6.RP Voting for Three, Variation 1

Alignments to Content Standards: 6.RP.A.3

Task

a. John, Marie, and Will all ran for 6th grade class president. Of the 36 students, 16 voted for John, 12 for Marie, and 8 for Will. What was the ratio of votes for John to votes for Will? What was the ratio of votes for Marie to votes for Will? What was the ratio of votes for Marie to votes for John?

b. Because no one got half the votes, they had to have a run-off election. Marie dropped out and convinced all her voters to vote for Will. What is the new ratio of Will's votes to John's?

c. John and Will also ran for Middle School Council President. There are 90 students voting in middle school. If the ratio of Will's votes to John's votes remains the same as it was in part (b), how many more votes will Will get than John?

IM Commentary

This problem is the fifth in a series of seven about ratios. At first glance the problem may look to be beyond 6.RP.1, which limits itself to “describe a ratio relationship between two quantities.” However, even though there are three quantities (the number of each candidates' votes), they are only considered two at a time.

In the first problem students define the simple ratios that exist among the three candidates. It opens an opportunity to introduce unit rates.

The subsequent problems are more complex. In the second problem, students apply their understanding of ratios to combine two pools of voters to determine a new ratio. In the third problem, students apply a known ratio to a new, larger pool of voters to determine the number of votes that would be garnered.

Solutions

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Solution: Question #1

a. John's votes to Will's, 16 to 8, or 2 to 1. Marie's votes to Will's, 12 to 8, 3 to 2, or $\frac{3}{2}$ to 1, the unit ratio. Marie's votes to John's, 12 to 16, 3 to 4, or $\frac{3}{4}$ to 1, the unit ratio.

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Solution: Question #2

2. Will now has 8 + 12 = 20 votes to John's 16 votes, so the ratio of Will's votes to John's votes is 20 : 16, 5 : 4, or $\frac{5}{4}$: 1, the unit ratio.

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Solution: Question #3 - Computing votes

There are different ways to approach this problem, but both begin with the fact that Will gets votes in a 5 to 4 ratio compared with John and require recognizing that a 5 to 4 ratio means a total of 9 equal parts. Then it is straightforward to compute:

$\frac{5}{9} \times 90 = 50$ votes for Will

$\frac{4}{9} \times 90 = 40$ for John

$50 - 40 = 10$ more votes for Will.

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Solution: Question #3 - Applying fractions

One can solve the problem by working fractions by recognizing that Will getting votes

in a 5 to 4 ratio means a total of 9 equal parts. It follows that Will gets $\frac{5}{9}$ of the 90 votes and John gets $\frac{4}{9}$ of the 90 votes:

$\frac{5}{9} - \frac{4}{9} = \frac{1}{9}$ of the voters

$\frac{1}{9} \times 90 = 10$ more votes for Will

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Solution: Question #3 - Equivalent Ratios

An alternate very basic solution to Question 3 involves creating a series of equivalent ratios. This approach may be selected by students who are still developing an understanding of proportional situations. Students may begin with the ratio of 5 to 4 and proceed to find a ratio such that the sum of numerator and denominator is 90. This sequence may appear as follows:

$\frac{5}{4} = \frac{10}{8} = \frac{15}{12} = \frac{20}{16} = \frac{25}{20} = \frac{30}{24} = \frac{35}{28} = \frac{40}{32} = \frac{45}{36} = \frac{50}{40}$

Then 50 - 40 = 10 more votes for Will