Weighted Averages and Missing Data Values

Name: _____	Date: _____	Score: _____ / 18

Quick Review and Helpful Hints

A *weighted average* multiplies each value by its weight (or count), adds the products, then divides by the total weight. To find a *missing value* when the mean is known, multiply the mean by the number of values to get the total, then subtract the values you know.

▷ **Example:** A student scores 80 on 2 tests and 95 on 3 tests. Find the weighted average. **Work:** $\frac{80(2)+95(3)}{2+3} = \frac{160+285}{5} = \frac{445}{5}$.

★ **Answer:** 89

$$\frac{\sum(\text{value} \times \text{weight})}{\sum \text{weight}}$$

Multiply, add, then divide.

Practice Problems

Find each average or missing value.

1. Mean of $4, 6, 8$

2. Mean of $10, 20, 30, 40$

3. $\frac{90(1)+80(1)}{2}$

4. $\frac{70(2)+100(3)}{5}$

5. Mean of 3 tests is 80; two are $75, 85$. Find the third

6. Mean of $5, 5, 5, 5$

7. $\frac{60(1)+90(2)}{3}$

8. Mean of $2, 4, 6, 8, 10$

9. Mean of 4 values is 10; three are $8, 10, 12$. Find the missing value

10. $\frac{100(3)+50(1)}{4}$

11. Mean of $12, 18$

12. Mean of two is 20; one is 15. Find the other

13. $\frac{80(2)+90(2)}{4}$

14. Mean of $3, 7, 11$

Word Problems

15. Grades: 85 on 2 tests and 95 on 2 tests. Find the weighted average.

16. A class of 10 averages 70; a class of 20 averages 85. Find the combined average.

17. Five quiz scores average 8; four of them are $7, 9, 8, 10$. Find the fifth.

18. Homework counts 40% and the exam 60%. Homework $= 90$, exam $= 80$. Find the final grade.

Answer Keys

1. $\boxed{6}$	**7.** $\boxed{80}$	**13.** $\boxed{85}$
2. $\boxed{25}$	**8.** $\boxed{6}$	**14.** $\boxed{7}$
3. $\boxed{85}$	**9.** $\boxed{10}$	**15.** $\boxed{90}$
4. $\boxed{88}$	**10.** $\boxed{87.5}$	**16.** $\boxed{80}$
5. $\boxed{80}$	**11.** $\boxed{15}$	**17.** $\boxed{6}$
6. $\boxed{5}$	**12.** $\boxed{25}$	**18.** $\boxed{84}$

Step-by-Step Explanations

1. Start by naming the process: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{4+6+8}{3} = \frac{18}{3} = 6$. So the final answer is 6.

2. A good way to think about this is: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{100}{4} = 25$. So the final answer is 25.

3. Step by step: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{90+80}{2} = 85$. So the final answer is 85.

4. Take it one move at a time: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{140+300}{5} = \frac{440}{5} = 88$. So the final answer is 88.

5. Start by naming the process: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is Total $= 80 \times 3 = 240$. The two known scores sum to 160, so the third $= 240 - 160 = 80$. So the final answer is 80.

6. A good way to think about this is: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is All values are 5: mean 5. So the final answer is 5.

7. Step by step: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{60+180}{3} = \frac{240}{3} = 80$. So the final answer is 80.

8. Take it one move at a time: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{30}{5} = 6$. So the final answer is 6.

9. Start by naming the process: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is Total $= 10 \times 4 = 40$. Subtract 30: missing $= 10$. So the final answer is 10.

10. A good way to think about this is: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{300+50}{4} = \frac{350}{4} = 87.5$. So the final answer is 87.5.

11. Step by step: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{12+18}{2} = 15$. So the final answer is 15.

12. Take it one move at a time: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is Total $= 20 \times 2 = 40$. Subtract 15: other $= 25$. So the final answer is 25.

13. Start by naming the process: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{160+180}{4} = \frac{340}{4} = 85$. So the final answer is 85.

14. A good way to think about this is: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{3+7+11}{3} = \frac{21}{3} = 7$. So the final answer is 7.

15. Step by step: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{85(2)+95(2)}{4} = \frac{170+190}{4} = 90$. So the final answer is 90.

16. Take it one move at a time: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $\frac{10(70)+20(85)}{30} = \frac{2400}{30} = 80$. So the final answer is 80.

17. Start by naming the process: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is Total $= 8 \times 5 = 40$. Subtract 34: fifth $= 6$. So the final answer is 6.

18. A good way to think about this is: For an average, add the values and divide by how many values there are; for a missing value, work backward from the total. The setup/work is $0.4(90) + 0.6(80) = 36 + 48 = 84$. So the final answer is 84.

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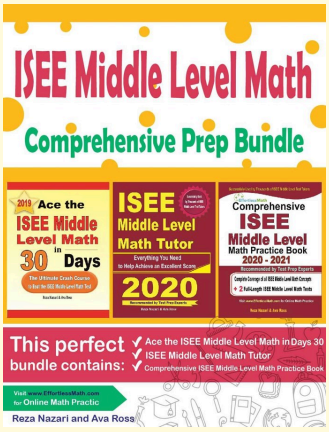

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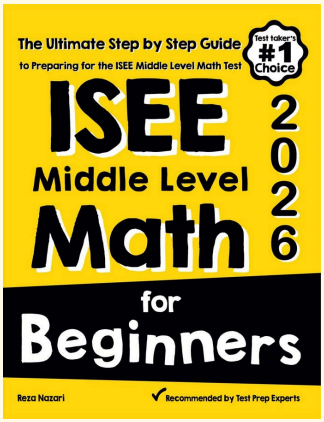

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