## A.S.16: Average Known with Missing Data: Recognize how linear transformations of one-variable data affect the data's mean, median, mode, and range

1 For what value of $x$ will 8 and $x$ have the same mean (average) as 27 and 5?
1) 1.5
2) 8
3) 24
4) 40

2 If 6 and $x$ have the same mean (average) as 2, 4, and 24, what is the value of $x$?
1) 5
2) 10
3) 14
4) 36

3 A set of data consists of four scores: $x_1$, $x_2$, $x_3$, and $x_4$. If the mean of the four scores is 9, what is the value of $x_3$ when $x_1 = 5$, $x_2 = 7$, and $x_4 = 11$?
1) 9
2) 13
3) 3
4) 12

4 For five algebra examinations, Maria has an average of 88. What must she score on the sixth test to bring her average up to exactly 90?
1) 92
2) 94
3) 98
4) 100

5 The exact average of a set of six test scores is 92. Five of these scores are 90, 98, 96, 94, and 85. What is the other test score?
1) 92
2) 91
3) 89
4) 86

6 During each marking period, there are five tests. If Vanita needs a 65 average to pass this marking period and her first four grades are 60, 72, 55, and 80, what is the *lowest* score she can earn on the last test to have a passing average?
1) 58
2) 65
3) 80
4) 100

7 In his first three years coaching baseball at High Ridge High School, Coach Batty's team won 7 games the first year, 16 games the second year, and 4 games the third year. How many games does the team need to win in the fourth year so that the coach's average will be 10 wins per year?
1) 13
2) 10
3) 3
4) 9

8 This year, John played in 10 baseball games. In these games he had hit the ball 2, 3, 0, 1, 3, 2, 4, 0, 2, and 3 times. In the first 10 games he plays next year, John wants to increase his average (mean) hits per game by 0.5. What is the total number of hits John needs over the first 10 games next year to achieve his goal?
1) 5
2) 2
3) 20
4) 25

9 The mean (average) weight of three dogs is 38 pounds. One of the dogs, Sparky, weighs 46 pounds. The other two dogs, Eddie and Sandy, have the same weight. Find Eddie's weight.

10 The students in Woodland High School's meteorology class measured the noon temperature every schoolday for a week. Their readings for the first 4 days were Monday, 56°; Tuesday, 72°; Wednesday, 67°; and Thursday, 61°. If the mean (average) temperature for the 5 days was exactly 63°, what was the temperature on Friday?

11 TOP Electronics is a small business with five employees. The mean (average) weekly salary for the five employees is $360. If the weekly salaries of four of the employees are $340, $340, $345, and $425, what is the salary of the fifth employee?

12 On his first 5 biology tests, Bob received the following scores: 72, 86, 92, 63, and 77. What test score must Bob earn on his sixth test so that his average (mean score) for all six tests will be 80? Show how you arrived at your answer.

13 Juan received scores of 82, 76, 93, and 80 on his first four chemistry tests of the year. His goal is to have an 86 average in chemistry for his first five tests. What score must he earn on the next test to achieve an average of exactly 86?

14 Judy needs a mean (average) score of 86 on four tests to earn a midterm grade of B. If the mean of her scores for the first three tests was 83, what is the lowest score on a 100-point scale that she can receive on the fourth test to have a midterm grade of B?

15 On the first six tests in her social studies course, Jerelyn's scores were 92, 78, 86, 92, 95, and 91. Determine the median and the mode of her scores. If Jerelyn took a seventh test and raised the mean of her scores *exactly* 1 point, what was her score on the seventh test?

16 Noj has the following test scores:

$$76, 84, 69, 74, 91$$

His teacher will allow him to retake the test on which he scored lowest. Noj wants an average of *at least* 82. Determine the *least* number of additional points Noj must score on the retest.

17 Tamika could not remember her scores from five mathematics tests. She did remember that the mean (average) was exactly 80, the median was 81, and the mode was 88. If all her scores were integers with 100 the highest score possible and 0 the lowest score possible, what was the *lowest* score she could have received on any one test?

