

*Category 8 Word Problem*

1. Water has been pouring into a tank for  $12\frac{1}{2}$  minutes at the constant rate of 1 gallon per second. If the tank was initially empty and is now  $\frac{1}{3}$  full, what is the total capacity of the tank, in gallons?
- (A) 375  
(B) 1,125  
(C) 1,500  
(D) 2,160  
(E) 2,250
2. During a sale, Pam paid the regular price for one quart of oil and paid \$0.01 for a second quart. If she paid a total of \$1.20 for the two quarts, the amount paid for the second quart was what fraction of the amount paid for the first quart?
- (A)  $\frac{1}{118}$       (B)  $\frac{1}{119}$       (C)  $\frac{1}{120}$       (D)  $\frac{1}{121}$       (E)  $\frac{1}{122}$
3. A carpenter purchases a hammer costing \$8.03, a bag of nails costing \$5.16, and a tape measure costing \$2.81 with a twenty-dollar bill. How much change does the carpenter receive if a sales tax of 5 percent is charged on the entire purchase?
- (A) \$3.20  
(B) \$3.29  
(C) \$3.80  
(D) \$4.00  
(E) \$4.80

4. A certain property doubled in value from 1950 to 1960 and tripled in value from 1960 to 1980. The value of the property in 1980 was how many times the value in 1950?

(A) 3  
(B) 5  
(C) 6  
(D) 8  
(E) 9

5. Of the final grades received by the students in a certain math course,  $\frac{1}{5}$  are  $A$ 's,  $\frac{1}{4}$  are

$B$ 's,  $\frac{1}{2}$  are  $C$ 's and the remaining 10 grades are  $D$ 's. What is the number of students in the course?

(A) 80  
(B) 110  
(C) 160  
(D) 200  
(E) 400

6. If 50 tomatoes weigh a total of 30 pounds and cost 35 cents per pound, what is the cost per tomato?

(A) 17 cents  
(B) 21 cents  
(C) 24 cents  
(D) 28 cents  
(E) 35 cents

7. On a new job Alice earned \$198 the first week and \$220 the second week. If she worked 4 more hours the second week than the first week and was paid at the same hourly rate, how much did she earn per hour?
- (A) \$4.00  
(B) \$4.50  
(C) \$5.00  
(D) \$5.50  
(E) \$6.00
8. If a store purchased 6 dozen items at a cost of \$1.80 per dozen and later sold them all for \$0.20 apiece, what was the store's profit on these items?
- (A) \$2.16  
(B) \$2.40  
(C) \$2.84  
(D) \$3.20  
(E) \$3.60
9. A mail clerk put 1 or 2 stamps on each of 20 envelopes, using a total of 36 stamps. On how many of the envelopes did the clerk put 2 stamps?
- (A) 4  
(B) 6  
(C) 8  
(D) 12  
(E) 16

10. In 1984 the production costs of Company  $X$  totaled \$719,000 and nonproduction costs totaled \$15,000. In 1985 robots were introduced, and production costs dropped to \$600,000, but nonproduction costs rose to \$65,000 for the year. What was the decrease in total costs for Company  $X$  from 1984 to 1985?
- (A) \$50,000  
(B) \$69,000  
(C) \$119,000  
(D) \$134,000  
(E) \$169,000
11. In traveling from a dormitory to a certain city, a student went  $\frac{1}{5}$  of the way by foot,  $\frac{2}{3}$  of the way by bus, and the remaining 8 kilometers by car. What is the distance, in kilometers, from the dormitory to the city?
- (A) 30  
(B) 45  
(C) 60  
(D) 90  
(E) 120
12. A grocer purchased a quantity of bananas at 3 pounds for \$0.50 and sold the entire quantity at 4 pounds for \$1.00. How many pounds did the grocer purchase if the profit from selling the bananas was \$10.00?
- (A) 40  
(B) 60  
(C) 90  
(D) 120  
(E) 240

