In This Chapter…

Averages, Weighted Averages, Median, and Mode

For questions in the Quantitative Comparison format ("Quantity A" and "Quantity B" given), the answer choices are always as follows:

(A) Quantity A is greater.
(B) Quantity B is greater.
(C) The two quantities are equal.
(D) The relationship cannot be determined from the information given.

For questions followed by a numeric entry box ☐, you are to enter your own answer in the box. For questions followed by fraction-style numeric entry boxes ☐/☐, you are to enter your answer in the form of a fraction. You are not required to reduce fractions. For example, if the answer is 1/4, you may enter 25/100 or any equivalent fraction.

All numbers used are real numbers. All figures are assumed to lie in a plane unless otherwise indicated. Geometric figures are not necessarily drawn to scale. You should assume, however, that lines that appear to be straight are actually straight, points on a line are in the order shown, and all geometric objects are in the relative positions shown. Coordinate systems, such as *xy*-planes and number lines, as well as graphical data presentations such as bar charts, circle graphs, and line graphs, *are* drawn to scale. A symbol that appears more than once in a question has the same meaning throughout the question.

1. Husain and Dino have an average of $20 each. Dino wins a cash prize, which raises their average to $80. Assuming no other changes occurred, how many dollars did Dino win?

$ ☐

2.

Janani is 6 centimeters taller than Preeti, who is 10 centimeters taller than Rey.

Quantity A	**Quantity B**
The average height of the three people	The median height of the three people

3. The average of Joelle's five quiz scores is 88. What score does Joelle need to get on a sixth quiz to raise her average for all six quizzes to 90?

(A) 88

(B) 94
(C) 98
(D) 100
(E) 102

4.

The average of x and y is 55. The average of y and z is 75.

Quantity A	**Quantity B**
$z - x$	40

5. In Clarice's class, each test weights her overall grade average three times as much as each quiz does. If Clarice scored 88 and 94 on two quizzes, respectively, and she scored 90 on the only test, what is her current overall grade average?

6. What is the average of x, $x - 6$, and $x + 12$?

(A) x
(B) $x + 2$
(C) $x + 9$
(D) $3x + 6$
(E) It cannot be determined from the information given.

7. The average of four numbers is 12. If the set of numbers includes 9, 11, and 12, what is the fourth number?

(A) 12
(B) 14
(C) 16
(D) 20
(E) 24

8.

For a set of 30 integers, the average is 30 and none of the integers are greater than 60.

Quantity A	**Quantity B**
The range of the set	30

9. If x is negative, what is the median of the list 20, x, 7, 11, 3?

(A) 3
(B) 7
(C) 9
(D) 11
(E) 15.5

10. If the average of n and 11 is equal to $2n$, then what is the average of n and $\frac{13}{3}$?

(A) 4
(B) 8
(C) 11
(D) 14
(E) 19

11.

Quantity A	**Quantity B**
The average of $x - 3, x, x + 3, x + 4$, and $x + 11$	The median of $x - 3, x, x + 3, x + 4$, and $x + 11$

12. John buys 5 books with an average price of $12. If John then buys another book with a price of $18, what is the average price of the 6 books?

(A) $12.50
(B) $13
(C) $13.50
(D) $14
(E) $15

13. Every week, Renee is paid 40 dollars per hour for the first 40 hours she works, and 80 dollars per hour for each hour she works after the first 40 hours. How many hours would Renee have to work in one week to earn an average of 60 dollars per hour that week?

(A) 60
(B) 65
(C) 70
(D) 75
(E) 80

14.

At a certain school, the 118 juniors have an average final exam score of 88 and the 100 seniors have an average final exam score of 92.

Quantity A	**Quantity B**
The average final exam score for all of the juniors and seniors combined.	90

15. Last year a car dealership sold 640 cars over the entire year. This year, the dealership has sold an average of 32 cars per month for the first four months. What is the average number of cars sold per month over the entire 16-month period?

(A) 43
(B) 44
(C) 48
(D) 51
(E) 64

16.

Quantity A	**Quantity B**
The average (arithmetic mean) of x, y, and z	The average (arithmetic mean) of $0.5x$, $0.5y$, and $0.5z$

17. Balpreet's quiz scores in English are 80, 82, 79 and 84. Her quiz scores in History are 90 and 71. What is the sum of the scores she would need to get on her next English quiz and her next History quiz to raise each class' quiz score average to 85?

