Weighted average examples and answers
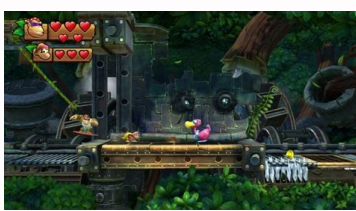
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Distinguish between a parameter and a statistic

Examples:
Identify if each describes a parameter or a statistic.
1. The 2009 team payroll of the Philadelphia Phillies was $113,004,046.

2. In a survey of 752 adults in the US, 42% think there should be a law that prohibits people from talking on cell phones in public places.

3. In a recent study of math majors at a university, 10 students were minoring in physics.

	A	B	C
1	Person	Age	Weight
2	1	25	0.8
3	2	25	0.9
4	3	25	0.9
5	4	28	0.6
6	5	28	1.1

The Weighted Mean

$$\bar{X}_w = \frac{\sum (wx)}{\sum w}$$

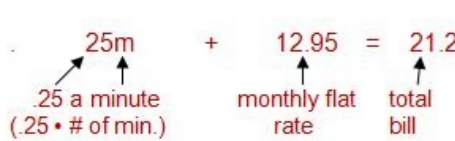$$\bar{X}_w = \frac{w_1 x_1 + w_2 x_2 + w_3 x_3 \ldots}{w_1 + w_2 + w_3 + \ldots}$$

Example 2:

A cell phone company charges a monthly rate of $12.95 and $0.25 a minute per call. The bill for m minutes is $21.20.

1. Write an equation that models this situation.

Let m = number of minutes billed.

