

GMAT Quant - Word Problems

Topics Covered:

- ☐ Percentages
- ☐ Ratios
- ☐ Simple Interest
- ☐ Compound Interest
- ☐ Population Growth
- ☐ Work and Rate
- ☐ Speed and Distance
- ☐ Averages
- ☐ Mixtures
- ☐ Miscellaneous Word Problems

1. If \$1,000 is deposited in a certain bank account and remains in the account along with any accrued interest, the dollar amount of interest, I , earned by deposit in the first n years is given by $I = 1,000 \left((1+r/100)^n - 1 \right)$, where r percent is the annual interest rate paid by the bank. Is the annual interest rate paid by the bank greater than 8%?
1) the deposit earns a total of \$210 in interest in the first 2 years. 2) $(1+r/100)^2 > 1.15$
2. At least 100 students at a certain high school study Japanese. If 4 percent of the students at the school who study French also study Japanese, do more students at the school study French than Japanese?
1) 16 students at the school study both French and Japanese.
2) 10 percent of the students at the school who study Japanese also study French.
3. The sales price of a certain jacket was 15 percent less than its original price, and the sale price of a certain shirt was 10 percent less than original price. How much greater was the original price of the jacket than the original price of the shirt?
1) The sale price of the jacket was \$83 greater than the sales price of the shirt
2) The original price of the jacket was \$140
4. In Jefferson School, 300 students study French or Spanish or both. If 100 of these students do not study French, how many of these students study both French and Spanish?
(1) Of the 300 students, 60 do not study Spanish.
(2) A total of 240 of the students study Spanish.
5. In a village of hundred households, 75 have at least one DVD player, 80 have at least one cell phone, and 55 have at least one MP3 player. Every village has at least one of these three devices. If X and Y are respectively the greatest and the lowest possible number of households that have all the three of these devices, $X-Y$ is :
A) 65 B) 55 C) 45 D) 35 E) 25
6. Of the 75 houses in a certain community, 48 have a patio. How many of the houses in the community have a swimming pool?
1) 38 of the houses in the community have a patio but do not have a swimming pool.
2) The number of houses in the community that have a patio and a swimming pool is equal to the number of houses in the community that have neither a swimming pool nor a patio.
7. According to the directions on a can of frozen orange juice concentrate, 1 can of concentrate is to be mixed with 3 cans of water to make orange juice. How many 12 ounce cans of the concentrate are required to prepare 200 6-ounce servings of orange juice?
1) 25 2) 34 3) 50 4) 67 5) 100
8. The cost of delivery for an order of desk chairs was \$10.00 for the first chair, and additional \$1.00 for each additional chair in order. If an office manager placed an order for n desk, is $n > 24$?
1) The delivery cost for the order totaled more than \$30.00
2) The average (arithmetic mean) delivery cost per chair of the n chairs was \$1.36

9. In 1995 Division A of Company X had 4850 customers. If there were 86 service errors in Division A that year, what was the service-error rate, in number of service errors per 100 customers, for Division B of Company X in 1995?
1. In 1995 the overall service-error rate for Divisions A and B combined was 1.5 service errors per 100 customers.
 2. In 1995, Division B had 9350 customers, none of which were customers of Division A.
10. A certain car averages 25 miles per gallon of gasoline when driven in the city and 40 miles per gallon when driven on the highway. According to these rates, which of the following is closest to the number of miles per gallon that the car averages when it is driven 10 miles in the city and then 50 miles on the highway?
- 28 30 33 36 38
11. For each order, a mail-order bookseller charges a fixed processing fee and an additional fee for each book in the order. Rajeev placed five different orders with this bookseller- an order for 1 book in January, an order for 2 books in February, an order for 3 books in March, an order for 4 books in April, an order for 5 books in May. What was the total of Rajeev's processing and shipping fees for these five orders?
- 1) Rajeev's processing and shipping fees were \$1.00 more for his order in March than for his order in January.
 - 2) The total of Rajeev's shipping fees for the five orders was \$7, 50.
12. Pump A can drain container in 3 hours, B can drain it in 2 hours and C can fill a full container in 6 hour opening A,B,C together, if a container has full water, how many times does it drain the container will be half-full?
- A)30 minutes B) 45 minutes C) 50 minutes D) 60 minutes E) 72 minutes
13. During a 40-mile trip, Marla traveled at an average speed of x miles per hour for the first y miles of the trip and at an average speed of $1.25x$ mph for the last $40-y$ miles of the trip. The time that Marla took to travel the 40 miles was what percent of the time it would have taken her if she has traveled at an average speed of x miles per hour for the entire trip?
- 1) $x = 48$
 - 2) $y = 20$
14. How much time did it take a certain car to travel 400 kilometers?
- (1) The car travelled the first 200 km in 2.5 hrs.
 - (2) If the car's average speed had been 20 km/h greater than it was, it would have travelled the 400 km in 1 hr less than it did.
15. Of the students who eat in a certain cafeteria, each student either likes or dislikes lima beans and each student either likes or dislikes Brussels sprouts. Of these students, $\frac{2}{3}$ dislike lima beans; and of those who dislike lima beans, $\frac{3}{5}$ also dislike Brussels sprouts. How many of the students like Brussels sprouts but dislike lima beans? A. 120 students eat in the cafeteria. B. 40 of the students like lima beans.
16. In a certain senior class, 72 percent of the male students and 80 percent of the female students have applied to college. What fraction of the students in the senior class is male?
- (1) There are 840 students in the senior class
 - (2) 75 percent of the students in the senior class have applied to college.
17. A college admissions officer predicts that 20% of the students who are accepted will not attend the college. According to this prediction, how many students should be accepted to achieve a planned enrollment of x students?
- A. $1.05x$ B. $1.1x$ C. $1.2x$ D. $1.25x$ E. $1.8x$
18. A certain one-day seminar consisted of a morning session and an afternoon session. If each of the 128 people attending the seminar attended at least one of the two sessions, how many of the people attended the morning session only.
- 1) $\frac{3}{4}$ of the people attended both sessions
 - 2) $\frac{7}{8}$ of the people attended the afternoon session
19. During a trip on expressway, Don drove a total of x miles. His average speed on a 5 mile section is 30miles/hr and his average speed of remainder of trip was 60 miles/hr. His travel time was what % greater than it would have been if he had traveled at constant rate of 60 miles /hr.

