Algebra Word Problems

Lesson 3

Worksheet 3

Algebra Word Problems

Involving

Averages

Algebra Word Problems – Lesson 3 - Worksheet 3 - Algebra Word Problems Involving Averages

Problem 1) At a factory, three workers produced $87, 93$ and 102 units respectively in one day. What is the average production, in units, of these three workers?

Problem 2) The teacher sets a goal for a class average of 88 on a test. Out of a class of 12 students, six students scored 88 and five students scored 86. What must the remaining score be in order to reach the goal? Can it be done?

Problem 3) In an English class, four students wrote essays of 1327, 1295, 1198 and 1456 words in length, respectively. What is the average length of these four essays?

Problem 4) The average of eight numbers is 22. If we remove one number, the average of the remaining numbers is 19. What number was removed?

Problem 5) The teacher sets a goal for a class average of 92 on a test. Out of a class of 12 students, seven students scored 89 and four students scored 84. What must the remaining score be in order to reach the goal? Can it be done?

Problem 6) In a restaurant, a waiter collected tips from five of his tables. The tips were $\$4.50, \$6.00, \$8.00, \$12.00$ and $\$7.50$, respectively. What is the average amount of tip from these five tables?

Problem 7) The average of twelve numbers is 28. If we remove one number, the average of the remaining numbers is 26. What number was removed?

Problem 8) The teacher sets a goal for a class average of 85 on a test. Out of a class of 12 students, eight students scored 81 and three students scored 86. What must the remaining score be in order to reach the goal? Can it be done?

Problem 9) There are six students in a Math class. Five of their six grades are: $73, 84, 86, 91, 92$. If the class average for all six students is 87, and the student with the lowest grade drops the class, what is the average grade of the remaining students? (Calculate to the nearest tenth.)

Problem 10) Find the average score on an Algebra test among seven students who scored $82, 91, 75, 83, 93, 47$ and 68, respectively.

Problem 11) The teacher sets a goal for a class average of 90 on a test. Out of a class of 12 students, five students scored 80 and six students scored 96. What must the remaining score be in order to reach the goal? Can it be done?

Problem 12) The average of ten numbers is 35. If we remove one number, the average of the remaining numbers is 34. What number was removed?

Problem 13) There are seven students in a Math class. Six of their seven grades are: $74, 82, 85, 88, 93, 94$. If the class average for all seven students is 84, and the student with the lowest grade drops the class, what is the average grade of the remaining students? (Calculate to the nearest tenth.)

Problem 14) At a grocery store, three shoppers spent $\$114.56, \$86.95$ and $\$238.26$, respectively. What is the average cost of groceries for these three shoppers?

Problem 15) The average of nine numbers is 23. If we remove one number, the average of the remaining numbers is 24. What number was removed?

Problem 16) There are eight students in a class. Seven of their eight grades are: $76, 82, 86, 90, 91, 92, 98$. If the class average for all eight students is 89, and the student with the lowest grade drops the class, what is the average grade of the remaining students? (Calculate to the nearest tenth.)

Problem 17) A restaurant menu shows the following calorie counts for the fajitas on the menu:

Item	Shrimp	Loaded Shrimp	Steak	Loaded Steak	Chicken	Loaded Chicken
Calories	1310	1440	1520	1660	1430	1560

What is the difference between the average calories for the loaded fajitas and the non-loaded fajitas? (Round calculations to the nearest whole calorie.)

Problem 18) The teacher wants to set a goal for a class average on a test. Out of a class of 12 students, eight students scored 90 and three students scored 85, with one more student still to take the test. What is the maximum possible goal the teacher could set and achieve it?

Problem 19) The average of six numbers is 64. If we remove one number, the average of the remaining numbers is 66. What number was removed?

Problem 20) At a commercial laundry, three washers can wash $18, 19$ and 23 shirts per load, respectively. Three other washers can wash $19, 27$ and 29 pairs of pants per load, respectively. What is the difference between the averages of these washers?

Answers - Algebra Word Problems – Lesson 3 - Worksheet 3 - Algebra Word Problems Involving Averages

Problem 1) At a factory, three workers produced $87, 93$ and 102 units, respectively, in one day. What is the average production, in units, of these three workers?

Solution:

Find the average by adding the number of units and dividing by the number of workers:

$$Avg = \frac{87 + 93 + 102}{3} = \frac{282}{3} = 94$$

Answer: 94

Problem 2) The teacher sets a goal for a class average of 88 on a test. Out of a class of 12 students, six students scored 88 and five students scored 86. What must the remaining score be in order to reach the goal? Can it be done?

Solution:

Calculate the current average using the given information:

$$\frac{6(88) + 5(86) + x}{12} = \frac{528 + 430 + x}{12} = \frac{958 + x}{12} = 88$$

$$958 + x = 12(88)$$

$$958 + x = 1056$$

$$x = 98$$

Answer: 98, yes

Problem 3) In an English class, four students wrote essays with 1327, 1295, 1198 and 1456 words in length, respectively. What is the average length, in words, of these four essays?

