

Name: _____

Section: _____

Ratio Representations

The 150 students at Addams Middle School were asked if they prefer seeing the movie *Hunger Games* or *Divergent*. The data showed that 100 preferred *Hunger Games* and 50 preferred *Divergent*.

a. Look at the following statements and decide if each accurately reports the results of the survey and explain *how you know*.

1.) At Skokie School, $\frac{1}{3}$ of the students prefer *Hunger Games*.

2.) Students prefer *Hunger Games* to *Divergent* in a ratio of 2 to 1.

3.) The ratio of students who prefer *Divergent* to students who prefer *Hunger Games* is 1 to 2.

4.) The number of students who prefer *Hunger Games* is 50 more than the number of students who prefer *Divergent*.

5.) The number of students who prefer *Hunger Games* is two times the number of students who prefer *Divergent*.

- b. Compare statements (4) and (5) above. In what ways is the information given by these statements similar? In what ways is it different? Explain.

The ratio of the number of boys to the number of girls at school is 4:5.

- a. What fraction of the students are boys?
- b. If there are 120 boys, how many students are there altogether?

Mr. Cooper's class has a female student to male student ratio of 3:2. Mr. Cooper's class has 18 girls, how many boys does he have? Show how you determined your answer. Explain your reasoning in words.

Ms. Green's class has the same number of students as Mr. Cooper's class. Her female to male ratio is 2:1. Which class has the greater number of females? How do you know?

Solution

a.

i. There are 150 students who took the survey so $\frac{1}{3}$ of the students would be 50 students. But 100 of the students surveyed preferred *Hunger Games* to *Divergent* so this is not true. It is an easy mistake to make, however, because it is true that $\frac{1}{3}$ more of the 150 students prefer *Hunger Games* compared to those who prefer *Divergent*.

ii. The ratio of students who prefer *Hunger Games* to students who prefer *Divergent* is 100:50. This is equivalent to the ratio 2:1 as we can see by multiplying 2 and 1 by 50. This can also be shown in steps with a ratio table:

Students who prefer <i>Hunger Games</i>	Students who prefer <i>Divergent</i>
100	50
10	5
2	1

iii. The second line comes from the first by multiplying both entries by 110 and then the third row is the second row multiplied by 15.

iv. The ratio of students who prefer *Divergent* to students who prefer *Hunger Games* is 50:100. This is equivalent to 1:2 as we can see by multiplying 1 and 2 by 50. This can be shown with the ratio table of part (b) or with a double number line as below:



The given information is furthest to the right and then the equivalent ratios, calculated by multiplying by 110 and then 15, are to the left closer to 0.

- v. Since 100 students prefer *Hunger Games* and 50 prefer *Divergent* and $100 = 50 + 50$ it is true that 50 more students prefer *Hunger Games*.
- vi. Since 100 students prefer *Hunger Games* and 50 prefer *Divergent* and $100 = 2 \times 50$ it is true that the number of students who *Hunger Games* is twice the number who prefer *Divergent*.
- b. The two statements give the same information if we know how many students took the survey. If we know that 150 students took the survey then both (d) and (e) tell us that 100 students preferred *Hunger Games* and 50 preferred *Divergent*. On the other hand, without this information only (e) tells us the ratio of students who preferred *Hunger Games* to *Divergent*