20. In a certain year the United Nations' total expenditures were \$1.6 billion. Of this amount, 67.8% was paid by the 6 highest-contributing countries, and the balance was paid by the remaining 153 countries. Was Country X among the highest-contributing countries?
- 1) 56% of the total expenditures was paid by the 4 highest-contributing countries, each of which paid more than Country X.
 - 2) Country X paid 4.8% of the total expenditures.
21. All the clients that Company X had at the beginning of last year remained with the company for the whole year. If Company X acquired new clients during the year, what was the ratio of the number of clients that Company X had at the end of last year to the number of clients that it had at the beginning of last year?
1. The ratio of the number of clients that Company X had at the beginning of last year to the number of new clients that it acquired during the year was 12 to 1.
 2. Company X had 144 clients at the beginning of last year.
22. If X worked alone to take him 15 hours then y independently for 18 hours if x alone to do first for 6 hours, two people were doing together for three hours, rest of job will be finished by y, and then y need how many hours to complete?
- A) 13/3 hours B) 17/3 hours C) 13/5 hours D) 16/3 hours E) 16/5 hours F) 21/5 hours
23. If it took Carlos $\frac{1}{2}$ hour to cycle from his house to the library yesterday, was the distance he cycled greater than 6 miles?
- (1) The average speed at which Carlos cycled from his house to the library yesterday was greater than 16 feet per second.
 - (2) The average speed at which Carlos cycled from his house to the library yesterday was less than 18 feet per second.
24. At the bakery, Lew spent a total of \$6.00 for one kind of cupcake and one kind of doughnut. How many doughnuts did he buy?
- 1) The price of 2 doughnuts was \$0.10 less than the price of 3 cupcakes.
 - 2) The average (arithmetic mean) price of 1 doughnut and 1 cupcake was \$0.35.
25. Six machines, each working at the same constant rate, together can complete a certain job in 12 days. How many additional machines, each working at the same constant rate, will be needed to complete the job in 8 days?
- A) 2 B) 3 C) 4 D) 6 E) 7
26. On a certain road 10 percent of the motorists exceed the posted speed limit and receive speeding tickets, but 20 percent of the motorists who exceed the posted speed limit do not receive speeding tickets. What percent of the motorists on the road exceed the posted speed limit?
- A) 10.5 B) 12.5 C) 15 D) 22 E) 30
27. Last year a certain bond with a face value of \$5000 yielded 8 percent of its face value in interest. If that interest was approx. 6.5 percent of the bond's selling price, approx. what was the bond's selling price?
- A. \$4,063 B. \$5, 325 C. \$5, 351 D. \$6,000 E. \$6,154
28. For each customer, a bakery charges p dollars for the 1st loaf of bread bought by the customer and charges q dollars for each additional loaf bought by the customer. What is the value of p?
- 1) A customer who buys 2 loaves is charged 10% less per loaf than a customer who buys a single loaf.
 - 2) A customer who buys 6 loaves of bread is charged \$10.
29. During a sale, a clothing store sold each shirt at a price of \$15 and each sweater at a price of \$25. Did the store sell more sweaters than shirts during the sale?
- (1) The average (arithmetic mean) of the prices of all the shirts and sweaters that the store sold during the sale was \$21.
 - (2) The total of the prices of all the shirts and sweaters that the store sold during the sale was \$420.
30. Marla buys two types of pencils only, which costs 21 cents or 23 cents. How many 23 cent pencils did she buy?
- (A) She bought 6 pencils in total
 - (B) The total cost of her purchase was 130 cents

31. The table shows the amount of waste material, in tons, recycled by each of five counties in a single year and the amount of waste material, also in tons, that was disposed of in landfills by the five counties in that year. Which county had the lowest ratio of waste material disposed of to waste material recycled in the year reported in the table?

Country	Amount Recycled	Amount disposed of
A	16700	142800
B	8800	48000
C	13000	51400
D	3900	20300
E	3300	16200

a) A b) B c) C d) D e) E

32. Before being simplified, the instructions for computing the income tax in Country K were to add 2% of annual income to average of 100 units of Country K's currency and 1% of annual income. Which represents the simplified formula for computing income tax for a person with an annual income I ?
- a. $50 + I/200$ b. $50 + 3I/100$ c. $50 + I/40$ d. $50 + I/50$ e. $50 + 3I/100$
33. Pumps A, B and C operate at their respective constant rates. Pumps A and B, simultaneously, can fill a certain tank in $6/5$ hours. Pump A and C, operating simultaneously, can fill the tank in $3/2$ hours; and pumps B and C, operating simultaneously, can fill the tank in 2 hours. How many hours does it take pumps A, B, and C, operating simultaneously, to fill the tank?
- (A) $1/3$ (B) $1/2$ (C) $2/3$ (D) $5/6$ (E) 1
34. Warehouse W's revenue from the sale of sofas was what percentage greater this year than it was last year?
- 1) Warehouse W sold 10% more sofas this year than last.
2) Warehouse W's selling price per sofa was \$30 greater this year than last.
35. In a sample of college students, 40 percent are third-year students and 70 percent are not second-year students. What fraction of those students who are not third-year students are second-year students?
- (A) 43 (B) 32 (C) 74 (D) 21 (E) 73
36. A contractor combined x tons of a gravel mixture that contained 10% gravel G, by weight, with y tons of a mixture that contained 2% gravel G, by weight, to produce z tons of a mixture that was 5% gravel G, by weight. What is the value of x ?
1. $y = 10$ 2. $z = 16$
37. If $T = 5/9(K-32)$, and if $T = 290$, then $K =$
- (a) $17938/9$ (b) 322 (c) 490 (d) 554 (e) $2898/5$
38. A manufacturer produced x percent more video cameras in 1994 than in 1993 and y percent more video cameras in 1995 than in 1994. If the manufacturer produced 1,000 video cameras in 1993, how many video cameras did the manufacturer produce in 1995?
- (1) $xy=20$ (2) $x+y+xy/100 = 9.2$
39. If the drama club and music club are combined, what percent of the combined membership will be male?
- (1) of the 16 members of the drama club, 15 are male.
(2) of the 20 members of the music club, 10 are male.
40. A rabbit on a controlled diet is fed daily 300 grams of a mixture of two foods, food x and food y . Food X contains 10 percent protein and food Y contains 15 percent protein. If the rabbit's diet provides exactly 38 grams of protein daily, how many grams of food X are in the mixture?
- A) 100 B) 140 C) 150 D) 160 E) 200
41. A corporation with 5,000,000 shares of publicly listed stock reported total earnings of \$7.20 per share for the first 9 months of operation. During the final quarter the number of publicly listed shares was increased to 10,000,000 shares and fourth quarter earnings were reported as \$1.25 per share. What are the average annual earnings per share based on the number of shares at the end of the year?
- (A) \$1.83 (B) \$2.43 (C) \$4.85 (D) \$8.45 (E) \$9.70
42. A grocery store purchased crates of 40 oranges each for \$5.00 per crate and then sold each orange for \$0.20. What was the store's gross profit on each crate of oranges?
- A. \$3.00 B. \$6.00 C. \$8.00 D. \$10.00 E. \$13.00

