.. |
|  | Step 6: Multiply to check. |

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| Example 3: | $125 x^{3}-27$ | Difference of Cubes problem $a^{3}-b^{3}=(a-b)\left(a^{2}+a b+b^{2}\right)$ |
| :---: | :---: | :---: |
| $1) 1$ |  | Step 1: Set signs for the factors. |
| $a=$ | $b=$ | Step 2: Find the cube root of $a^{3}$ and $b^{3}$. |
| $a^{2}=$ | $b^{2}=$ | Step 3: Square $a$ and b. |
| $a \cdot b=$ |  | Step 4: Multiply a times b. |
|  |  | Step 5: Fill in the fields for your formula.. |
|  |  | Step 6: Multiply to check. |

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