13. A man who died left an estate valued at \$111,000. His will stipulated that his estate was to be distributed so that each of his three children received from the estate and his previous gifts, combined, the same total amount. If he had previously given his oldest child \$15,000, his middle child \$10,000, and his youngest \$2,000, how much did the youngest child receive from the estate?
- (A) \$50,000  
(B) \$48,000  
(C) \$46,000  
(D) \$44,000  
(E) \$39,000
14. On a 3-day fishing trip, 4 adults consumed food costing \$60. For the same food costs per person per day, what would be the cost of food consumed by 7 adults during a 5-day fishing trip?
- (A) \$300  
(B) \$175  
(C) \$105  
(D) \$100  
(E) \$84
15. Joe went on a diet 6 months ago when he weighed 222 pounds. If he now weighs 198 pounds and continues to lose at the same average monthly rate, in approximately how many months will he weigh 180 pounds?
- (A) 3  
(B) 3.5  
(C) 4  
(D) 4.5  
(E) 5

16. Mr. Hernandez, who was a resident of State  $X$  for only 8 months last year, had a taxable income of \$22,500 for the year. If the state tax rate were 4 percent of the year's taxable income prorated for the proportion of the year during which the taxpayer was a resident, what would be the amount of Mr. Hernandez's State  $X$  tax for last year?
- (A) \$900  
(B) \$720  
(C) \$600  
(D) \$300  
(E) \$60
17. If a 50-pound food package consists of individual 4-ounce packets, how many individual packets are contained in 4 tons of 50-pound packages? (Assume that all weights given exclude the weight of packaging material. 1 ton = 2,000 pounds; 1 pound = 16 ounces)
- (A) 32,000  
(B) 8,000  
(C) 800  
(D) 200  
(E) 160
18. The cost of sending a package is 30 cents per ounce in addition to a basic fee of 5 dollars. If integer  $x$  represents the weight in ounces of a certain package, which of the following represents the cost, in dollars, of sending the package?
- (A)  $5x + 0.30$   
(B)  $(5 + x)0.30$   
(C)  $5 - 0.30x$   
(D)  $0.30x + 5$   
(E)  $0.70x + 5$

19. An empty oil tanker was filled with oil at a uniform rate in  $t$  hours. What proportion of the tanker was filled during the first  $x$  hours if  $x < t$ ?

(A)  $\frac{x}{t}$       (B)  $\frac{t}{x}$       (C)  $\frac{x}{t-x}$       (D)  $\frac{t-x}{t}$       (E)  $\frac{t-x}{x}$

20. If a basketball team scores an average (arithmetic mean) of  $x$  points per game for  $n$  games and then scores  $y$  points in its next game, what is the team's average score for the  $n+1$  games?

(A)  $\frac{nx+y}{n+1}$

(B)  $x + \frac{y}{n+1}$

(C)  $x + \frac{y}{n}$

(D)  $\frac{n(x+y)}{n+1}$

(E)  $\frac{x+ny}{n+1}$

21. If a train travels at a speed of  $k$  meters per second, how many kilometers will it travel in  $t$  minutes? (1 kilometer = 1,000 meters)

(A)  $\frac{60kt}{1,000}$

(B)  $\frac{60kt}{100}$

(C)  $\frac{1,000kt}{60}$

(D)  $6.000kt$

(E)  $60,000kt$

< *High Level* >

22. Mason and Kathy, who both work in the evening wish to arrange for an evening off together. Each evening that Mason is off is followed by 3 evenings that he is at work, and each evening that Kathy is off is followed by 5 evenings that she is at work. If Mason will be off this evening, and Kathy will be off tomorrow evening, how many evenings must pass before they have an evening off together?
- (A) 10  
(B) 12  
(C) 24  
(D) 28  
(E) So long as they continue this working pattern, they will never have the same evening off.
23. On a certain 10-question test, each question after the first question is worth 2 points more than the previous question. If the greatest number of points that can be scored on the test is 100, how many points is the eighth question worth?
- (A) 9  
(B) 14  
(C) 15  
(D) 19  
(E) 33
24. A certain car dealership sells only full-size and mid-size cars. One of its sales representatives receives an annual salary of \$15,000. He also receives a commission of \$800 for each full-size car he sells and \$500 for each midsize car he sells. What is the least number of cars he must sell in a year to receive total annual earnings of exactly \$25,000?
- (A) 7  
(B) 12  
(C) 13  
(D) 14  
(E) 17