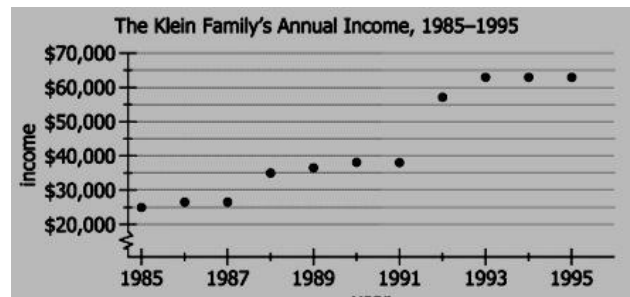
43. In a certain year the United Nations' total expenditures were \$1.6 billion. Of this amount, 67.8 percent was paid by the 6 highest-contributing countries, and the balance was paid by the remaining 153 countries. Was Country X among the 6 highest-contributing countries?
 (1) 56 percent of the total expenditures was paid by the 4 highest-contributing countries, each of which paid more than Country X.
 (2) Country X paid 4.8 percent of the total expenditures.
44. In a demographic study, the population and total income of a certain region were estimated from other data, and both estimates had upper and lower limits. At the time of the estimates, was the per capita income for the region greater than \$16,500?
 (1) The lower limit for the estimate of the population was 330,000 people.
 (2) The lower limit for the estimate of the total income was \$5,500,000,000.
45. Connie paid a sales tax of 8 percent on her purchase. If the sales tax had been only 5%, she would have paid \$12 less in sales tax on her purchase. What was the total amount that Connie paid for her purchase including sales tax?
 368 380 400 420 432
46. The table gives three factors to be considered when choosing an Internet service provider and the percent of the 1,200 respondents to a survey who cited that factor as important. If 30 percent of the respondents cited both "user-friendly" and "fast response time", what is the maximum possible number of respondents who cited "bargain prices," but neither "user-friendly" nor "fast response time?"

User-friendly	56%
Fast response time	48%
Bargain prices	42%

 A. 312 B. 336 C. 360 D. 384 E. 420
47. At a certain college there are twice as many English majors as history majors and three times as many English majors as mathematics majors. What is the ratio of the number of history majors to the number of mathematics majors?
 6 to 1 3 to 2 2 to 3 1 to 5 1 to 6
48. A certain car averages 25 miles per gallon when driving in the city and 40 miles to the gallon when driving on the highway. According to these rates, which of the following is closest to the number of miles per gallon that the car averages when it is driven 10 miles in the city and 50 miles on the highway?
 a)28 b)30 c)33 d)36 e)38
49. In May Mrs. Lee's earnings were 60 percent of the Lee family's total income. In June Mrs. Lee earned 20 percent more than in May. If rest of the family's income did not change, then, in June, Mrs. Lee's earnings were approximately what percent of the Lee family's total income?
 1. 64% 2. 68% 3. 72% 4. 76% 5. 80%
50. On July 1 of last year, the total number of employees at Company E was decreased by 10 percent. Without any change in the salaries of the remaining employees, the average (arithmetic mean) of employee salary was 10 percent more after the decrease in number of employees than before the decrease. The total of the combine salaries of all the employees at Company E after July 1 last year was what percent of that before July 1 last year?
 a. 90% b. 99% c. 100% d. 101% e. 110%
51. If the drama club and music club are combined, what percent of the combined membership will be male?
 (1) of the 16 members of the drama club, 15 are male
 (2) of the 20 members of the music club, 10 are male
52. A wooden rod is cut into two pieces. What is the length of the longer piece?
 1. One of the pieces is 20 inches longer than the other piece.
 2. The length of the shorter piece is $\frac{1}{3}$ the length of the longer piece
53. Company C has a machine that, working alone at its constant rate, processes 100 units of a certain product in 5 hours. If Company C plans to buy a new machine that will process this product at a constant rate and if the two machines, working together at their respective constant rates, are to process 100 units of this product in 2 hours, what should be the constant rate, in units per hour, of the new machine?
 A. 50 B. 45 C. 30 D. 25 E. 20

54. A certain kennel will house 24 dogs for 7 days. Each dog requires 10 ounces of dog food per day. If the kennel purchases dog food in cases of 30 cans each and if each can holds 8 ounces of dog food, how many cases will the kennel need to feed all of the dogs for 7 days?
A. 5 B. 6 C. 7 D. 8 E. 9
55. Each year Mark works 40 hours per week for 50 weeks. Last year Mark was paid a total of \$20000. If this year his hourly pay rate is raised by \$0.50, what is the total amount that Mark will be paid this year?
A. \$30000 B. \$25000 C. \$22500 D. \$21000 E. \$20020
56. Henry purchased 3 items during a sale. He received a 20 percent discount of the regular price of the most expensive item and a 10 percent discount off the regular price of the other 2 items. Was the total amount of the 3 discounts greater than 15 percent of the sum of regular prices of the 3 items?
(1) The regular price of the most expensive item was \$50, and the regular price of the next most expensive item was \$20.
(2) The regular price of the least expensive item was \$15
57. On a certain tour, ratio of number of women to number of children was 10 to 4. What was the no of men on the tour?
(1) ratio of children to men was 10 to 22 (2) no of women on the tour was less than 30
58. Over a certain time period, did the number of shares of stock in Ruth's portfolio increase?
(1) Over the time period, the ratio of the number of shares of stock to the total number of shares of stocks and bonds in Ruth's portfolio increased.
(2) Over the time period, the total number of shares of stock and bonds in Ruth's portfolio increased
59. One gram of a certain health food contains 7 percent of the minimum daily requirement of vitamin E and 3 percent of the minimum daily requirement of vitamin A. If vitamins E and A are to be obtained from no other source, approximately how many grams of the health food must be eaten daily to provide at least the minimum daily requirement of both vitamins?
A. 3 B. 7 C. 10 D. 14 E. 33
60. Of 200 members of a certain association each member who speaks German also speaks English and 70 of the members speak only Spanish. If no members speak all 3 languages; how many members speak 2 of 3 languages?
A. 60 of the members speak only English
B. 20 of the members do not speak any of the three languages.
61. In 1995 Division A of Company X had 4,850 customers. If there were 86 service errors in Division A that year, what was the service-error rate, in number of service errors per 100 customers, for Division B of company X in 1995?
(1) In 1995, the overall service-error rate for Divisions A and B combined was 1.5 service errors per 100 customers
(2) In 1995 Division B had 9350 customers, none of whom were customers of Division A
62. Linda, Robert and Pat packed a certain number of boxes with books. What is the ratio of the number of books that Robert packed to the number of books that Pat packed?
(1) Linda packed 30% of all the boxes (2) Robert packed 10 boxes more than Pat.
63. Two water pumps working simultaneously at their respective constant rates, took exactly 4 hours to fill a certain swimming pool. If the constant rate of one pump was 1.5 times faster than constant rate of the other, how many hours would it have taken the faster pump to fill the swimming pool if it had worked alone at its constant rate?
A) 5 b) 16/3 c) 11/2 d) 6 e) 20/3

