MATHEMATICS · GRADES 7-9

Weighted Averages Introduction

Difficulty level: Intermediate

Mathematics: Grades 7-9

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Overview of the concept

This is how you work out an average where some values count more than others, like a final mark where the exam counts more than the homework, instead of treating every mark equally. A plain average gives every mark the same weight, but a final mark should count the exam more than a small homework task. A weighted average gives each value the weight it deserves, so the result reflects what actually matters. That is how final marks, course grades, and any average with unequal parts are really worked out.



Rule

Weighted averages: weighted average = $\dfrac{\text{sum of (value} \times \text{weight)}}{\text{total of the weights}}$.

A value that counts more pulls the average further toward itself.

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Worked examples

EXAMPLE 1

Q Homework 80 counts once and a test 100 counts twice. Find the weighted average.

SOLUTION

Multiply each value by its weight: 80 × 1 = 80; 100 × 2 = 200.

Add the weighted values: 80 + 200 = 280. Add the weights: 1 + 2 = 3.

Divide: 280 ÷ 3 = 93.3, to one decimal place.

EXAMPLE 2

Q Two quizzes worth 60 and 90, with weights 1 and 3. Find the weighted average.

SOLUTION

Weighted values: 60 × 1 = 60; 90 × 3 = 270

Total weighted value: 60 + 270 = 330
Total weight: 1 + 3 = 4

330 ÷ 4 = 82.5

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Practice questions

1. Homework is worth 70 and counts once, and a test is worth 90 and counts twice. What is the weighted average, to one decimal place?

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2. Two quizzes are worth 70 and 80, with weights 1 and 3. What is the weighted average?

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3. A shop sells two kinds of apples. One kind costs 10 and the other costs 20, and the same number of each is sold. What is the weighted average price?

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4 A student scores 10 on a short quiz and 20 on a long quiz, with weights 1 and 3. What is the weighted average?

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5 Two teams score 50 and 100, and each team plays twice. What is the weighted average score?

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6 A recipe uses 40 grams of sugar in one batch and 100 grams of sugar in another, with equal weights. What is the weighted average?

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7 A worker earns 80 on three days and 90 on one day. What is the weighted average daily pay?

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8 Homework is worth 60 and counts once, and a test is worth 90 and counts twice. What is the weighted average?

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9 Homework is worth 60 and counts once, and a test is worth 90 and counts three times. What is the weighted average?

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10 **Three classes score 40, 60 and 80, with weights 1, 2 and 1. What is the weighted average?**

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ANSWER KEY

1. 83.3

2. 77.5

3. 15

4. 17.5

5. 75

6. 70

7. 82.5

8. 80

9. 82.5

10. 60

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