18 Angelo, Brandon, and Carl work in the same office. Angelo's age is 4 years more than twice Carl's age. Brandon is 5 years younger than Carl. The average of the three ages is 41. Find the age *of each* of the men.

19 The mean of three numbers is 25. The second number is four less than twice the first. The third number is two more than four times the first. Find the smallest number.

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**Answer Section**

1 ANS: 3

$$\frac{x+8}{2} = \frac{27+5}{2}$$
$$x+8 = 32$$
$$x = 24$$

REF: spring9801a

2 ANS: 3

$$\frac{6+x}{2} = \frac{2+4+24}{3}$$
$$\frac{6+x}{2} = 10$$
$$6+x = 20$$
$$x = 14$$

REF: 089913a

3 ANS: 2 REF: 068820siii

4 ANS: 4

$$\frac{88+88+88+88+88+x}{6} = 90$$
$$440 + x = 540$$
$$x = 100$$

REF: 060017a

5 ANS: 3

$$\frac{90+98+96+94+85+x}{6} = 92$$
$$463 + x = 552$$
$$x = 89$$

REF: 080110a

6 ANS: 1

$$\frac{60+72+55+80+x}{5} = 65$$
$$267 + x = 325$$
$$x = 58$$

REF: 060204a

7 ANS: 1

$$\frac{7+16+4+x}{4} = 10$$
$$27 + x = 40$$
$$x = 13$$

REF: 060703a

8 ANS: 4

$$\frac{2+3+0+1+3+2+4+0+2+3}{10} = \frac{20}{10} = 2 \quad \frac{x}{10} = 2 + 0.5$$
$$x = 25$$

REF: 081020ia

9 ANS:

$$\frac{46 + x + x}{3} = 38$$

34. $46 + 2x = 114$
$2x = 68$
$x = 34$

REF: 069929a

10 ANS:

$$\frac{56 + 72 + 67 + 61 + x}{5} = 63$$

59. $256 + x = 315$
$x = 59°$

REF: 010230a

11 ANS:

$$\frac{340 + 340 + 345 + 425 + x}{5} = 360$$

\$350. $1450 + x = 1800$
$x = 350$

REF: 010432a

12 ANS:

$$\frac{72 + 86 + 92 + 63 + 77 + x}{6} = 80$$

90. $390 + x = 480$
$x = 90$

REF: spring9826a

13 ANS:

$$\frac{82+76+93+80+x}{5}=86$$

99. $331+x=430$

$x=99$

REF: 010936a

14 ANS:

$$\frac{83+83+83+x}{4}=86$$

95. $249+x=344$

$x=95$

REF: 010026a

15 ANS:

$$\frac{92+78+86+95+91+x}{7}=89+1$$

median = 91.5; mode = 92; 96. $534+x=630$

$x=96$

REF: 060438a

16 ANS:

$\frac{76+84+x+74+91}{5}=82$ $85-69=16$

$x+325=410$

$x=85$

REF: 011535ia

17 ANS:

63. Since there is an odd number of tests (5), the median (81) represents an actual score, and not the average of two scores. Since the mode is 88, that score appears at least twice. To calculate the lowest score Tamika could have received on the fifth test, maximize what she received on the fourth test. But if she received a 100 on the fourth test, the median would no longer be 81. Therefore the fourth exam must be less than the median, or 80.

$$\frac{81+88+88+80+x}{5}=80$$

$337+x=400$

$x=63$

REF: 080227a

18 ANS:
Angelo is 66, Brandon is 26, and Carl is 31. Carl = $x$, Angelo = $2x + 4$, Brandon = $x - 5$.

$$\frac{x + (2x + 4) + (x - 5)}{3} = 41$$

$4x - 1 = 123$. Carl = 31, Angelo = 2(31) + 4 = 66, Brandon = 31 – 5 = 26.

$x = 31$

REF: 060738a

19 ANS:

$$\frac{x + (2x - 4) + (4x + 2)}{3} = 25$$

11. $7x - 2 = 50$

$x = 11$

REF: 080836a