Solution:

Find the average by adding the number of words from each essay and then dividing by the number of essays:

$$Avg = \frac{1327 + 1295 + 1198 + 1456}{4} = \frac{5276}{4} = 1319$$

Answer: 1319

Problem 4) The average of eight numbers is 22. If we remove one number, the average of the remaining numbers is 19. What number was removed?

Solution:

Find the total of the numbers before and after removing the number:

$$\frac{Sum\ of\ 8\ numbers}{8} = 22$$

$$Sum\ of\ 8\ numbers = 8(22) = 176$$

$$\frac{Sum\ of\ 7\ numbers}{7} = 19$$

$$Sum\ of\ 7\ numbers = 7(19) = 133$$

Find the difference: $176 - 133 = 43$.

The number 43 was removed from the original set of numbers.

Answer: 43

Problem 5) The teacher sets a goal for a class average of 92 on a test. Out of a class of 12 students, seven students scored 89 and four students scored 84. What must the remaining score be in order to reach the goal? Can it be done?

Solution:

Calculate the current average using the given information:

$$\frac{7(89)+4(84)+x}{12}=\frac{623+336+x}{12}=\frac{959+x}{12}=92$$

$$959+x=12(92)$$

$$959+x=1104$$

$$x=145$$

Answer: 145, no

Problem 6) In a restaurant, a waiter collected tips from five of his tables. The tips were $\$4.50, \$6.00, \$8.00, \$12.00$ and $\$7.50$, respectively. What is the average amount of tip from these five tables?

Solution:

Find the average by adding the amounts of each tip and then dividing by the number of tables:

$$Avg=\frac{4.5+6+8+12+7.5}{5}=\frac{38}{5}=7.6$$

Answer: $\$7.60$

Problem 7) The average of twelve numbers is 28. If we remove one number, the average of the remaining numbers is 26. What number was removed?

Solution:

Find the total of the numbers before and after removing the number:

$$\frac{Sum\ of\ 12\ numbers}{12} = 28$$

$$Sum\ of\ 12\ numbers = 12(28) = 336$$

$$\frac{Sum\ of\ 11\ numbers}{11} = 26$$

$$Sum\ of\ 11\ numbers = 11(26) = 286$$

Find the difference: $336 - 286 = 50$.

The number 50 was removed from the original set of numbers.

Answer: 50

Problem 8) The teacher sets a goal for a class average of 85 on a test. Out of a class of 12 students, eight students scored 81 and three students scored 86. What must the remaining score be in order to reach the goal? Can it be done?

Solution:

Calculate the current average using the given information:

$$\frac{8(81) + 3(86) + x}{12} = \frac{648 + 258 + x}{12} = \frac{906 + x}{12} = 85$$

$$906 + x = 12(85)$$

$$906 + x = 1020$$

$$x = 114$$

Answer: 114, no

Problem 9) There are six students in a Math class. Five of their six grades are: $73, 84, 86, 91, 92$. If the class average for all six students is 87, and the student with the lowest grade drops the class, what is the average grade of the remaining students? (Calculate to the nearest tenth.)

Solution:

Find the sixth grade:

$$\frac{73 + 84 + 86 + 91 + 92 + x}{6} = \frac{426 + x}{6} = 87$$

$$426 + x = 6(87)$$

$$426 + x = 522$$

$$x = 96$$

The lowest score is 73. Calculate the new average:

$$\frac{84 + 86 + 91 + 92 + 96}{5} = \frac{449}{5} = 89.8$$

Answer: 89.8

Problem 10) Find the average score on a test in an Algebra class among seven students who scored $82, 91, 75, 83, 93, 47$ and 68.

Solution:

Find the average by adding the grades and then dividing by the number of students:

$$Avg = \frac{82 + 91 + 75 + 83 + 93 + 47 + 68}{7} = \frac{539}{7} = 77$$

Answer: 77

Problem 11) The teacher sets a goal for a class average of 90 on a test. Out of a class of 12 students, five students scored 80 and six students scored 96. What must the remaining score be in order to reach the goal? Can it be done?

Solution:

Calculate the current average using the given information:

$$\frac{5(80)+6(96)+x}{12}=\frac{400+576+x}{12}=\frac{976+x}{12}=90$$

$$976+x=12(90)$$

$$976+x=1080$$

$$x=104$$

Answer: 104, no

Problem 12) The average of ten numbers is 35. If we remove one number, the average of the remaining numbers is 34. What number was removed?

Solution:

Find the total of the numbers before and after removing the number:

$$\frac{Sum\ of\ 10\ numbers}{10}=35$$

$$Sum\ of\ 10\ numbers=10(35)=350$$

$$\frac{Sum\ of\ 9\ numbers}{9}=34$$

$$Sum\ of\ 9\ numbers=9(34)=306$$

Find the difference: $350-306=44$.

