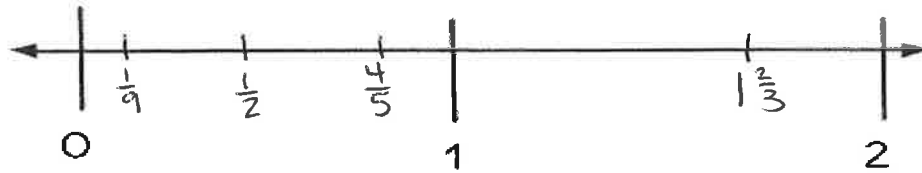


Lesson 4-1 Notes
Estimating with Fractions and Mixed Numbers

Review: Place the fractions below on the number line in the correct place.

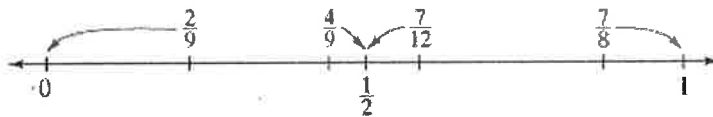
$$1\frac{2}{3} \quad \frac{1}{9} \quad \frac{1}{2} \quad \frac{4}{5}$$



Estimating with Fractions

We can use benchmarks to estimate fractions.

Benchmarks for Estimating Fractions: 0 $\frac{1}{2}$ and 1.



Estimate as 0 when the numerator is very small compared to the denominator.

Estimate as $\frac{1}{2}$ when the numerator is about half the denominator.

Estimate as 1 when the numerator and denominator are nearly equal.

Example:

Estimate $\frac{7}{8} + \frac{4}{9}$.

$$\frac{7}{8} + \frac{4}{9}$$

↓ ↓

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

← Use benchmarks to estimate each fraction. Then add.

You Try!

Use benchmarks to estimate the sum of $\frac{5}{12} + \frac{1}{15}$.

$$\downarrow \\ \frac{1}{2} + 0 = \boxed{\frac{1}{2}}$$

Use benchmarks to estimate the difference of $\frac{3}{5} - \frac{1}{8}$.

$$\downarrow \\ \frac{1}{2} - 0 = \boxed{\frac{1}{2}}$$

Use benchmarks to estimate the difference of $\frac{7}{8} - \frac{5}{9}$.

$$1 - \frac{1}{2} = \boxed{\frac{1}{2}}$$

Estimating with Mixed Numbers

When estimating Mixed Numbers, round to the nearest whole number.

Example:

Swimming In one week, Paulo practices by swimming $8\frac{1}{5}$ mi. Allen swims $4\frac{3}{4}$ mi. **About**
how many more miles does Paulo swim?

$$8\frac{1}{5} - 4\frac{3}{4} \quad \leftarrow \text{Estimate } 8\frac{1}{5} - 4\frac{3}{4}.$$

$$\downarrow \quad \downarrow$$

$$8 - 5 = 3 \quad \leftarrow \text{Round each mixed number. Then subtract.}$$

Paulo swims about 3 mi farther.

You Try!

Pets You buy a puppy that weighs $8\frac{1}{4}$ lb. A month later, the

puppy weighs $11\frac{7}{8}$ lb. About how much weight did the puppy gain?

$$\cancel{11} \quad 11\frac{7}{8} - 8\frac{1}{4}$$

↓

$$12 - 8 = \boxed{4 \text{ lbs}}$$

Estimating Products and Quotients of Mixed Numbers

Multiplication: To estimate a product of mixed numbers, round each mixed number to the nearest whole number. Then multiply.

$$\text{Estimate } 2\frac{2}{5} \cdot 6\frac{1}{10}$$

$$2\frac{2}{5} \cdot 6\frac{1}{10}$$

↓ ↓

$$2 \cdot 6 = 12 \quad \leftarrow \text{Round each mixed number. Then multiply.}$$

You Try!

$$\text{Estimate } 3\frac{5}{6} \cdot 5\frac{1}{8}$$

↓ ↓

$$4 \cdot 5 = \boxed{20}$$

$$\text{Estimate } 8\frac{1}{8} \cdot 5\frac{11}{12}$$

↓ ↓

$$8 \cdot 6 = \boxed{48}$$

Division: To estimate a quotient of mixed numbers, you can use compatible numbers. Choose numbers that are easy to divide.

$$\text{Estimate } 43\frac{1}{4} \div 5\frac{7}{8}$$

$$43\frac{1}{4} \div 5\frac{7}{8}$$

43 ← ↓ ↓ 6
→ 42 ÷ 6 = 7

← Use compatible numbers. Use 42 for $43\frac{1}{4}$ and use 6 for $5\frac{7}{8}$.

You Try!

$$\text{Estimate } 35\frac{3}{4} \div 5\frac{11}{12}$$

↓ ↓
36 ÷ 6 = $\boxed{6}$

$$\text{Estimate } 22\frac{7}{8} \div 3\frac{5}{6}$$

↓ ↓
23 ÷ 4

↓
24 ÷ 4 = $\boxed{6}$

$$\textcircled{1} \quad 15\frac{1}{6} \div 3\frac{1}{3}$$

↓ ↓

$$15 \div 3 = \boxed{5}$$

$$\textcircled{2} \quad 71\frac{2}{5} \div 8\frac{3}{4}$$

↓

$$71 \div 9$$

↓

$$72 \div 9 = \boxed{8}$$

$$\textcircled{3} \quad 36\frac{1}{4} \div 6\frac{5}{6}$$

↓ ↓

$$36 \div 7$$

↓

$$35 \div 7 = \boxed{5}$$