

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

Factoring Polynomials

Emphasis on Factoring Difference of Cubes

Completely factor each of the following using SOAP:

<p>1. $x^3 - 8$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{8} = 2 = b \text{ term}$ $(x-2)(x^2 + 2x + 4)$</p>	<p>2. $x^3 - 64$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{64} = 4 = b \text{ term}$ $(x-4)(x^2 + 4x + 16)$</p>
<p>3. $x^3 - 216$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{216} = 6 = b \text{ term}$ $(x-6)(x^2 + 6x + 36)$</p>	<p>4. $x^3 - 512$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{512} = 8 = b \text{ term}$ $(x-8)(x^2 + 8x + 64)$</p>
<p>5. $x^3 - 1000$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{1000} = 10 = b \text{ term}$ $(x-10)(x^2 + 10x + 100)$</p>	<p>6. $x^3 - 3375$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{3375} = 15 = b \text{ term}$ $(x-15)(x^2 + 15x + 225)$</p>
<p>7. $x^3 - 2197$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{2197} = 13 = b \text{ term}$ $(x-13)(x^2 + 13x + 169)$</p>	<p>8. $x^3 - 1331$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{1331} = 11 = b \text{ term}$ $(x-11)(x^2 + 11x + 121)$</p>
<p>9. $x^3 - 729$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{729} = 9 = b \text{ term}$ $(x-9)(x^2 + 9x + 81)$</p>	<p>10. $x^3 - 343$ $\sqrt[3]{x^3} = x = a \text{ term}$ $\sqrt[3]{343} = 7 = b \text{ term}$ $(x-7)(x^2 + 7x + 49)$</p>

$$11. \frac{8x^3}{8} - \frac{216}{8} \Rightarrow x^3 - 27$$

$$\sqrt[3]{x^3} = x = a \text{ term}$$

$$\sqrt[3]{27} = 3 = b \text{ term}$$

$$8(x-3)(x^2 + 3x + 9)$$

$$12. 125x^3 - 8$$

$$\sqrt[3]{125x^3} = 5x = a \text{ term}$$

$$\sqrt[3]{8} = 2 = b \text{ term}$$

$$(5x-2)(25x^2 + 10x + 4)$$

$$13. 2744x^3 - 27$$

$$\sqrt[3]{2744x^3} = 14x = a \text{ term}$$

$$\sqrt[3]{27} = 3 = b \text{ term}$$

$$(14x-3)(196x^2 + 42x + 9)$$

$$14. \frac{1728x^3}{216} - \frac{216}{216} \Rightarrow 8x^3 - 1$$

$$\sqrt[3]{8x^3} = 2x = a \text{ term}$$

$$\sqrt[3]{1} = 1 = b \text{ term}$$

$$216(2x-1)(4x^2 - 2x + 1)$$

$$15. 2197x^3 - 512$$

$$\sqrt[3]{2197x^3} = 13x = a \text{ term}$$

$$\sqrt[3]{512} = 8 = b \text{ term}$$

$$(13x-8)(169x^2 + 104x + 64)$$

$$16. 3375x^3 - 1$$

$$\sqrt[3]{3375x^3} = 15x = a \text{ term}$$

$$\sqrt[3]{1} = 1 = b \text{ term}$$

$$(15x-1)(225x^2 + 15x + 1)$$

$$17. 64x^3 - 343$$

$$\sqrt[3]{64x^3} = 4x = a \text{ term}$$

$$\sqrt[3]{343} = 7 = b \text{ term}$$

$$(4x-7)(16x^2 + 28x + 49)$$

$$18. 1331x^3 - 729$$

$$\sqrt[3]{1331x^3} = 11x = a \text{ term}$$

$$\sqrt[3]{729} = 9 = b \text{ term}$$

$$(11x-9)(121x^2 + 99x + 81)$$

$$19. 1000x^3 - 1$$

$$\sqrt[3]{1000x^3} = 10x = a \text{ term}$$

$$\sqrt[3]{1} = 1 = b \text{ term}$$

$$(10x-1)(100x^2 + 10x + 1)$$

$$20. \frac{27x^3}{27} - \frac{729}{27} \Rightarrow x^3 - 27$$

$$\sqrt[3]{x^3} = x = a \text{ term}$$

$$\sqrt[3]{27} = 3 = b \text{ term}$$

$$27(x-3)(x^2 + 3x + 9)$$