

MATHCOUNTS® Problem of the Week Archive

Tennis Scores – March 27, 2023

Problems & Problems

The scoring pattern used in a game of tennis can be confusing, as it doesn't appear to follow the expected pattern. Tennis points go like this: Love (0 points), 15, 30, 40. You may be asking, "Why not 45?" Back in the Middle Ages, tennis scores were kept using two clock faces, which went from 0 to 60. It is believed that the point system used to be 0, 15, 30, 45, and a win on 60, but "forty-five" took too long to say, so it was shortened to "forty".

Suppose it took a Middle Ages tennis announcer $\frac{4}{5}$ of a second to say "forty-five". If each syllable takes the same amount of time to say, and "forty-five" is said an average of 39 times in a tennis match (composed of several games), how much time did they save per match by shortening this score to "forty"? Express your answer as a mixed number.

Changing "forty-five" to "forty" reduces the number of syllables from 3 to 2. So, if each syllable takes the same amount of time to say, one syllable is said in $(\frac{4}{5}) \times (\frac{1}{3}) = \frac{4}{15}$ of a second. If "forty-five" is said 39 times, then changing this score to "forty" saves $(\frac{4}{15}) \times 39 = \frac{52}{5} = \mathbf{10 \frac{2}{5}}$ seconds.

Suppose that, after realizing "forty-five" took too long to say, the Middle Ages tennis announcers decided to save even more time by changing the whole scoring pattern to 0, 1, 2, 3, and a win on 4. Consider the tennis game in the table below. Each row shows a score announced during the game, but instead of saying the final score, the announcer says "game" to indicate that someone has won and the game is over. Using what you found from the previous problem on how long it takes to say one syllable, how much time would be saved in the tennis game below if the Middle Ages scoring pattern had been changed to this new scoring pattern? 'Love-15' is read 'love fifteen', and '0-1' is read 'zero one'. Express your answer as a common fraction.

Middle Ages Scoring	New Scoring
Love-15	0-1
Love-30	0-2
15-30	1-2
15-45	1-3
30-45	2-3
Game	Game

In the Middle Ages scoring pattern, 15 and 30 each have two syllables, Love and Game each have one syllable, and 45 has three syllables. There are $3(1) = 3$ syllables from one-syllable points; there are $6(2) = 12$ syllables from two-syllable points; and there are $2(3) = 6$ syllables from three-syllable points. This is a total of $3 + 12 + 6 = 21$ syllables, which takes $(\frac{4}{15}) \times 21 = \frac{84}{15}$ seconds to say. In the new scoring system, 0 has two syllables, and 1, 2, 3 and Game each have one syllable. There are $2(2) = 4$ syllables from two-syllable points, and there are $9(1) = 9$ syllables from one-syllable points. This is a total of $9 + 4 = 13$ syllables, which takes $(\frac{4}{15}) \times 13 = \frac{52}{15}$ seconds to say. Therefore, by changing to this new scoring system, tennis announcers would save $\frac{84}{15} - \frac{52}{15} = \mathbf{\frac{32}{15}}$ seconds per game.

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