7.RP Chess Club

Task

There were 24 boys and 20 girls in a chess club last year. This year the number of boys increased by 25% but the number of girls decreased by 10%. Was there an increase or decrease in overall membership? Find the overall percent change in membership of the club.

IM Commentary

This problem includes a percent increase in one part with a percent decrease in the remaining and asks students to find the overall percent change. The problem may be solved using proportions or by reasoning through the computations or writing a set of equations.

When using equations to solve the problem, the task of finding the number of club members this year can be accomplished in two separate steps by finding the appropriate percent of last year's members and then adjusting the number of members by this amount. Alternatively, the number can be determined in one step by finding the appropriate percent that will remain after the change. The second approach requires a deeper understanding of the concept of percent change.

As with equations, when solving this problem using proportions, the number of new club members can be found in one or two steps. Again, the second approach requires a deeper understanding.

Solutions

Solution: Using an equation to find the number of new club members in two

steps

Last year there were 24 boys in chess club. This year the number increased by 25%:

$24 \times 0.25 = 6$ more boys this year

$24 + 6 = 30$ total boys this year

Last year there were 20 girls in chess club. This year the number decreased by 10%:

$20 \times 0.1 = 2$ fewer girls this year

$20 - 2 = 18$ total girls this year

Combining the number of girls and boys this year:

$30 + 18 = 48$ total members this year

Combining the number of girls and boys last year:

$24 + 20 = 44$ total members last year

Finding the difference in the number of members this year and last year:

$48 - 44 = 4$ more members this year

To find the percent change, divide the change in the number of members by the number of members last year:

$4 \div 44 = 0.\overline{09}$ repeating

Change the decimal amount into a percent amount and round to the nearest whole percent:

$0.\overline{09} \times 100 \approx 9\%$ change in the chess club membership

Since there are 4 more members in the club this year when compared to last year, the change is a 9% increase.

Solution: Using an equation to find the number of new club members in one step

A 25% increase in the number of boys is equivalent to 125% of the number of boys last year:

$24 \times 1.25 = 30$ total boys this year

A 10% decrease in the number of girls is equivalent to 90% of the number of girls last year:

$20 \times 0.9 = 18$ total girls this year

The remaining steps to the solution are the same as shown in the solution above.

Solution: Using proportions and two steps to find the number of new members

Write a proportion where b represents the increase in the number of boys:

$$\frac{b}{24} = \frac{25}{100}$$

Multiplying both sides by 24, we get $b = 6$ more boys this year

$24 + 6 = 30$ total boys this year

Write a proportion where g represents the decrease in the number of girls:

$$\frac{g}{20} = \frac{10}{100}$$

Multiplying both sides by 20, we get $g = 2$ fewer girls this year

$20 - 2 = 18$ total girls this year

The remaining steps are the same as those shown in the first solution above.

Solution: Using proportions and one step to find the number of new members

Write a proportion where b represents the number of boys in the club this year:

$$\frac{b}{24} = \frac{125}{100}$$

Multiplying both sides by 24, we get $b = 30$ total boys this year

Write a proportion where g represents the number of girls in the club this year:

$$\frac{g}{20} = \frac{90}{100}$$

Multiplying both sides by 20, we get $g = 18$ total girls this year

The remaining steps are the same as those shown in the first solution above.