25. A school supply store sells only one kind of desk and one kind of chair, at a uniform cost per desk or per chair. If the total cost of 3 desks and 1 chair is twice that of 1 desk and 3 chairs then the total cost of 4 desks and 1 chair is how many times that of 1 desk and 4 chairs?
- (A) 5      (B) 3      (C)  $\frac{8}{3}$       (D)  $\frac{5}{2}$       (E)  $\frac{7}{3}$
26. A merchant paid \$300 for a shipment of  $x$  identical calculators. The merchant used 2 of the calculators as demonstrators and sold each of the others for \$5 more than the average (arithmetic mean) cost of the  $x$  calculators. If the total revenue from the sale of the calculators was \$120 more than the cost of the shipment, how many calculators were in the shipment?
- (A) 24  
(B) 25  
(C) 26  
(D) 28  
(E) 30
27. A manufacturer can save  $x$  dollars per unit in production costs by overproducing in certain seasons. If storage costs for the excess are  $y$  dollars per unit per day ( $x > y$ ), which of the following expresses the maximum number of days that  $n$  excess units can be stored before the storage costs exceed the savings on the excess units?
- (A)  $x - y$   
(B)  $(x - y)n$   
(C)  $\frac{x}{y}$   
(D)  $\frac{xn}{y}$   
(E)  $\frac{x}{yn}$

28. A certain disability plan pays monthly benefits of 60 percent of the first \$2,000 of monthly salary plus 40 percent of any portion in excess of \$2,000—the total monthly benefit not to exceed \$2,500. What is the smallest monthly salary that will yield the maximum monthly benefit under this plan?
- (A) \$5,750  
(B) \$5,250  
(C) \$4,500  
(D) \$3,250  
(E) \$2,200
29. One-fifth of the light switches produced by a certain factory are defective. Four-fifths of the defective switches are rejected and  $\frac{1}{20}$  of the nondefective switches are rejected by mistake. If all the switches not rejected are sold, what percent of the switches sold by the factory are defective?
- (A) 4%  
(B) 5%  
(C) 6.25%  
(D) 11%  
(E) 16%
30. In Company  $X$ , 30 percent of the employees live over ten miles from work and 60 percent of the employees who live over ten miles from work are in car pools. If 40 percent of the employees of Company  $X$  are in car pools, what percent of the employees of Company  $X$  live ten miles or less from work and are in car pools?
- (A) 12%  
(B) 20%  
(C) 22%  
(D) 28%  
(E) 32%

31. A garment order consists of jackets costing \$36 each and shirts costing \$26 each. If the total cost of the order is \$1,200, and if the average (arithmetic mean) cost per garment is \$30, how many more shirts than jackets are in the order?
- (A) 32  
(B) 22  
(C) 18  
(D) 13  
(E) 8
32. The front wheels of a toy truck are 4 inches in circumference. The back wheels are 7 inches in circumference. If the truck travels in a straight line without slippage, how many inches will the truck have traveled when the front wheels have made 12 more revolutions than the back wheels?
- (A) 112  
(B) 64  
(C) 48  
(D) 36  
(E) 28
33. A club sold an average (arithmetic mean) of 92 raffle tickets per member. Among the female members, the average number sold was 84, and among the male members, the average number sold was 96. What was the ratio of the number of male members to the number of female members in the club?
- (A) 1 : 1  
(B) 1 : 2  
(C) 1 : 3  
(D) 2 : 1  
(E) 3 : 1

34. A team won 40 percent of the 15 games it has already played. If the team were to win 75 percent of its remaining games, it will have won 60 percent of all its games. How many remaining games are there?
- (A) 12  
(B) 20  
(C) 24  
(D) 30  
(E) 45
35. In a quality control process it has been determined that all of the engines that fail inspection are faulty, but approximately  $\frac{1}{6}$  of the faulty engines pass inspection. If, in a group of 1,000 engines, 100 fail inspection, approximately how many faulty engines pass inspection?
- (A) 16  
(B) 20  
(C) 50  
(D) 70  
(E) 120
36. If an organization were to sell  $n$  tickets for a theater production, the total revenue from ticket sales would be 20 percent greater than the total costs of the production. If the organization actually sold all but 5 percent of the  $n$  tickets, the total revenue from ticket sales was what percent greater than the total costs of the production?
- (A) 4%  
(B) 10%  
(C) 14%  
(D) 15%  
(E) 18%