(A) 109
(B) 192
(C) 194
(D) 198
(E) 218

18. Aaron's first three quiz scores were 75, 84, and 82. If his score on the fourth quiz reduced his average quiz score to 74, what was his score on the fourth quiz?

19. Paco's practice test scores are 650, 700, 630 and 640. What score on the 5th test would result in an average score of 660 for all 5 tests?

20. A quiz is scored from 0 to 110. JaeHa has 5 quiz scores: 90, 95, 88, 84, 92. What does the average on her next 2 quizzes need to be in order to bring her average for all 7 quizzes up to 95?

21.

The integer ages of the three children in the Chen family range from 2 to 13, and no two children are the same age.

Quantity A	**Quantity B**
The average age of all three children in the Chen family	10

22.

Four people have an average age of 18, and none of the people are older than 30.

Quantity B

Quantity A	
The range of the four people's ages	25

23.

Set A consists of 5 numbers, which have an average value of 43. Set B consists of 5 numbers.

Quantity A	**Quantity B**
The value of x if the average of x and the 5 numbers in Set A is 46	The average of Set B if the average of the 10 numbers in Sets A and B combined is 52

24. The average of 7 numbers is 12. The average of the 4 smallest numbers in this set is 8, while the average of the 4 greatest numbers in this set is 20. How much greater is the sum of the 3 greatest numbers than the sum of the 3 smallest numbers?

(A) 4
(B) 14
(C) 28
(D) 48
(E) 52

25. If the average of a, b, c, 5, and 6 is 6, what is the average of a, b, c, and 13?

(A) 8
(B) 8.5
(C) 9
(D) 9.5
(E) It cannot be determined from the information given.

26. The average (arithmetic mean) of 8 numbers is 42. One of the numbers is removed from the set, and the resulting average (arithmetic mean) of the remaining numbers is 40. What number was removed from the set?

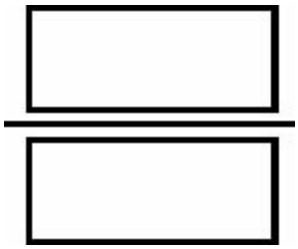
(A) 26
(B) 28
(C) 50
(D) 54
(E) 56

27. The average of 13 numbers is 70. If the average of 10 of these numbers is 90, what is the average of the other 3 numbers?

(A) -130
(B) $\frac{10}{3}$
(C) 30
(D) 90
(E) 290

28. Town A has 6,000 citizens and an average (arithmetic mean) of 2 radios per citizen. Town B has 10,000 citizens and an average (arithmetic mean) of 4 radios per citizen. What is the average number of radios per citizen in both towns combined?

Give your answer as a fraction.



29.

Joe's quiz scores are 80, 82, 78, 77, and 83. Dave's quiz scores are 60, 90, and 80.

Quantity A	**Quantity B**
The score Joe would need on his next quiz to increase his overall average score to 82.	The score Dave would need on his next quiz to increase his overall average score to 82.

30. Fiber X Cereal is 55% fiber. Fiber Max Cereal is 70% fiber. Sheldon combines an amount of the two cereals in a single bowl of mixed cereal that is 65% fiber. If the bowl contains 12 ounces of cereal, how much of the cereal, in ounces, is Fiber X?

(A) 3
(B) 4
(C) 6
(D) 8
(E) 9

31. The average population in Town X was recorded as 22,455 during the years 2000–2010, inclusive. However, an error was later uncovered: the figure for 2009 was erroneously recorded as 22,478, but should have been correctly recorded as 22,500. What is the average population in Town X during the years 2000–2010, inclusive, once the error is corrected?

Liquor Brand	**Percent Alcohol**
Delicate Flower	4%
Fine and Dandy	6%
Monster Smash	12%

32. Based on the chart above, which of the following statements must be true?

Indicate <u>all</u> such statements.

☐ A cocktail made with one part Fine and Dandy and two parts Monster Smash (and no other ingredients) will be more than 9% alcohol.
☐ A cocktail made with 11.5 grams each of all three liquors (and no other ingredients) will be more than

7% alcohol.

☐ A cocktail made with one part Delicate Flower, two parts Fine and Dandy, and one part alcohol-free mixer (and no other ingredients) will be more than 7% alcohol.

