

8-3 Examples

$$\begin{array}{r}
 2^{-3} \cdot 2^2 \cdot y^{-7} \\
 \hline
 2^3 y^7 \\
 \hline
 2^2 y^7
 \end{array}$$

The expression  $2^{-3} \cdot 2^2 \cdot y^{-7}$  is circled. A curved arrow points from this expression to the first step of the simplification.

$$\begin{array}{r}
 5^1 \cdot 5^{-4} \\
 5^1 \cdot 5^{-4} \\
 5^1 \cdot \frac{1}{5^4} = \frac{5}{5^4}
 \end{array}$$

The expression  $5^1 \cdot 5^{-4}$  is circled. Below it, the same expression is written twice, followed by the simplified form  $5^1 \cdot \frac{1}{5^4} = \frac{5}{5^4}$ .

### 8-3 Examples

$$-\boxed{3^{-4}} \neq \boxed{(-3)^{-4}}$$

$$-\left(3^{-4}\right) \qquad \left(-3\right)^{-4}$$


$$\frac{1}{\sqrt[4]{3}}$$

$\neq$

$$\frac{1}{\sqrt[4]{(-3)}}$$

### 8-3 Examples

$$-\boxed{2^2} \stackrel{?}{=} \boxed{(-2)^2}$$

$$-(2 \cdot 2) \stackrel{?}{=} -2 \cdot -2$$

$$-4 \neq 4$$



8-3 Examples

$$\begin{array}{r} 90 \quad 7 \quad -11 \\ y^7 \quad z^{-11} \\ - \frac{y^7}{z^{11}} \end{array}$$

8-3 Examples

$$\frac{7x^0 y^{-5}}{2^{-1} m^2} = \frac{7 \cdot 1 \cdot y^{-5}}{2^{-1} m^2}$$

$$\frac{7 \cdot 1 \cdot 2^1}{m^0 y^5} = \frac{7 \cdot 1}{2^{-1} m^2 y^5}$$

$$\frac{14}{m^2 y^5}$$

8-3 Examples

$$\frac{3^{-2} y^4 x^{-3}}{5^0 d^{-8} f^2} = \frac{y^4 x^{-3}}{3^2 \cdot 5^0 d^{-8} f^2}$$

$$\frac{y^4 d^8}{3^2 \cdot 5^0 \cdot x^3 \cdot f^2} = \frac{y^4}{3^2 \cdot 5^0 \cdot d^{-8} x^3 \cdot f^2}$$

$$\frac{y^4 d^8}{9 x^3 f^2}$$

### 8-3 Examples

$$a^b \cdot a^d = a^{b+d}$$

$$x^3 \cdot x^2 = x^5$$

$$y^9 \cdot y^{-2} = y^7$$

$$\frac{a^b}{a^d} = a^{b-d}$$

### 8-3 Examples

$$c^{-2} \cdot c^7 = c^5$$

$$\frac{c^{-2}}{c^7} = c^{-9} = \frac{1}{c^9}$$

$$\frac{c^{-3}}{c^{-8}} = c^5$$

### 8-3 Examples

$$\frac{c^{-8}}{c^{-3}} = c^{-5} = \frac{1}{c^5}$$

$$(x^2 y^3)(x^3 y^5) = x^5 y^8$$

$$\frac{x^2 y^3}{x^3 y^5} = x^{-1} y^{-2} = \frac{1}{x y^2}$$

8-3 Examples

$$\frac{3x^{-4}y^{-2}}{2x^5y^{-5}}$$

$$\frac{4y^3}{x^9}$$

$$(3x^1y^2)(2x^3y^{-5})$$

$$\frac{24x^3}{y^3} = \frac{24x^3}{y^3}$$

### 8-3 Examples

$$\begin{aligned} & \underline{3^x} \cdot \underline{3^{2-x}} \cdot \underline{3^2} \\ & 3^{(x+2-x+2)} \\ & 3^4 = 81 \end{aligned}$$

8-3 Examples

$$3^x \cdot 2^y \cdot 3^2 \cdot 2^x$$

*(Red handwritten annotations: a bracket under  $3^x \cdot 3^2$  and a bracket under  $2^y \cdot 2^x$ )*

$$3^{x+2} \cdot 2^{y+x}$$

### 8-3 Examples

$$\frac{1}{x^2 \cdot x^{-5}} = \frac{1}{x^{-3}} = x^3$$

$$\frac{x^5}{x^2} = x^{5-2} = x^3$$

### 8-3 Examples

$$\frac{3^3 x^{-4} y^5 z^{-2}}{3^{-2} x^3 y^{-2} z^0}$$

$$\frac{3^5 y^7}{x^7 z^2}$$