37. Jeff drove to work from his home averaging 40 miles per hour, and was 12 minutes late. The next day he left home for work at the same time, took the same route, averaging 48 miles per hour, and was 7 minutes late. How far in miles is it from Jeff's home to his work?
- (A) 20.0  
(B) 24.5  
(C) 30.0  
(D) 37.5  
(E) 40.0
38. If a motorist had driven 1 hour longer on a certain day and at an average rate of 5 miles per hour faster, he would have covered 70 more miles than he actually did. How many more miles would he have covered than he actually did if he had driven 2 hours longer and at an average rate of 10 miles per hour faster on that day?
- (A) 100  
(B) 120  
(C) 140  
(D) 150  
(E) 160
39. When a certain stretch of highway was rebuilt and straightened, the distance along the stretch was decreased by 20 percent and the speed limit was increased by 25 percent. By what percent was the driving time along this stretch reduced for a person who always drives at the speed limit?
- (A) 16%  
(B) 36%  
(C)  $37\frac{1}{2}\%$   
(D) 45%  
(E)  $56\frac{1}{4}\%$

40. Solution  $Y$  is 30 percent liquid  $X$  and 70 percent water. If 2 kilograms of water evaporate from 8 kilograms of solution  $Y$  and 2 kilograms of solution  $Y$  are added to the remaining 6 kilograms of liquid, what percent of this new solution is liquid  $X$  ?
- (A) 30%
- (B)  $33\frac{1}{3}\%$
- (C)  $37\frac{1}{2}\%$
- (D) 40%
- (E) 50%
41. How many gallons of water must be mixed with 1 gallon of a 15-percent salt solution to obtain a 10-percent salt solution?
- (A) 0.50
- (B) 0.67
- (C) 1.00
- (D) 1.50
- (E) 2.00
42. The seating chart of an airplane shown 30 rows of seats. Each row has 3 seats on each side of the center aisle, and one of the seats on each side is a window seat. The view from the window seats in 5 of the rows is obscured by the wings of the airplane. If the first person to be assigned a seat is assigned a window seat and the window seat is assigned randomly, what is the probability that the person will get a seat with an unobscured view?
- (A)  $\frac{1}{6}$
- (B)  $\frac{1}{3}$
- (C)  $\frac{2}{3}$
- (D)  $\frac{5}{6}$
- (E)  $\frac{17}{18}$

43. One week a certain truck rental lot had a total of 20 trucks, all of which were on the lot Monday morning. If 50 percent of the trucks that were rented out during the week were returned to the lot on or before Saturday morning of that week, and if there were at least 12 trucks on the lot that Saturday morning, what is the greatest number of different trucks that could have been rented out during the week?
- (A) 18  
(B) 16  
(C) 12  
(D) 8  
(E) 4
44. A car traveled 462 miles per tankful of gasoline on the highway and 336 miles per tankful of gasoline in the city. If the car traveled 6 fewer miles per gallon in the city than on the highway, how many miles per gallon did the car travel in the city?
- (A) 14  
(B) 16  
(C) 21  
(D) 22  
(E) 27
45. On a 20-mile course Pat bicycled at an average rate of 30 miles per hour for the first 12 minutes and, without a break, ran the rest of the distance at an average rate of 8 miles per hour. How many minutes did Pat take to cover the entire course?
- (A) 75  
(B) 105  
(C) 117  
(D) 150  
(E) 162

46. An investor bought  $n$  shares of Company  $X$  stock at \$75 per share. She sold 60 percent of the shares for \$120 per share and the rest at a later date for \$70 per share. If her gross profit on the sale of the  $n$  shares of stock was \$7,500, how many shares did she buy?
- (A) 375  
(B) 300  
(C) 100  
(D) 95  
(E) 75
47. In 1982 a certain company had losses of \$10,000 per month. In the first three months of 1983, this company had gains of \$4,000 per month. On the average, what would the company need to gain per month in the remainder of 1983 in order to break even over this two-year period?
- (A) \$9,000  
(B) \$10,800  
(C) \$12,000  
(D) \$13,500  
(E) \$18,000
48. An author received \$0.80 in royalties for each of the first 100,000 copies of her book sold, and \$0.60 in royalties for each additional copy sold. If she received a total of \$260,000 in royalties, how many copies of her book were sold?
- (A) 130,000  
(B) 300,000  
(C) 380,000  
(D) 400,000  
(E) 420,000