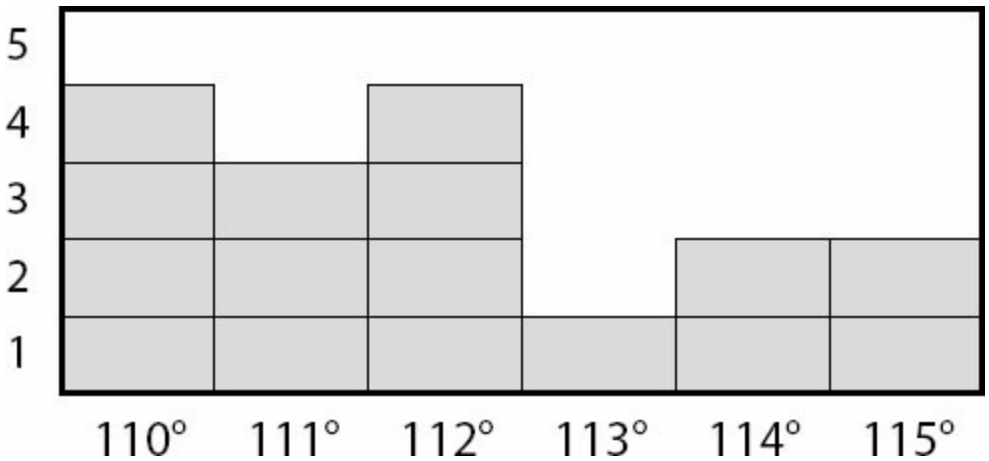
33.

$$S_n = 3n + 3$$

Sequence S is defined for all integers n such that $0 < n < 10{,}000$

Quantity A	**Quantity B**
The median of sequence S	The mean of sequence S

34. The bar graph below displays the number of temperature readings at each value from a sample, measured in degrees Fahrenheit. What was the average temperature reading?



☐ degrees Fahrenheit

35. In a certain dance troupe, there are 55 women and 33 men. If all of the women are 62 inches tall and all of the men are 70 inches tall, what is the average height of the dancers in the troupe?

☐ inches

36. Set A: 1, 3, 5, 7, 9
Set B: 6, 8, 10, 12, 14

For the sets of numbers above, which of the following statements are true?

Indicate <u>all</u> such statements.

☐ The mean of Set B is greater than the mean of Set A.
☐ The median of Set B is greater than the median of Set A.
☐ The standard deviation of Set B is greater than the standard deviation of Set A.
☐ The range of Set B is greater than the range of Set A.

37. Three people have $32, $72, and $98, respectively. If they pool their money then redistribute it among them, what is the maximum value for the median amount of money?

(A) $72
(B) $85
(C) $98
(D) $101
(E) $202

38.

Weekly Revenue Per Product Category at Office Supply Store *X*

Product Category	Weekly Revenue in Dollars
Pens	164
Pencils	111
Legal Pads	199
Erasers	38
Average of Categories above	128

According to the chart above, the average revenue per week per product category is $128. However, there is an error in the chart; the revenue for Pens is actually $176, not $164. What is the new, correct average revenue per week per product category be, in dollars?

(A) 130
(B) 131
(C) 132
(D) 164
(E) 176

39.

A set of 7 integers has a range of 2, an average of 3, and a mode of 3.

Quantity A	**Quantity B**
The third number in the set when the numbers are arranged in ascending order	The fifth number in the set when the numbers are arranged in ascending order

40.

Set *S* consists of the first 500 positive, even multiples of 7.

Quantity A	**Quantity B**
The average of the set	The median of the set

41.

The average of $3x$, x, and y is equal to $2x$

Quantity A	**Quantity B**
$2x$	y

42. The average age of the buildings on a certain city block is greater than 40 years old. If four of the buildings were built two years ago and none of the buildings are more than 80 years old, which of the following could be the number of buildings on the block?

Indicate all such numbers.

- ☐ 4
- ☐ 6
- ☐ 8
- ☐ 11
- ☐ 40

43. Four students contributed to a charity drive, and the average amounts contributed by each student was $20. If no student gave more than $25, what is the minimum amount that any student could have contributed?

$ ☐

44.

The average of 7 distinct integers is 12, and the least of these integers is -15.

Quantity A	**Quantity B**
The greatest that any of the integers could be	84

45.

Set N consists of the first 9 positive multiples of 3

Quantity A	**Quantity B**
The average of the first and last terms in the set	The average of the third and seventh terms in the set

46. The average of 15 consecutive integers is 88. What is the greatest of these integers?

☐

47.

The average of 5 integers is 10 and the range of the 5 integers is 10.

Quantity A	**Quantity B**
The median of the 5 integers	10

48.

3 numbers have a range of 2 and a median of 4.4

Quantity A	**Quantity B**
The greatest of the numbers	5.4