

5.20

Factoring the Sum and Difference of Two Cubes

• Example 1

Factor.

(a) $x^3 - 8$

We notice first that we can write 8 as 2^3 and rewrite the expression as

$$x^3 - 2^3$$

The formula for factoring the difference of two cubes is

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

Apply the formula to $x^3 - 8$.

$$x^3 - 8 = x^3 - 2^3 = (x - 2)(x^2 + 2x + 4)$$

(b) $x^3 + 8$

We write 8 as 2^3 and rewrite as above.

$$x^3 + 2^3$$

The formula for the sum of two cubes is

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

Apply the formula to $x^3 + 8$.

$$x^3 + 8 = x^3 + 2^3 = (x + 2)(x^2 - 2x + 4)$$

● ● ● CHECK YOURSELF 1

Factor completely.

a. $x^3 - 27$ **b.** $x^3 + 64$

● ● ● CHECK YOURSELF ANSWER

1.(a) $(x - 3)(x^2 + 3x + 9)$; **(b)** $(x + 4)(x^2 - 4x + 16)$.

5.20 Exercises

Name _____

Section _____

Date _____

A N S W E R S

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

Factor completely.

1. $8x^3 - 27$

2. $x^3 + 1$

3. $64x^3 - 1$

4. $125x^3 + 8$

5. $x^3 + 27$

6. $27 - 8y^3$

7. $x^3 - y^3$

8. $x^3 + 8y^3$