$$25m + 12.95 = 21.20$$

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   25m        +    12.95    =    21.20
   ↑               ↑              ↑
.25 a minute    monthly flat    total
(.25 • # of min.)   rate        bill
```

2. How many minutes were charged on this bill?

(Solve for m)

$$25m + 12.95 = 21.20$$
$$25m + 12.95 - 12.95 = 21.20 - 12.95$$
$$\frac{25m}{25} = \frac{8.25}{25}$$

$$m = 33$$
33 minutes were charged on this bill.

Check: $25m + 12.95 = 21.20$
$25(33) + 12.95 = 21.20$
$8.25 + 12.95 = 21.20$

Weighted averages examples. Weighted average example problems. Weighted averages worksheet answer key. Weighted average example excel.

For a fact, "Average" and "Mean" mean the same and are used as synonyms. To calculate the average, you add all the observations followed by division by the number of observations. For example, in a family, there are 5 children weighing 20, 35, 80, 100, and 145 pounds respectively. So to find their average rate, we add all their weights (20 + 35 + 80 + 100 + 145 = 280) and then divide it with the number of children whose weights we have calculated, that is 280 / 5 = 145 pounds. The applications of average in our day to day life is huge. So, let us learn more about the average.What is the Weighted Average? A weighted average is an average where we assign weights to each quantity or value according to the relative importance of each value or quantity. Let us take an example. Assume that the overall rank of a student needs to be calculated who has scored marks in different subjects and each subject has a different percentage of the total marks. For example, the written test may have 50%, the practical test may have 30% and sports may have 20% weightage in total grade marks. Then what is the weighted average? The weighted average of the written test will be 0.5, the practical test will be 0.3, and sports will be 0.2. The assigned weights can be zero but can never be negative. Also, if a value has the highest weight, then it will have more effect on the weighted average and vice-versa. A weighted mean formula is usually more accurate than a simple average because, in a simple average, all the numbers in a data set are assigned an identical weight.Weighted Mean FormulaThe weight that we assign to each variable varies from situation to situation, so does the formula. So, in general, we can write the weighted mean formula as: (Ax1+Bx2+Cx3..............Zxn)/nThe formula to calculate weighted average in excelThe weighted average can also be calculated on an excel sheet by following the given steps:One can use the "SUMPRODUCT" and "SUM" functions to calculate the weighted average of a given series. For example, the price of 10 apples is 20 rupees and another fruit 40 rupees per 10 fruits. To measure the weighted average, use the function "=SUMPRODUCT(A2:A3, B2:B3)/SUM(B2:B3)" here A2 and A3 are the frequency of the number and the number itself whereas, B2 and B3 are the same values of another variety of fruits in this case.Solved Examples   A teacher conducted a science test of 25 students out of which 10 students scored 80 and the rest scored 60. What is the weighted average score of the entire class?Solution: (80 marks X 10 students) + (60 marks X 15 students)= 800+ 900=1700Total number of students = 25Weighted average formula= sum of weighted average terms/ total number of terms=1700/25=68Class 8 has two sections A and B. There are 25 students in section A and 30 students in section B. the average marks scored by the students in section A is 75 and the average marks scored by the students of section B is 60. Calculate the average marks obtained by the whole class.Solution: (25 X 75) + (30 X 60)=1875+1800=3675Weighted average formula:Weighted average formula= sum of weighted average observations/ sum of weights=3675/55=66.81Fun Facts About Weighted AverageA weighted average is usually more accurate than a simple average.A weighted average formula is used by stock investors basically to track the cost basis of shares.The weighted average method takes less paperwork. For example, the person who calculates the weighted average of the cost of inputs in a factory can use the same value for all the other methods, this method is easy to calculate. One can fall back on this method if they want to conduct voting or any process based on proportional representation. Related Pages Mean, Median, Mode, Range Other Algebra Word Problems There are three main types of average problems commonly encountered in school algebra: Average (Arithmetic Mean), Weighted Average and Average Speed. The following table gives the formulas for average problems: Weighted Average, Mean, and Average Speed. Scroll down the page for examples and solutions. Weighted Average Problems One type of average problems involves the weighted average - which is the average of two or more terms that do not all have the same number of members. To find the weighted term, multiply each term by its weighting factor, which is the number of times each term occurs. The formula for weighted average is: Example: A class of 25 students took a science test. 10 students had an average (arithmetic mean) score of 80. The other students had an average score of 60. What is the average score of the whole class? Solution: Step 1: To get the sum of weighted terms, multiply each average by the number of students that had that average and then sum them up. 80 × 10 + 60 × 15 = 800 + 900 = 1700 Step 2: Total number of terms = Total number of students = 25 Step 3: Using the formula, Answer: The average score of the whole class is 68. Be careful! You will get the wrong answer if you add the two average scores and divide the answer by two. Example of how to calculate the weighted average Example: At a health club, 80% of the members are men and 20% of the members are women. If the average age of the men is 30 and the average age of the women is 40, what is the average age of all the members? Show Video Lesson How to find the weighted average given a frequency table? Example: A group of people were surveyed for how many movies they see in a week. The table below shows the result of the survey. (a) How many people took part in the survey? (b) What was the total number of movies seen in a week by all the survey takers? (c) What was the average number of movies seen in a week per person surveyed? Show Video Lesson How to solve Weighted Averages and Mixture Problems? Mixture problems are problems in which two or more parts are combined into a whole. Examples: Premium coffee is $9.50/lb, Supreme coffee is $11.75/lb and Blend coffee is $10.00/lb. How many pounds of Premium coffee beans should be mixed with two pounds of Supreme coffee to make Blend coffee? A car's radiator should contain a solution of 50% antifreeze. Bo has 2 gallons of 35% antifreeze. How many gallons of 100% antifreeze should he add to his solution to produce a solution of 50% antifreeze? Show Video Lesson How to solve Weighted Average Word Problems? Examples: How many pounds of mixed nuts selling for $4.75 per pound should be mixed with 10 pounds of dried fruit selling for $5.50 per pound to obtain a trail mix that sells for $4.95 per pound? A chemistry experiment calls for a 30% solution of copper sulfate. Kendra has 40 milliliters of 25% solution. How many milliliters of 60% solution should she add to make a 30% solution? A car and an emergency are heading toward each other. The car is traveling at a speed of 30 mph or 44 feet per second. The emergency vehicle is traveling at a speed of 50 mph or about 74 feet per second. If the vehicles are 1000 feet apart and the conditions are ideal, in how many seconds will the drive of the car first hear the siren? Show Video Lesson Try the free Mathway calculator and problem solver below to practice various math topics. Try the given examples, or type in your own problem and check your answer with the step-by-step explanations. We welcome your feedback, comments and questions about this site or page. Please submit your feedback or enquiries via our Feedback page. Also called Weighted Average A mean where some values contribute more than others. Mean When we do a simple mean (or average), we give equal weight to each number. Here is the mean of 1, 2, 3 and 4: Add up the numbers, divide by how many numbers: Mean = 1 + 2 + 3 + 44 = 104 = 2.5 Weights We could think that each of those numbers has a "weight" of ¼ (because there are 4 numbers): Mean = ¼ × 1 + ¼ × 2 + ¼ × 3 + ¼ × 4 = 0.25 + 0.5 + 0.75 + 1 = 2.5 Same answer. Now let's change the weight of 3 to 0.7, and the weights of the other numbers to 0.1 so the total of the weights is still 1: Mean = 0.1 × 1 + 0.1 × 2 + 0.7 × 3 + 0.1 × 4 = 0.1 + 0.2 + 2.1 + 0.4 = 2.8 This weighted mean is now a little higher ("pulled" there by the weight of 3). When some values get more weight than others, the central point (the mean) can change. Decisions Weighted means can help with decisions where some things are more important than others: Example: Sam wants to buy a new camera, and decides on the following rating system: Image Quality 50% Battery Life 30% Zoom Range 20% The Sonu camera gets 8 (out of 10) for Image Quality, 6 for Battery Life and 7 for Zoom Range The Conan camera gets 9 for Image Quality, 4 for Battery Life and 6 for Zoom Range Which camera is best? Sonu: 0.5 × 8 + 0.3 × 6 + 0.2 × 7 = 4 + 1.8 + 1.4 = 7.2 Conan: 0.5 × 9 + 0.3 × 4 + 0.2 × 6 = 4.5 + 1.2 + 1.2 = 6.9 Sam decides to buy the Sonu. What if the Weights Don't Add to 1? When the weights don't add to 1, divide by the sum of weights. Example: Alex usually eats lunch 7 times a week, but some weeks only gets 1, 2, or 5 lunches. Alex had lunch: on 2 weeks: only one lunch for the whole week on 14 weeks: 2 lunches each week on 8 weeks: 5 lunches each week on 32 weeks: 7 lunches each week What is the mean number of lunches Alex has each week? Use "Weeks" as the weighting: Weeks × Lunches = 2 × 1 + 14 × 2 + 8 × 5 + 32 × 7 = 2 + 28 + 40 + 224 = 294 Also add up the weeks: Weeks = 2 + 14 + 8 + 32 = 56 Divide total lunches by total weeks: Mean = 29456 = 5.25 It looks like this: But it is often better to use a table to make sure you have all the numbers correct: Let's use: w for the number of weeks (the weight) x for lunches (the value we want the mean of) Multiply w by x, sum up w and sum up wx: Weight w Lunches x wx 2 1 2 14 2 28 8 5 40 32 7 224 Σw = 56 Σwx = 294 The symbol Σ (Sigma) means "Sum Up" Divide Σwx by Σw: Mean = 29456 = 5.25 (Same answer as before.) And that leads us to our formula: In other words: multiply each weight w by its matching value x, sum that all up, and divide by the sum of weights. Summary Weighted Mean: A mean where some values contribute more than others. When the weights add to 1: just multiply each weight by the matching value and sum it all up Otherwise, multiply each weight w by its matching value x, sum that all up, and divide by the sum of weights: Copyright © 2017 MathsIsFun.com

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