

# Warm-up

Add or Subtract without a Calculator

$$\textcircled{1} \frac{1}{2} + \frac{1}{4}$$

$$\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$$

$$\textcircled{2} \frac{1}{3} + \frac{3}{4}$$

$$= \frac{4}{12} + \frac{9}{12}$$

$$= \frac{13}{12}$$

$$\textcircled{3} \frac{5}{4} - \frac{2}{3}$$

$$= \frac{15}{12} - \frac{8}{12}$$

$$= \frac{7}{12}$$

## 6.2 Rational Exponent Properties

### Same Base

- products

$$a^m \cdot a^n = a^{m+n}$$

$$5^4 \cdot 5^3 = 5^{4+3} = 5^7$$

$$5^{\frac{1}{2}} \cdot 5^{\frac{1}{4}} = 5^{\frac{1}{2} + \frac{1}{4}} = 5^{\frac{3}{4}}$$

$$2^{\frac{1}{2}} \cdot 2^{\frac{1}{3}} = 2^{\frac{1}{2} + \frac{1}{3}} = 2^{\frac{5}{6}}$$

$$\frac{3}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$$

- quotients

$$\frac{a^m}{a^n} = a^{m-n}$$

$$\frac{7^4}{7^1} = 7^{4-1} = 7^3$$

$$\frac{7^{\frac{3}{4}}}{7^{\frac{1}{4}}} = 7^{\frac{3}{4} - \frac{1}{4}} = 7^{\frac{2}{4}} = 7^{\frac{1}{2}}$$

$$\frac{1}{4} - \frac{2}{3} = -\frac{5}{12}$$

$$\frac{\frac{1}{2}}{\frac{3}{2}} = \frac{1}{3} = \frac{1}{3}$$

$$\frac{5^{\frac{1}{4}}}{5^{\frac{2}{3}}} = \frac{1}{5^{\frac{5}{12}}}$$

$$\left( 5^{2/3} \cdot 3^{1/3} \right)^3$$

$$= 5^{2/3 \cdot 3} \cdot 3^{1/3 \cdot 3}$$

$$= 5^2 \cdot 3^1$$

$$\left( \frac{4^2}{3^{2/3}} \right)^{3/2}$$

$$= \frac{4^{2 \cdot 3/2}}{3^{2/3 \cdot 3/2}}$$

$$= \frac{4^3}{3^1}$$

# Homework

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$$\textcircled{1} 5^{\frac{2}{3}} \cdot 5^{\frac{1}{3}}$$

$$\textcircled{2} 7^{\frac{1}{4}} \cdot 7^{\frac{1}{5}}$$

$$\textcircled{3} (6^{\frac{1}{2}} \cdot 4^{\frac{1}{3}})^2$$

$$\textcircled{4} (4^5 \cdot 3^5)^{\frac{1}{5}}$$

$$\textcircled{5} \frac{5^{\frac{1}{3}}}{5^{\frac{1}{2}}}$$

$$\textcircled{6} \left( \frac{42^{\frac{1}{3}}}{6^{\frac{1}{3}}} \right)^2$$

$$\textcircled{7} (5^{\frac{1}{3}} \cdot 7^{\frac{1}{4}})^3$$

$$\textcircled{8} 2^{\frac{3}{4}} \cdot 2^{\frac{1}{2}}$$

$$\textcircled{9} \frac{3^{\frac{5}{4}}}{3}$$