

**Example 3**

There is a movement in Major League Baseball to use a weighted mean to calculate a batting average. In this new system, each type of hit carries a different weight.

A player was at bat a total of 28 times. He struck out 5 times and hit 4 singles, 5 doubles, 6 triples and 8 home runs. Each of these results carries a different weight, a strike-out = 0, a single = 1, a double = 2, a triple = 3 and a home run = 4.

Use the weighted mean formula to determine this player's batting average.

$$\begin{aligned} \text{weighted mean} &= \frac{(\text{score} \times \text{weight}) + (\text{score} \times \text{weight}) + \dots}{\text{Total weight}} \\ &= \frac{(\text{strikes} \times 0) + (\text{singles} \times 1) + (\text{doubles} \times 2) + (\text{triples} \times 3) + (\text{home runs} \times 4)}{(0 + 1 + 2 + 3 + 4)} \\ &= \frac{(5 \times 0) + (4 \times 1) + (5 \times 2) + (6 \times 3) + (8 \times 4)}{10} = \underline{\underline{6.4}} \end{aligned}$$

Sometimes you are not provided **weights** – but you are provided with a **frequency**. The frequency of a score is a number that represents the number of times that score appears in a set of data. To calculate the (weighted) mean when using frequency – simply replace all references to 'weight' with the word 'frequency'.

$$\text{Weighted Mean} = \frac{\text{score} \times \text{frequency} + \text{score} \times \text{frequency} + \text{score} \times \text{frequency} \dots}{\text{sum of frequencies}}$$

**Example 4**

In a math class of 15 students, 8 students scored 75%, 5 students scored 80% and 2 students scored 90%. Calculate the mean for this class.

$$\begin{aligned} \text{weighted mean} &= \frac{(75 \times 8) + (80 \times 5) + (90 \times 2)}{8 + 5 + 2} = \frac{600 + 400 + 180}{15} \\ &= \frac{1180}{15} \\ &= 78.666 \\ &= \boxed{78.67\%} \end{aligned}$$