3.6 Rounding & Estimating with Fractions

Rounding: If the fraction is equal to or greater than $\frac{1}{2}$, then go up to the next whole number. If not, stay on the given whole number.

Example:

$3\frac{1}{2}$ rounded = 4, 5 $\frac{3}{4}$ rounded = 6, 7 $\frac{1}{8}$ rounded = 7

Observe that when the numerator of the fraction is equal to or greater than $\frac{1}{2}$ of the denominator of the fraction, then the fraction is equal to or greater than $\frac{1}{2}$.

$\frac{3}{4}$ → $\frac{3}{2}$ of 4 = 2 → So, we went up to 6

$\frac{1}{8}$ → $\frac{1}{2}$ of 8 is 4 →

When the denominator is an even number (2, 4, 6, ...) it is easy to find $\frac{1}{2}$ of the denominator so you can compare the numerator to $\frac{1}{2}$ of denominator. But what do you do if the denominator is an odd number (3, 5, 7, ...)?

Answer: Pretend the denominator is one more than the given denominator, so that it becomes an even number, then, make your decision to round based on the numerator being $\frac{1}{2}$ or more of the denominator (new).

Examples:

$\frac{4}{9}$ → pretend this is a "10" → 14 $\frac{4}{10}$ → 4 is not $\frac{1}{2}$ of 10

$\frac{6}{11}$ → pretend this is a "12" → 7 $\frac{6}{12}$ → 6 is $\frac{1}{2}$ of 12 → rounds up to

= 8
**In Class Work**

**Round the Following Mixed Numbers to a Whole Number:**

1) \(13 \frac{3}{8} \rightarrow \) 

2) \(2 \frac{2}{7} \rightarrow \) 

3) \(8 \frac{5}{9} \rightarrow \) 

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**Drawing Fraction Diagrams**

You will be required to draw fraction diagrams using either bars or circles:

Example \(\frac{3}{4} \rightarrow \text{Bar} \rightarrow \)

Circle

1. Make a line halfway
2. Make another line that cuts each half
3. Shade 3 sections

For even denominators, always make the 1st line (cut) at the halfway point.

Example \(\frac{5}{6} \rightarrow \text{Bar} \rightarrow \)

Circle

1. Make half cut line
2. Make cuts that divide halves into 3 pieces
3. Shade 5 sections

1. Make a line halfway
2. 3. Cut 1st half into 3 pieces
4. 5. Cut 2nd half into 3 pieces
Shade 5 sections
When Denom is odd → cut a little past halfway on 1st line

Then divide each side to get total odd number (one side will have one more piece than other side)

In class work

4) Draw bar diagram for the fraction $\frac{2}{3}$

5) Draw bar diagram for the fraction $\frac{3}{5}$

6) Draw circle diagram for the fraction $\frac{2}{5}$

7) Draw circle diagram for the fraction $\frac{5}{8}$
Example

1. **Estimate the sum:**
   \[
   5 \frac{3}{8} + 9 \frac{7}{11} + 4 \frac{3}{4}
   \]
   Rounded ↓  ↓  ↓
   5 + 10 + 5 = 20

2. **Estimate the product:**
   \[
   6 \frac{7}{18} \cdot 9 \frac{5}{9}
   \]
   Rounded ↓
   6 \cdot 10 = 60