64. Which of the following statements can be inferred from the data given?



- I. The Klein family's annual income more than doubled from 1985 to 1995.
 II. The Klein family's annual income increased by a greater amount from 1985 to 1990 than from 1990 to 1995.
 III. The Klein family's average (arithmetic mean) annual income for the period shown was greater than \$40,000.
 a. I only b. II only c. I and III only d. II and III only e. I, II, and III
65. Marla buys two types of pencils only, which costs 21 cents or 23 cents. How many 23 cent pencils did she buy?
 (A) She bought 6 pencils in total (B) The total cost of her purchase was 130 cents
66. Machine x and y work at their respective rates. how many more hours does it take machine Y to fill a production order of a certain size than it takes machine x working alone?
 (1) Machine X and Y fill production order in two thirds the time that machine x working alone does
 (2) Machine Y working alone fills the production order of this size in 2x the time that machine X working alone does
67. A hiker walking at a constant rate of 4 miles per hour is passed by a cyclist travelling in the same direction along the same path at a constant rate of 20 miles per hour. The cyclist stops to wait for the hiker 5 minutes after passing her while the hiker continues to walk at her constant rate. How many minutes must the cyclist wait until the hiker catches up?
 6.66 15 20 25 26.66
68. The ratio of the amount of Alex's fuel oil bill for the month of February to the amount of his fuel oil bill for the month of January was $\frac{3}{2}$. If the fuel oil bill for February had been \$40 more, the corresponding ratio would have been $\frac{5}{3}$. How much was Alex's fuel oil bill for January?
69. Did it take Pei more than 2 hours to walk a distance of 10 miles along a certain trail? (1 mile = 1.6 kilometers, rounded the nearest tenth.)
 (1) Pei walked this distance at an avg. rate of less than 6.4 kilometers per hour.
 (2) On avg., it took Pei more than 9 minutes per kilometer to walk this distance.
70. Are at least 10 percent of the people in country X who are 65 yrs old or older employed?
 (1) in country X, 11.3 percent of population is 65 yrs old or older
 (2) in country X, of the population 65 yrs old or older , 20 percent of the men and 10 percent of the women are employed
71. Of the 800 employees of company X, 70% have been with the company for last 10 years. If y of those long term members were to retire and no other employee changes were to occur, what value of y would reduce the percent of long-term employees in the company to 60%?
 A.200 B.160 C.112 D.80 E.56
72. At a speed of 50 miles per hour, a certain car uses 1 gallon of gasoline every 30 miles. If the car starts with a full 12 gallon take of gasoline and travels for 5 hours at 50 miles per hour, the amount of gasoline used would be what fraction of a full tank?
 A) $\frac{3}{25}$ B) $\frac{11}{36}$ C) $\frac{7}{12}$ D) $\frac{2}{3}$ E) $\frac{25}{36}$
73. A construction company was paid a total of \$500,000 for a construction project. The company's only costs for the project were for labor and materials. Was the company's profit for the project greater than 150,000?
 (1) The company's total cost was three times its cost for materials.
 (2) The company's profit was greater than its cost for labor.

