G4-M5-Lesson 41

1. Find the sums.

I draw brackets connecting fractions that add up to equal 1.

a. $\underbrace{\frac{0}{3}+\overbrace{\frac{1}{3}+\frac{2}{3}}^{1}}_{1}+\frac{3}{3}$

$\left(\frac{0}{3}+\frac{3}{3}\right)+\left(\frac{1}{3}+\frac{2}{3}\right)=1+1=2$

The denominator is odd. Every addend has a partner.

There are 2 pairs of fractions that equal 1. 2 fourths is leftover without a partner.

b. $\underbrace{\frac{0}{4}+\overbrace{\frac{1}{4}+\frac{2}{4}+\frac{3}{4}}^{1}+\frac{4}{4}}_{1}$

$\left(\frac{0}{4}+\frac{4}{4}\right)+\left(\frac{1}{4}+\frac{3}{4}\right)+\frac{2}{4}=1+1+\frac{1}{2}=2\frac{1}{2}$

The denominator is even. One addend does not have a partner. This could be a pattern.

2. Find the sums.

I notice patterns that help me solve without calculating!

a. $\frac{0}{13}+\frac{1}{13}+\frac{2}{13}+\cdots+\frac{13}{13}$

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I think about the number of addends, 14, in the expression with odd denominators.

b. $\frac{0}{16}+\frac{1}{16}+\frac{2}{16}+\cdots+\frac{16}{16}$

$8\frac{8}{16}$

There are 17 addends in this expression with even denominators. Half of 17 is $8\frac{1}{2}$.

3. How can you apply this strategy to find the sum of all the whole numbers from 0 to 1,000?

Sample Student Response:

I can pair the $1,001$ *addends from* 0 *to* $1,000$ *to make sums that equal* $1,000$. *There would be* 500 *pairs. One addend would be left over. I multiply* $1,000 \times 500$, *which makes* $500,000$. *When I add the left over addend, I have a total sum of* $500,500$.