49. For each hour worked in excess of 40 hours per week, a mechanic is paid  $1\frac{1}{2}$  times her regular rate of \$12 per hour. Her gross pay for a week in which she works 52 hours is equal to her pay at the regular rate for how many hours?
- (A) 58  
(B) 64  
(C) 66  
(D) 70  
(E) 78
50. Fifty percent of the subscribers to newspaper  $X$  are corporate managers and of these, 30 percent are in the financial field. If 40 percent of the subscribers who are corporate managers in the financial field are money managers, how many of the newspaper's 25,000 subscribers are corporate money managers in the financial field?
- (A) 1,500  
(B) 3,000  
(C) 3,750  
(D) 7,500  
(E) 8,750
51. Reggie had to type 90 letters. During the first day he typed  $\frac{1}{3}$  of the letters, and during the second day he typed  $\frac{2}{5}$  of the remaining letters. How many letters were still untyped at the end of the second day?
- (A) 36  
(B) 32  
(C) 24  
(D) 18  
(E) 12

52. One karat signifies that  $\frac{1}{24}$  of an alloy is pure gold. If a certain ring is 14-karat gold, approximately what percent of the alloy composing the ring is not gold?
- (A) 14%      (B) 24%      (C) 42%      (D) 55%      (E) 58%
53. At a certain pizzeria,  $\frac{1}{8}$  of the pizzas sold in one week were mushroom and  $\frac{1}{3}$  of the remaining pizzas sold were pepperoni. If  $n$  of the pizzas sold were pepperoni, how many were mushroom?
- (A)  $\frac{3}{8}n$
- (B)  $\frac{3}{7}n$
- (C)  $\frac{7}{16}n$
- (D)  $\frac{7}{8}n$
- (E)  $3n$
54. Beth received  $\frac{3}{10}$  of the votes cast in a certain election. What fraction of the other votes cast would she have needed in order to have received  $\frac{1}{2}$  of the votes cast?
- (A)  $\frac{1}{5}$
- (B)  $\frac{2}{7}$
- (C)  $\frac{3}{10}$
- (D)  $\frac{7}{20}$
- (E)  $\frac{1}{2}$

55. From January 1, 1980, to January 1, 1984, the number of employees of Company  $X$  declined by 700 per year. If the number of employees on January 1, 1984, was 80 percent of the number on January 1, 1980, how many employees did the company have on January 1, 1984?
- (A) 2,800
  - (B) 3,500
  - (C) 11,200
  - (D) 16,800
  - (E) 17,500
56. Both marble tiles and terra-cotta tiles are available in squares with 12-centimeter sides, but marble tiles cost  $x$  cents more per tile than terra-cotta tiles. How much more would it cost, in cents, to tile a rectangular floor 240 centimeters by 120 centimeters with marble tiles than with terra-cotta tiles?
- (A)  $200x$
  - (B)  $360x$
  - (C)  $720x$
  - (D)  $2,400x$
  - (E)  $28,800 - 144x$
57. If 6 machines ran at the same constant rate, they can complete a certain job in 8 hours. If only 5 of these machines run at this rate, how many more minutes will be required to complete the same job?
- (A) 38
  - (B) 72
  - (C) 80
  - (D) 90
  - (E) 96

58. An inlet pipe can fill an empty pool with water in 3 hours, and the pool's outlet pipe can empty a full pool in 4 hours. The water flows at constant rates through both pipes regardless of the water level in the pool. If both pipes were inadvertently left open, what fraction of the pool would be filled exactly 2 hours after water began to flow into the empty pool?
- (A)  $\frac{1}{12}$       (B)  $\frac{1}{6}$       (C)  $\frac{1}{4}$       (D)  $\frac{1}{3}$       (E)  $\frac{1}{2}$
59. Working alone,  $R$  can complete a certain kind of job in 9 hours.  $R$  and  $S$ , working together at their respective rates, can complete one of these jobs in 6 hours. In how many hours can  $S$ , working alone, complete one of these jobs?
- (A) 18  
(B) 12  
(C) 9  
(D) 6  
(E) 3
60. Machines  $A$ ,  $B$ , and  $C$  working together, but independently, at their respective constant rates can do a certain job in  $1\frac{1}{2}$  hours. If  $A$  alone can do the job in 5 hours, and  $B$  alone can do the job in 3 hours, in how many hours can  $C$  alone do the job?
- (A)  $1\frac{1}{3}$   
(B)  $2\frac{1}{7}$   
(C) 3  
(D) 5  
(E)  $7\frac{1}{2}$