74. At a certain college there are twice as many English majors as history majors and three times as many English majors as mathematics majors. What is the ratio of the number of history majors to the number of mathematics majors
6 to 1 3 to 2 2 to 3 1 to 5 1 to 6
75. To celebrate a colleague's retirement, the T coworkers in an office agreed to share equally the cost of a catered lunch. If the lunch costs a total of x dollars and S of the coworkers fail to pay their share, which of the following represents the additional amount, in dollars, that each of the remaining coworkers would have to contribute so that the cost of the lunch is completely paid?
A) x/T B) $x/T-S$ C) $Sx/T-S$ D) $Sx/T(T-S)$ E) $x(T-S)/T$
76. Francine traveled x percent of the distance of a trip at a constant speed of 40 mph and the rest of the trip at a constant speed of 60 mph. What is the average speed for the trip in terms of x?
a) $(x+180)/2$ b) $2400/(x+100)$ c) $12000/(x+200)$ d) $200/(x+180)$ e) $(x+240)/180$
77. If the speed of X meters per second is equivalent to the speed of y kilometers per hour, what is Y in terms of x?
 $5x/18$ $6x/5$ $18x/5$ $60x$ $2,600,000x$
78. For each month of next year, Company R's monthly revenue target is x dollars greater than its monthly target for the preceding month. What is Company R's revenue target for March of next year?
(1) Co R's revenue target for December of next year is \$310,000.
(2) Co R's revenue target for September of next year is \$30,000 greater than its revenue target for June of next year.
79. The rate of a certain chemical reaction is directly proportional to the square of the concentration of chemical A present and inversely proportional to the concentration of chemical B present. If the concentration of chemical B is increased by 100%, which of the following is closest to the % change in concentration of chemical A required to keep the reaction rate unchanged?
(A) 100% decrease (B) 50% decrease (C) 40% decrease (D) 40% increase (E) 50% increase
80. Three thousand families live in a certain town. How many families who live in the town own neither a car nor a television set?
(1) Of the families who live in the town, 2,980 own a car.
(2) Of the families who live in the town, 2,970 own both a car and a television set.
81. The ratio, by volume, of acid to base to water in a certain solution is 4:15:20. The solution is altered so that the ratio of acid to base is 3:5 and the ratio of acid to water remains same. If the solution initially contained 30mm of base, what is the minimum amount of water that could be added in the second phase?
A) 18 B) 36 C) 50 D) 60 E) 90
82. In a certain bathtub, both the cold-water and the hot-water fixtures leak. The cold-water leak alone would fill an empty bucket in c hours and the hot-water leak alone would fill the same bucket in h hours, where $c < h$. If both fixtures began to leak at the same time into the empty bucket at their respective constant rates and consequently it took t hours to fill the bucket, which of the following must be true?
I. $0 < t < h$ II. $c < t < h$ III. $c/2 < t < h/2$
A) I only B) II only C) III only D) I and II E) I and III
83. If $M = \text{square root } 4 + \text{cube root } 4 + \text{fourth root of } 4$, then the value of M is:
a) less than 3 b) equal to 3 c) between 3 and 4 d) equal to 4 e) greater than 4
84. Susan drove an average speed of 30 mph for the first 30 minutes of a trip. She did drove 60 mph for the next 30 minutes. If she made no stops, what was the average speed, in miles per hour, for the entire trip? a. 35 b. 40 c. 45 d. 50 e. 55
85. For manufacturer M, the cost C of producing x units of its product per month is given by $C = kx + t$, where C is in dollars and k and t are constants. Last month, if manufacturer M produced 1,000 units of its product and sold all the units for $k + 60$ dollars each, what was manufacturer M's gross profit on the 1,000 units?
(1) Last month, manufacturer M's revenue from the sale of the 1,000 units was \$150,000
(2) Manufacturer M's cost of producing 500 units in a month is \$45,000 less than its cost of producing 1,000 units a month.

86. A certain military vehicle can run on pure Fuel X, pure Fuel Y, or any mixture of X and Y. Fuel X costs \$3 per gallon; the vehicle can go 20 miles on a gallon of Fuel X. In contrast, Fuel Y costs \$5 per gallon, but the vehicle can go 40 miles on a gallon of Fuel Y. What is the cost per gallon of the fuel mixture currently in the vehicle's tank?
 (1) Using fuel currently in its tank, the vehicle burned 8 gallons to cover 200 miles.
 (2) The vehicle can cover 7 and $\frac{1}{7}$ miles for every dollar of fuel currently in its tank
87. If \$10,000 is invested at x percent simple annual interest for n years, which of the following represents the total amount of interest, in dollars, that will be earned by this investment in the n years?
 (A) $10,000(x^n)$ (B) $10,000(x/100)^n$ (C) $10,000n*(x/100)$ (D) $10,000(1+x/100)^n$
 (E) $10,000n*(1+x/100)$
88. Jan lives X floors above the ground floor of a high-rise building. It takes her 30 seconds per floor to walk down the steps and 2 seconds per floor to ride the elevator. If it takes Jan the same amount of time to walk down the steps to the ground floor as to wait for the elevator for 7 minutes and ride down, then X equals:
 A - 4 B - 7 C - 14 D - 15 E - 16
89. According to the directions on a can of frozen orange juice concentrate, 1 can of concentrate is to be mixed with 3 cans of water to make orange juice. How many 12 ounce cans of concentrate are required to prepare 200 6 ounce servings of orange juice?
 25 34 50 67 100
90. A certain city with a population of 1, 32,000, is divided into 11 voting districts, and no district is to have a population that is more than 10% greater than the population of any other district. What is the minimum possible population that the least populated district could have?
 A) 10700 B) 10800 C) 10900 D) 11000 E) 11100
91. The time it took car A to travel 400 miles was 2 hours less than the time it took car B to travel the same distance. If car A's average speed was 10 miles per hour greater than that of car B, what was car B's average speed, in miles per hour?
 (A) 20 (B) 30 (C) 40 (D) 50 (E) 80
92. The time it took car A to travel 400 miles was 2 hours less than the time it took car B to travel the same distance. If car A's average speed was 10 miles per hour greater than that of car B, what was car B's average speed, in miles per hour?
 (A) 20 (B) 30 (C) 40 (D) 50 (E) 80
93. At a certain instant in time, the number of cars, N , traveling on a portion of a certain highway can be estimated by the formula $N = (20 * L * d) / (600 + s^2)$
 where L is the number of lanes in the same direction, d is the length of the portion of the highway, in feet, and s is the average speed of the cars, in miles per hour. Based on the formula, what is the estimated number of cars traveling on a 21 mile portion of the highway if the highway has 2 lanes in the same direction and the average speed of the cars is 40 miles per hour? (5,280 feet = 1 mile)
 (A) 155 (B) 96 (C) 80 (D) 48 (E) 24
94. How many seconds will it take for a car that is traveling at a constant rate of 45 miles per hour to travel a distance of 22 yards? (1 mile = 1,660 yards)
 A. 8 B. 9 C. 10 D. 11 E. 12
95. P, Q, and R are located in flat region of a certain state. Q is x miles due east of P and y miles due north of R. Each pair of points is connected by a straight road. What is the number of hours needed to drive from Q to R and then from R to P at a constant rate of z miles per hour, in term of x , y , and z ? (Assume x , y , and z are positive.)
 A) $\sqrt{x^2 + y^2} / z$ B) $x + \sqrt{x^2 + y^2} / z$ C) $y + \sqrt{x^2 + y^2} / z$ D) $z / x + \sqrt{x^2 + y^2}$
 E) $z / y + \sqrt{x^2 + y^2}$
96. $(1001^2 - 999^2) / (101^2 - 99^2)$
 10 20 40 80 100

