

## Review of Exponent Rules

Let  $a, b, c$  be constants (fixed numbers).

**Combining Like Terms:**  $ax^c + bx^c = (a + b)x^c$

- $4x^5 + 3x^5 = 7x^5$
- $2x^3 + 4x + 3x^3 + 3x - 6 = 5x^3 + 7x - 6$

**Adding Different Powers:**  $x^a + x^b$  cannot be simplified if  $a \neq b$

- $x^3 + x^2$  is simplified.
- $3x^4 + 3x^2$  is simplified.

**Multiplying Different Powers:**  $(x^a) \cdot (x^b) = x^{a+b}$

- $(x^3) \cdot (x^2) = (x \cdot x \cdot x) \cdot (x \cdot x) = (x \cdot x \cdot x \cdot x \cdot x) = x^5$ .
- $(3x^4) \cdot (7x^2) = 21x^6$

**Raising a Power to Another Power:**  $(x^a)^b = x^{a \cdot b}$

- $(x^3)^2 = (x \cdot x \cdot x) \cdot (x \cdot x \cdot x) = (x \cdot x \cdot x \cdot x \cdot x \cdot x) = x^6$ .
- $(3x^4)^2 = (3 \cdot x \cdot x \cdot x \cdot x) \cdot (3 \cdot x \cdot x \cdot x \cdot x) = 3^2 \cdot x^8 = 9x^8$ .
- $3(x^4)^2 = 3 \cdot (x \cdot x \cdot x \cdot x) \cdot (x \cdot x \cdot x \cdot x) = 3x^8$ .

**Fractional Exponents:**  $x^{a/b} = \sqrt[b]{x^a}$

- $x^{3/4} = x^{(3 \cdot \frac{1}{4})} = (x^3)^{\frac{1}{4}} = \sqrt[4]{x^3}$ .
- $x^{3/4} = x^{(\frac{1}{4} \cdot 3)} = (x^{\frac{1}{4}})^3 = (\sqrt[4]{x})^3$

**Negative Exponents:**  $x^{-a} = \frac{1}{x^a}$

- $x^{-5} = \frac{1}{x^5}$ .
- $3x^{-5} = 3 \cdot \frac{1}{x^5} = \frac{3}{x^5}$ .
- $6x^{-4/3} = 6 \cdot \frac{1}{x^{4/3}} = \frac{6}{\sqrt[3]{x^4}}$ .