61. Bell  $X$  rings once every 12 minutes, bell  $Y$  once every 14 minutes, and bell  $Z$  once every 15 minutes. If, during a given day, the three bells ring at exactly the same instant, how many minutes will elapse before the three bells next ring simultaneously?
- (A) 60  
(B) 210  
(C) 420  
(D) 840  
(E) 2,520
62. How many bits of computer memory will be required to store the integer  $x$ , where  $x = -\sqrt{810,000}$ , if each digit requires 4 bits of memory and the sign of  $x$  requires 1 bit?
- (A) 25  
(B) 24  
(C) 17  
(D) 13  
(E) 12
63. Of the science books in a certain supply room, 50 are on botany, 65 are on zoology, 90 are on physics, 50 are on geology, and 110 are on chemistry. If science books are removed randomly from the supply room, how many must be removed to ensure that 80 of the books removed are on the same science?
- (A) 81  
(B) 159  
(C) 166  
(D) 285  
(E) 324

64. In a certain game, a player can accumulate points only by scoring either an  $X$ , which counts 3 points, or a  $Y$ , which counts 2 points. If a player scored 24 points in the game and  $t$  points were made by scoring  $X$ 's how many different values could  $t$  have?
- (A) Four  
(B) Five  
(C) Six  
(D) Seven  
(E) Eight
65. An apartment building has 9 floors with  $2n$  apartments per floor. If  $\frac{1}{3}$  of the apartments are to have walls removed to form, in each case, one bigger apartment from two smaller ones, how many apartments will there be after the remodeling?
- (A)  $3n$   
(B)  $5n$   
(C)  $6n$   
(D)  $12n$   
(E)  $415n$
66. One-fourth of a solution that was 10 percent sugar by weight was replaced by a second solution, resulting in a solution that was 16 percent sugar by weight. The second solution was what percent sugar by weight?
- (A) 34%  
(B) 24%  
(C) 22%  
(D) 18%  
(E) 8.5%

# STOP



### Category 8-1 Word Problems

1. Water has been pouring into a tank for  $12\frac{1}{2}$  minutes at the constant rate of 1 gallon per second. If the tank was initially empty and is now  $\frac{1}{3}$  full, what is the total capacity of the tank, in gallons?

(A) 375 (B) 1,125 (C) 1,500 (D) 2,160 (E) 2,250

$12(1/2)$  minutes  $12 \times 30$  , second  $12 \times 60 + 30 = 750$  seconds. per second  
1 gallon 가 750 750 gallon 가 .

$$\frac{\text{capacity}}{3} = 750$$

(E)

2. During a sale, Pam paid the regular price for one quart of oil and paid \$0.01 for a second quart. If she paid a total of \$1.20 for the two quarts, the amount paid for the second quart was **what fraction of the amount paid for the first quart?**

(A)  $\frac{1}{118}$  (B)  $\frac{1}{119}$  (C)  $\frac{1}{120}$  (D)  $\frac{1}{121}$  (E)  $\frac{1}{122}$

$$\frac{\$0.01}{\$1.19 (1.20 - 0.01)} = \frac{1}{119} \quad \text{Tip : fractions}$$

fraction . the amount paid for the first quart what  
가 .

(B)

### Tips: Fractions

$\frac{d}{n} = \frac{\text{numerator}}{\text{denominator}} = \frac{\text{part}}{\text{whole}} = \frac{\text{dividend}}{\text{divisor}}$
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3. A carpenter purchases a hammer costing \$8.03, a bag of nails costing \$5.16, and a tape measure costing \$2.81 with a twenty-dollar bill. How much change does the carpenter receive if a sales tax of 5 percent is charged on the entire purchase?

- (A) \$3.20  
 (B) \$3.29  
 (C) \$3.80  
 (D) \$4.00  
 (E) \$4.80


$$\$20 - 1.05(\$8.03 + \$5.16 + \$2.81) = \$3.20 \quad < \quad 105\% \quad >$$

 (A)

4. A certain property doubled in value from 1950 to 1960 and tripled in value from 1960 to 1980. The value of the property in 1980 was how many times the value in 1950?

- (A) 3  
 (B) 5  
 (C) 6  
 (D) 8  
 (E) 9

$$1950 \xrightarrow{2} 1960 \xrightarrow{3} 1980, \quad 1980 \div 1950 = 6 \text{ 가 가}$$


 (C)

5. Of the final grades received by the students in a certain math course,  $\frac{1}{5}$  are A's,  $\frac{1}{4}$  are B's,  $\frac{1}{2}$  are C's and the remaining 10 grades are D's. What is the number of students in the course?