97. Pat, Kate and Mark charged a total of 162 hours to a certain project. If Pat charged twice as much to the project as Kate and $\frac{1}{3}$ as much time as Mark, how many more hours did Mark charge to the project than Kate?
A. 18 B. 36 C. 72 D. 90 E. 108
98. One night a certain motel rented $\frac{3}{4}$ of its rooms, including $\frac{2}{3}$ of its air-conditioned rooms. If $\frac{3}{5}$ of its rooms were air-conditioned, what percent of the rooms that were not rented were air-conditioned?
(A) 20% (B) 33.33% (C) 35% (D) 40% (E) 80%
99. Each of the students in a certain class received a single grade of P, F, or I. what percent of the students in the class were females?
(1) Of those who received a p, 40% were females
(2) Of those who received either an F or I, 80% were males.
100. Ann deposited money into two new accounts, A and B. Account A earns 5 percent simple annual interest and account B earns 8 percent simple annual interest. If there were no other transactions in the two accounts, then the amount of interest that account B earned in the first year was how many dollars greater than the amount of interest that account A earned in the first year?
(1) Ann deposited \$200 more in account B than in account A.
(2) The total amount of interest that the two accounts earned in the first year was \$120.
101. For manufacturer M, the cost C of producing X units of its product per month is given by $c = kx + t$, where c is in dollars and k and t are constants. Last month, if manufacturer M produced 1000 units of its product and sold all the units for $k+60$ dollars each, what was manufacturer M's gross profit on the 1000 units?
(1) Last month, manufacturer M's revenue from sale of the 1000 units was \$150,000
(2) manufacturer M's cost of producing 500 units in a month is \$45000 less than its cost of producing 1000 units in a month.
102. The temperature of a certain cup of coffee 10 minutes after it was poured was 120 degrees Fahrenheit. If the temperature f of the coffee t minutes after it was poured can be determined by the formula $f=120(2^{-at}) + 60$, where f is in degrees Fahrenheit and 'a' is a constant, then the temperature of the coffee 30 minutes after it was poured was how many degrees Fahrenheit?
103. A company wants to spend equal amounts of money for the purchase of two types of computer printers costing \$600 and \$375 per unit, respectively. What is the fewest number of computer printers that the company can purchase?
(A) 13 (B) 12 (C) 10 (D) 8 (E) 5
104. Alicia's take home pay last year was the same each month, and she saved the same fraction of her take-home pay each month. The total amt of money that she saved at the end of the year was 3 times the amt of that portion of her monthly take-home pay that she did not save. If all the money that she saved was from her take-home pay, what fraction of her take-home pay did she save each month?
105. On a certain sight-seeing tour, the ratio of the women to the number of children was 5 to 2. What was the number of men on the sight-seeing tour?
(1) On the sight-seeing tour, the ratio of the number of children to the number of men was 5 to 11
(2) The number of women on the sight-seeing tour was less than 30
106. Three Grades of milk are 1 percent, 2 percent and 3 percent fat by volume. If x gallons of the 1 percent grade, y gallons of the 2 grade, and z gallons of the 3 percent grade are mixed to give $x + y + z$ gallons of a 1.5 percent grade, what is x in terms of y and z
1. $y + 3z$ 2. $y+z/4$ 3. $2y+3z$ 4. $3y + z$ 5. $3y + 4.5z$
107. Robin split a total of \$24,000 between 2 investments, X and Y. If investment earns 7% simple annual interest, how much of that total did Robin put into investment Y?
1. Each investment earns the same dollar amount of the interest annually.
2. Investment X earns 5 percent simple annual interest.
108. At least 100 students at a certain school study Japanese. if 4 % of the students at school who study French also study Japanese, do more students at school study French than Japanese?
(1) 16 students at school study both French and Japanese
(2) 10 % of students at school who study Japanese also study French.

109. Machines X and Y produced identical bottles at different constant rates. Machine X, operating alone for 4 hours, filled part of a production lot; then machine Y, operating alone for 3 hours, filled the rest of this lot. How many hours would it have taken machine X operating alone to fill the entire production lot?
 (1) Machine X produced 30 bottles per minute.
 (2) Machine X produced twice as many bottles in 4 hours as machine Y produced in 3 hours.
110. In a class of 30 students, 2 students did not borrow any books from the library, 12 students each borrowed 1 book, 10 students each borrowed 2 books, and the rest borrowed at least 3 books. If the average number of books per student was 2, what is the maximum number of books any single student could have borrowed?
 A. 3 B. 5 C. 8 D. 13 E. 15
111. Of the 75 houses, 48 have a patio. How many have a swimming pool?
 (1) 38 of the houses have a patio but don't have a swimming pool.
 (2) The number of houses that have a patio and a swimming pool equals the number that have neither a patio nor a swimming pool.
112. A furniture dealer purchased a desk for \$150 and then set the selling price equal to the purchase price plus a markup that was 40% of the selling price. If the dealer sold the desk at the selling price, what was the amount of the dealer's gross profit from the purchase and the sale of the desk?
 a) \$40 b) \$60 c) \$80 d) \$90 e) \$100
113. Each employee of Company Z is an employee of either Division X or Division Y, but not both. If each division has some part-time employees, is the ratio of the number of full-time employees to the number of part-time employees greater for Div X than for Company Z?
 (1) The ratio of the number of full-time employees to the number of part-time employees is less for Div Y than for Company Z.
 (2) More than half of the full-time employees of Company Z are employees of Div X, and more than half of the part-time employees of Company Z are employees of Div Y
114. A Hiker walked for two days. On the second day the hiker walked 2 hours longer and at an average speed 1 mile per hour faster than he walked on the first day. If during the two days he walked a total of 64 miles and spent a total of 18 hours walking, what was his average speed on the first day?
 (A) 2 mph (B) 3 mph (C) 4 mph (D) 5 mph (E) 6 mph
115. To install cable television in home, a certain company charges a basic fee of \$30 plus a fee of \$20 for each cable outlet installed in the home. How much did the cable company charges the Horace family for installing cable television in their home?
 (1) The cable company installed three cable outlets in the Horace family home.
 (2) The amount that the cable company charged the Horace family for installing cable television in their home was equivalent to an average (mean) charge of \$30 per cable outlet installed.
116. Of the 1400 College teachers surveyed 42% said they considered engaging in research an essential goal. How many of the college teachers surveyed were women?
 (1) In the survey 36% of the men and 50% of the women said that they considered engaging in research an essential goal.
 (2) In the survey, 288 men said they considered engaging in research an essential goal.
117. Of the 60 animals on a certain farm, $\frac{2}{3}$ are either cows or pigs. How many of the animals are cows?
 (1) The farm has more than twice as many cows as pigs
 (2) The farm has more than 12 pigs
118. A firm has $y\%$ manufacturing capacity. It plans to increase its capacity by $x\%$. Will it have enough capacity for next year?
 (1) $y \cdot (100 - x) = 5040$ (2) $y - x = 100$
119. A company has two types of machines, type R and type S. Operating at a constant rate, a machine R does a certain job in 36 hours and a machine of type S does the same job in 18 hours. If the company used the same number of machines to do the job in 2 hours, how many machines of type R were used?
 A. 3 B. 4 C. 6 D. 9 E. 12

