

# Practice Exercises

Factor the following polynomials completely.

1.  $x^3 + 64y^3$

2.  $8x^3 - y^3z^6$

3.  $a^9 + 125b^6$

4.  $27m^3 - 8n^3$

5.  $64a^3 - 27b^3c^6$

# Problem Set

Factor the following polynomials completely.

1.  $27x^3 - 64y^3z^6$

2.  $8x^3 + 125$

3.  $64a^3 - 8b^9c^3$

4.  $27m^3 + 125n^3$

5.  $64a^3 + 27$

6.  $8x^9y^3 - 64z^6$

7.  $216x^3 + 8y^9$

8.  $a^3b^6 - 64c^9d^3$

9.  $125m^3 - 27n^6$

10.  $216a^6 + 64b^9$

# Problem Set

$$\begin{aligned} 1. \quad & 27x^3 - 64y^3z^6 \\ &= (3x)^3 - (4yz^2)^3 \\ &= (3x - 4yz^2)(9x^2 + 12xyz^2 + 16y^2z^4) \end{aligned}$$

$$\begin{aligned} 2. \quad & 8x^3 + 125 \\ &= (2x)^3 + (5)^3 \\ &= (2x + 5)(4x^2 - 10x + 25) \end{aligned}$$

$$\begin{aligned} 3. \quad & 64a^3 - 8b^9c^3 \\ &= 8(8a^3 - b^9c^3) \\ &= 8[(2a)^3 - (b^3c)^3] \\ &= 8(2a - b^3c)(4a^2 + 2ab^3c + b^6c^2) \end{aligned}$$

$$4. \quad 27m^3 + 125n^3$$

$$\begin{aligned}
&= (3m)^3 + (5n)^3 \\
&= (3m + 5n) (9m^2 - 15mn + 25n^2)
\end{aligned}$$

$$\begin{aligned}
5. \quad &64a^3 + 27 \\
&= (4a)^3 + (3)^3 \\
&= (4a + 3) (16a^2 - 12a + 9)
\end{aligned}$$

$$\begin{aligned}
6. \quad &8x^9y^3 - 64z^6 \\
&= 8(x^9y^3 - 8z^6) \\
&= 8[(x^3y)^3 - (2z^2)^3] \\
&= 8(x^3y - 2z^2) (x^6y^2 + 2x^3yz^2 + 4z^4)
\end{aligned}$$

$$\begin{aligned}
7. \quad &216x^3 + 8y^9 \\
&= 8(27x^3 + y^9) \\
&= 8[(3x)^3 + (y^3)^3]
\end{aligned}$$

$$= 8 (3x + y^3) (9x^2 - 3xy^3 + y^6)$$

$$8. \quad a^3b^6 - 64c^9d^3$$

$$= (ab^2)^3 - (4c^3d)^3$$

$$= (ab^2 - 4c^3d) (a^2b^4 + 4ab^2c^3d + 16c^6d^2)$$

$$9. \quad 125m^3 - 27n^6$$

$$= (5m)^3 - (3n^2)^3$$

$$= (5m - 3n^2) (25m^2 + 15mn^2 + 9n^4)$$

$$10. \quad 216a^6 + 64b^9$$

$$= 8(27^6 + 8b^9)$$

$$= 8[(3a^2)^3 + (2b^3)^3]$$

$$= 8 (3a^2 + 2b^3) (9a^4 - 6a^2b^3 + 4b^6)$$