- (A) 80      (B) 110      (C) 160      (D) 200      (E) 400

$$1 - (1/5 + 1/4 + 1/2) = \frac{1}{20} \text{ (the number of students in the course)} = 10$$

200 .

 (D)



6. If 50 tomatoes weigh a total of 30 pounds and cost 35 cents per pound, what is the cost per tomato?

(A) 17 cents  
☒ (B) 21 cents  
 (C) 24 cents  
 (D) 28 cents  
 (E) 35 cents

50 가 30 pounds 1 pound 가 35cent 가

$$: (30 \text{ pounds} \times 35(\text{cents})) / 50 ( ) = 21 \text{ cents}$$

 (B)

7. On a new job Alice earned \$198 the first week and \$220 the second week. If she worked 4 more hours the second week than the first week and was paid at the same hourly rate, how much did she earn per hour?

(A) \$4.00 (B) \$4.50 (C) \$5.00 ☒ (D) \$5.50 (E) \$6.00

가 \$198 \$220 ,

4

4

$$) 22(\text{dollars}) / 4 (\text{hours}) = 5.5 (\text{dollar}/\text{hour})$$

 (D)

8. If a store purchased 6 dozen items at a cost of \$1.80 per dozen and later sold them all for \$0.20 apiece, what was the store's profit on these items?

(A) \$2.16 (B) \$2.40 (C) \$2.84 (D) \$3.20 ☒ (E) \$3.60

12 \$1.8 72 (6 dozen items) \$0.20

가 ( 1.8 (dollars) / 12( ) = 0.15 ) 가 가

$$(0.2(\text{dollar}) - 0.15(\text{dollar}) = 0.05(\text{dollar}))$$

 (E)

9. A mail clerk put 1 or 2 stamps on each of 20 envelopes, using a total of 36 stamps. On how many of the envelopes did the clerk put 2 stamps?

(A) 4 (B) 6 (C) 8 (D) 12 (E) ☒ 16

20 가 36  
20 16  
16  
(E)

10. In 1984 the production costs of Company X totaled \$719,000 and nonproduction costs totaled \$15,000. In 1985 robots were introduced, and production costs dropped to \$600,000, but nonproduction costs rose to \$65,000 for the year. What was the decrease in total costs for Company X from 1984 to 1985?

(A) \$50,000 (B) ☒ \$69,000 (C) \$119,000 (D) \$134,000 (E) \$169,000

production cost \$719,000, nonproduction cost \$15,000 가  
production cost \$600,000 nonproduction cost \$65,000  
\$719,000 ⇨ \$600,000 : \$15,000 ⇨ \$65,000 가  
\$734,000 ⇨ \$665,000 가

(B)

11. In traveling from a dormitory to a certain city, a student went  $\frac{1}{5}$  of the way by foot,  $\frac{2}{3}$  of the way by bus, and the remaining 8 kilometers by car. What is the distance, in kilometers, from the dormitory to the city?

(A) 30 (B) 45 (C) ☒ 60 (D) 90 (E) 120

$\frac{1}{5}$   $\frac{2}{3}$  8Km

D 가 :  $D - (1/5D + 2/3D) = 8$  (Km)

(C)

12. A grocer purchased a quantity of bananas at 3 pounds for \$0.50 and sold the entire quantity at 4 pounds for \$1.00. How many pounds did the grocer purchase if the profit from selling the bananas was \$10.00?

(A) 40 (B) 60 (C) 90 (D) 120 (E) 240

3 pounds \$0.5 4 pounds \$1  
 \$10.00  
 가 가 \$10  
 3 4 12  
 : 12 pounds \$ 2  
 : 12 pounds \$ 3  
 12 pound \$1  
 12 pounds: \$1 =  $x$  : \$10

 (D)

13. A man who died left an estate valued at \$111,000. His will stipulated that his estate was to be distributed so that each of his three children received from the estate and his previous gifts, combined, the same total amount. If he had previously given his oldest child \$15,000, his middle child \$10,000, and his youngest \$2,000, how much did the youngest child receive from the estate?