120. Store S sold a total of 90 copies of a certain book during the last week, and it sold different numbers of copies on any two of the days. If for the seven days Store S sold the greatest number of copies on Saturday and the second greatest number of copies on Friday, did store S sell more than 11 copies on Friday?
 (1) Last week Store S sold 8 copies of the book on Thursday.
 (2) Last week Store S sold 38 copies of the book on Saturday.
121. A store purchased 20 coats that each cost an equal amount and then sold each of the 20 coats at an equal price. What was the store's gross profit on the 20 coats?
 (1) If the selling price had been twice as much the store's gross profit on the 20 coats would have been \$2,400
 (2) If the selling price had been \$2 more, the store's gross profit on the 20 coats would have been \$440
122. Which is greater than $\frac{2}{3}$?
 A) $\frac{33}{50}$ B) $\frac{8}{11}$ C) $\frac{3}{5}$ D) $\frac{13}{27}$ E) $\frac{5}{8}$
123. A certain library assesses fines for overdue books as follows. On the first day that a book is overdue, the total fine is \$0.10. For each additional day that the book is overdue, the total fine is increased by \$0.30 or doubled, whichever results in a lesser amount. What is the total for a book on the fourth day it is overdue?
 A) \$0.60 B) \$0.70 C) \$0.80 D) \$0.90 E) \$1.00
124. Jason's salary and Karen's salary were each p percent greater in 1998 than in 1995. What is the value of p ?
 1. In 1995 Karen's salary was 2,000 greater than Jason's.
 2. In 1998 Karen's salary was 2,400 greater than Jason's
125. Each of the offices in a certain building has a floor area of 200, 300, or 350 square feet. How many offices are on the first floor of the building?"
 (1) There is a total of 9,500 square feet of office space on the first floor of the building
 (2) Ten of the offices on the first floor have floor areas of 350 square feet each.
126. Linda put an amount of money into each of two new investments, A and B that pay simple annual interest. If the annual interest rate of investment B is $1\frac{1}{2}$ times that of investment A, what amount did Linda put into investment A
 (1) The interest for 1 year is \$50 for investment A and \$150 for investment B
 (2) The amount that Linda put into investment B is twice the amount that she put into investment A
127. In a stack of boards at a lumber yard, the 20th board counting from the top of the stack is immediately below the 16th board counting from the bottom of the stack. How many boards are in the stack?
128. At the end of each year, a certain card company pays a bonus to each of its credit card holders based on the amount, up to \$10,000, that the card holder charged throughout the year. A 0.5 percent bonus is paid on the first \$1000 charged; a 1.0 percent bonus is paid on the next \$2000 and so on, as indicated in the table above.
 What is the maximum annual bonus, in dollars? Amount Charged Percent Bonus
 \$0.01 - \$1000 0.5 \$1000 - \$3000 1.0 \$3000 - \$6000 1.5 \$6000 - \$10000 2.0
129. Of the 800 employees of company x, 70% have been with the company for at least 10 years. If y of these long-term members were to retire and no other employee changes were to occur, what value of y would reduce the percent of long-term employees in the company to 60%?
130. Al, Pablo, and Marsha shared the driving on a 1500 mile trip. Which of the three drove the greatest distance on the trip?
 (1) Al drove 1 hour longer than Pablo but an average rate of 5 miles per hour slower than Pablo.
 (2) Marsha drove 9 hrs and averaged 50 miles per hour.
131. In a certain year, the difference between Mary's and Jim's annual salaries was twice the difference between Mary's and Kate's annual salaries. If Mary's annual salary was the highest of the three people, what was the average annual salary of the three people that year??
 (1) Jim's annual salary was 30,000 that year (1) Kate's annual salary was 40,000 that year

132. An investment of d dollars at k percent simple annual interest yields \$600 over a 2 year period. In terms of d , what dollar amount invested at the same rate will yield \$24,000 over a 3 year period?
 A. $(2d)/3$ B. $(3d)/4$ C. $(4d)/3$ D. $(3d)/2$ E. $(8d)/3$
133. For 15 cars, the range of Selling Price was \$15,000 and lowest was \$4,500. In June Tom sold 10 cars. Range was \$16,500 and lowest SP \$6,100. What was the range of SP of the 25 cars Tom sold?
134. M travelled X miles/hr the 1st Y miles & $1.25X$ for the last $40-Y$ miles. The time M took to travel 40 miles was what % of the time taken her if travelled at an average of X miles for the entire trip?
 (1) $X=48$ (2) $Y=20$
135. What fraction of this year's graduating students at a certain college are males?
 (1) Of this year's graduating students, 33 percent of males and 20 percent of females are transferred from another college.
 (2) Of this year's graduating students, 25 percent transferred from another college
136. In a certain state, gasoline stations compute the price per gallon p , in dollars, charged at the pump by adding a 4 percent sales tax to the dealer's price per gallon d , in dollars, and then adding a gasoline tax of \$0.18 per gallon. Which of the following gives the dealer's price per gallon d in terms of the price per gallon p charged at the pump?
 A. $d=p-0.22$ B. $d=p/1.22$ C. $d=(p/1.04)-0.18$ D. $d=(p-0.18)/1.04$
 E. $d=(p-0.04)/1.18$
137. An auction house charges a commission of 15 percent on the first \$50,000 of the sale price of an item, plus 10 percent on the amount of the sale price in excess of \$50,000. What was the sale price of a painting for which the auction house charged a total commission of \$24,000?
 a. 115,000 b. 160,000 c. 215,000 d. 240,000 e. 365,000
138. This year Henry will save a certain amount of his income, and he will spend the rest. Next year Henry will have no income, but for each dollar that he saves this year, he will have $1 + r$ dollars available to spend. In terms of r , what fraction of his income should Henry save this year so that next year the amount he has available to spend will be equal to half the amount that he spends this year?
 a) $1/(r+2)$ b) $1/(2r+s)$ c) $1/(3r+2)$ d) $1/(r+3)$ e) $1/(2r+3)$
139. The number of stamps that Kaye and Alberto had was in the ratio of 5:3 respectively. After Kaye gave Alberto 10 of her stamps, the ratio of the number Kaye had to the number Alberto had was 7:5. As a result of this gift, Kaye had how many more stamps than Alberto?
 A) 20 B) 30 C) 40 D) 60 E) 90
140. The total of company C's assets in 1994 was 300 percent greater than the total in 1993, which in turn was 400 percent greater than the total in 1992. If the total of company C's assets in 1992 was N dollars, which of the following represents the total of company C's assets in dollars in 1994?
 7N 8N 9N 12N 20N
141. Rasheed bought two kinds of candy bars, chocolate and toffee, that came in packages of 2 bars each. He handed out $2/3$ of the chocolate bars and $3/5$ of the toffee bars. How many packages of chocolate bars did Rasheed buy?
 (1) Rasheed bought 1 fewer package of chocolate bars than toffee bars
 (2) Rasheed handed out the same number of each kind of candy bar
142. Each person in a certain group supports only one of two candidates R and T. Of the people in the group, 45 percent support Candidate R and the rest support Candidate T. How many people in the group are in favor of a flat tax?
 (1) Of the people in the group who support Candidate R, 58 percent are in favor of flat tax
 (2) Of the people in the group who support Candidate T, 22 are in favor of a flat tax.
143. Some of the students enrolled at college T are part-time students and the rest are full-time. By what percent did the number of full-time students enrolled at college T increase from fall of 1999 to the fall of 2000?
 1) There were 50 more full-time students enrolled at college T in the fall of 2000 than in the fall of 1999.
 2) The total number of students enrolled at college T increased by 5 percent from the fall of 1999 to the fall of 2000.