The number 44 was removed from the original set of numbers.

Answer: 44

Problem 13) There are seven students in a Math class. Six of their seven grades are: $74, 82, 85, 88, 93, 94$. If the class average for all six students is 84, and the student with the lowest grade drops the class, what is the average grade of the remaining students? (Calculate to the nearest tenth.)

Solution:

Find the seventh grade:

$$\frac{74 + 82 + 85 + 88 + 93 + 94 + x}{7} = \frac{516 + x}{7} = 84$$

$$516 + x = 7(84)$$

$$516 + x = 588$$

$$x = 72$$

The lowest score is 72. Calculate the new average:

$$\frac{74 + 82 + 85 + 88 + 93 + 94}{6} = \frac{516}{6} = 86$$

Answer: 86

Problem 14) At a grocery store, three shoppers spent $\$114.56, \$86.95$ and $\$238.26$, respectively. What is the average cost of groceries for these three shoppers?

Solution:

Find the average by adding the amounts of money spent and then dividing by the number of shoppers:

$$Avg = \frac{114.56 + 86.95 + 238.26}{3} = \frac{439.77}{3} = 146.59$$

Answer: $\$146.59$

Problem 15) The average of nine numbers is 23. If we remove one number, the average of the remaining numbers is 24. What number was removed?

Solution:

Find the total of the numbers before and after removing the number:

$$\frac{Sum\ of\ 9\ numbers}{9} = 23$$

$$Sum\ of\ 9\ numbers = 9(23) = 207$$

$$\frac{Sum\ of\ 8\ numbers}{8} = 24$$

$$Sum\ of\ 8\ numbers = 8(24) = 192$$

Find the difference: $207 - 192 = 15$.

The number 15 was removed from the original set of numbers.

Answer: 15

Problem 16) There are eight students in a Math class. Seven of their eight grades are: $76, 82, 86, 90, 91, 92, 98$. If the class average for all eight students is 89, and the student with the lowest grade drops the class, what is the average grade of the remaining students? (Calculate to the nearest tenth.)

Solution:

Find the sixth grade:

$$\frac{76 + 82 + 86 + 90 + 91 + 92 + 98 + x}{8} = \frac{615 + x}{8} = 89$$

$$615 + x = 8(89)$$

$$615 + x = 712$$

$$x = 97$$

The lowest score is 76. Calculate the new average:

$$\frac{82 + 86 + 90 + 91 + 92 + 97 + 98}{7} = \frac{636}{7} = 90.9$$

Answer: 90.9

Problem 17) A restaurant menu shows the following calorie counts for the fajitas on the menu:

Item	Shrimp	Loaded Shrimp	Steak	Loaded Steak	Chicken	Loaded Chicken
Calories	1310	1440	1520	1660	1430	1560

What is the difference between the average calories for the loaded fajitas and the non-loaded fajitas? (Round calculations to the nearest whole calorie.)

Solution:

Find the average of each by adding the amounts of calories and then dividing by the number of items:

$$Avg\ Loaded = \frac{1440 + 1660 + 1560}{3} = \frac{4660}{3} = 1553$$

$$Avg\ Unloaded = \frac{1310 + 1520 + 1430}{3} = \frac{4260}{3} = 1420$$

$$1553 - 1420 = 133$$

Answer: 133

Problem 18) The teacher wants to set a goal for a class average on a test. Out of a class of 12 students, eight students scored 90 and three students scored 85, with one more student still to take the test. What is the maximum possible goal the teacher could set and achieve it?

Solution:

We must assume the last student could get 100 on the test.

Calculate the current average using the given information:

$$\frac{8(90) + 3(85) + 100}{12} = \frac{720 + 255 + 100}{12} = \frac{1075}{12} = 89.5$$

Answer: 89.5

Problem 19) The average of six numbers is 64. If we remove one number, the average of the remaining numbers is 66. What number was removed?

Solution:

Find the total of the numbers before and after removing the number:

$$\frac{Sum\ of\ 6\ numbers}{6} = 64$$

$$Sum\ of\ 6\ numbers = 6(64) = 384$$

$$\frac{Sum\ of\ 5\ numbers}{5} = 66$$

$$Sum\ of\ 5\ numbers = 5(66) = 330$$

Find the difference: $384 - 330 = 54$.

The number 54 was removed from the original set of numbers.

Answer: 54

Problem 20) At a commercial laundry, three washers can wash $18, 19$ and 23 shirts per load, respectively. Three other washers can wash $19, 27$ and 29 pairs of pants per load, respectively. What is the difference between the averages of these washers?

Solution:

Find the average by adding the amounts of shirts and pants and then dividing by the number of washers:

$$Avg\ Shirts = \frac{18 + 19 + 23}{3} = \frac{60}{3} = 20$$

$$Avg\ Pants = \frac{19 + 27 + 29}{3} = \frac{75}{3} = 25$$

$$25 - 20 = 5$$

Answer: 5