144. Jack and Mark both receive hourly wage increases of 6%. After the wage increase, Jack's hourly wage was how many more dollars per hour than Mark's?
- Before the wage increases, Jack's hourly rate was 5 more than Mark's
 - Before the wage increases, the ratio of Jack's hourly wage to Mark's hourly wage was 4 to 3
145. Machine A produces pencils at a constant rate of 9,000 pencils per hour, and machine B produces pencils at a constant rate of 7,000 pencils per hour. If the two machines together must produce 100,000 pencils and if each machine can operate for at most 8 hours, what is the least amount of time, in hours, that machine B must operate?
- a) 4 b) 4 and $\frac{2}{3}$ c) 5 and $\frac{1}{3}$ d) 6 e) 6 and $\frac{1}{4}$
146. Malik's recipe for 4 servings of a certain dish requires $\frac{3}{2}$ cups of pasta. According to this recipe, what is the number of the cups of pasta that Malik will use the next time he prepares this dish?
- The next time he prepares this dish, Malik will make half as many servings as he did the last time he prepared the dish.
 - Malik used 6 cups of pasta the last time he prepared this dish.
147. Set A, B, C have some elements in common. if 16 elements are in both A and B, 17 elements are in both A and C, and 18 elements are in both B and C, how many elements do all three of the sets A, B, and C have in common?
- of the 16 elements that are in both A and B, 9 elements are also in C
 - A has 25 elements, B has 30 elements, and C has 35 elements
148. A boat traveled upstream a distance of 90 miles at an average speed of $(v-3)$ miles per hour and then traveled the same distance downstream at an average speed of $(v+3)$ miles per hour. If the trip upstream took half an hour longer than the trip downstream, how many hours did it take the boat to travel downstream? A: 2.5 B: 2.4 C: 2.3 D: 2.2 E: 2.1
149. At a certain university, the ratio of the number of teaching assistants to the number of students in any course must always be greater than 3:80. At this university, what is the maximum number of students possible in a course that has 5 teaching assistants?
- A) 130 B) 131 C) 132 D) 133 E) 134
150. On his trip from Alba to Benton, Julio drove the first x miles at an average rate of 50 m/hr and the remaining distance at an average rate of 60m/hr. How long did it take Julio to drive the first X miles?
- On this trip, Julio drove for a total of 10 hours and a total of 530 miles
 - On this trip, Julio took 4 more hours to drive the first x miles than to drive the remaining distance
151. One kilogram of a certain coffee brand consists of x kilograms of Type I coffee and y kilograms of Type II coffee. The cost of the brand is C dollars per kilogram, where $C = 6.5x + 8.5y$. Is $x < 0.8$? 1) $y \geq 0.15$ 2) $C \geq 7.30$
152. In 1999 Company X's gross profit is what percent of its revenue?
- In 1999 Company X's gross profit was $\frac{1}{3}$ of its expenses
 - In 1999 Company X's expenses were $\frac{3}{4}$ of its revenue
153. Each person attending a fund-raising party for a certain club was charged the same admission fee. How many people attended the party?
- If the admission fee had been \$0.75 less and 100 more people attended, the club would have received the same amount in admission fees.
 - If the admission fee had been \$1.50 more and 100 fewer people had attended, the club would have received the same amount in admission fees.
154. The mass of 1 cubic meter of a substance is 800 kg under certain conditions. What is the volume, in cubic centimeters of 1 gram of this substance under these conditions?
- a.80 b. 1.25 c. 8.00 d. 12.25 e. 80.00
155. At a two-day seminar, 90 percent of those registered attended the seminar on the first day. What percent of those registered did not attend the seminar on either day?
- A total of 1,000 people registered for the two-day seminar
 - Of those registered, 80 percent attended the seminar on the second day.

156. Six machines, each working at the same constant rate, together can complete a certain job in 12 days. How many additional machines, each working at the same constant rate, will be needed to complete the job in 8 days?
- a. 2 b. 3 c. 4 d. 6 e. 8
157. A and B working simultaneously can paint a Tank in $\frac{5}{6}$ hrs. A and C working simultaneously complete the same task in $\frac{3}{2}$ hrs, while C and B working simultaneously complete it in 2 hrs. If A, B, and C were to work together how long would it take them to finish painting the tank?
158. Mary persuaded n friends to donate \$500 each to her election campaign, and then each of these n friends persuaded n more people to donate \$500 each to Mary's campaign. If no one donated more than once and if there were no other donations, what was the value of n ?
- (1) The first n people donated $\frac{1}{16}$ of the total amount donated.
(2) The total amount donated was \$120,000.