(A) \$50,000  
 (B) \$48,000  
 (C) \$46,000  
 (D) \$44,000  
 (E) \$39,000

\$111,000 , \$15,000, 가 \$10,000,  
 가 \$2,000 . \$111,000  
 , \$111,000 가  
 .  
 $\$111,000 + \$15,000 + \$10,000 + \$2,000 \div 3 = \$46,000$  ( $\quad$ )  
 $\$2,000$   $\$46,000 - \$2,000 = \$44,000$  estate .

 (D)

14. On a 3-day fishing trip, 4 adults consumed food costing \$60. For the same food costs per person per day, what would be the cost of food consumed by 7 adults during a 5-day fishing trip?

(A) \$300 (B) \$175 (C) \$105 (D) \$100 (E) \$84

$$\frac{\$60}{3\text{-day} \times 4\text{adults}} = \$5, \quad 7 \quad 5 \quad \$5 \times 7 \text{ adults} \times 5\text{-day} = \$175$$

 (B)

15. Joe went on a diet 6 months ago when he weighed 222 pounds. If he now weighs 198 pounds and continues to lose at the same average monthly rate, in approximately how many months will he weigh 180 pounds?

(A) 3  
(B) 3.5  
(C) 4  
(D) 4.5  
(E) 5

$$6 \text{ months: } 24 \text{ pounds } (222 \text{ pounds} - 198 \text{ pounds}) = X : 18 \text{ pounds } (198 \text{ pounds} - 180 \text{ pounds})$$

$$X = 4.5$$

 (D)

16. Mr. Hernandez, who was a resident of State X for only 8 months last year, had a taxable income of \$22,500 for the year. If the state tax rate were 4 percent of the year's taxable income prorated for the proportion of the year during which the taxpayer was a resident, what would be the amount of Mr. Hernandez's State X tax for last year?

(A) \$900 (B) \$720 (C) \$600 (D) \$300 (E) \$60

$$\$22,500 \times 0.04 \times (8/12) = \$600;$$

가 resident

8

$$\frac{8}{12}$$

 (C)

17. If a 50-pound food package consists of individual 4-ounce packets, how many individual packets are contained in 4 tons of 50-pound packages? (Assume that all weights given exclude the weight of packaging material. 1 ton = 2,000 pounds; 1 pound = 16 ounces)

(A) 32,000 (B) 8,000 (C) 800 (D) 200 (E) 160

$$4\text{tons} \times 2000 \text{ pounds} \times 16 \text{ ounces} = 128,000 \text{ ounces}$$

$$\frac{128,000 \text{ ounces}}{4\text{-ounce packets}} = 128,000 \div 4 = 32,000$$

(A)

18. The cost of sending a package is 30 cents per ounce in addition to a basic fee of 5 dollars. If integer  $x$  represents the weight in ounces of a certain package, which of the following represents the cost, in dollars, of sending the package?

(A)  $5x + 0.30$   
 (B)  $(5 + x)0.30$   
 (C)  $5 - 0.30x$   
 (D)  $0.30x + 5$   
 (E)  $0.70x + 5$

$$\text{\$5} + \text{ounce} \times 30\text{cent} = \text{\$} \quad \text{가}$$

$$\text{Cent} \quad \$ \quad 30\text{cent} \quad \$0.3 \quad \dots$$

(D)

19. An empty oil tanker was filled with oil at a uniform rate in  $t$  hours. What proportion of the tanker was filled during the first  $x$  hours if  $x < t$ ?

(A)  $\frac{x}{t}$  (B)  $\frac{t}{x}$  (C)  $\frac{x}{t-x}$  (D)  $\frac{t-x}{t}$  (E)  $\frac{t-x}{x}$

$$\text{가} \quad t \quad x$$

$$\frac{1}{t} \quad t$$

$$\text{가}$$

(A)

20. If a basketball team scores an average (arithmetic mean) of  $x$  points per game for  $n$  games and then scores  $y$  points in its next game, what is the team's average score for the  $n+1$  games?

(A)  $\frac{nx + y}{n + 1}$

(B)  $x + \frac{y}{n + 1}$

(C)  $x + \frac{y}{n}$

(D)  $\frac{n(x + y)}{n + 1}$

(E)  $\frac{x + ny}{n + 1}$

N X points ; N y. :  
<Average Problem>  $N_1$  average  $A_1$  ,  $N_2$   $A_2$  ,

Combined Average =  $\frac{N_1 \cdot A_1 + N_2 \cdot A_2}{N_1 + N_2}$  ,

(A)

21. If a train travels at a speed of  $k$  meters per second, how many kilometers will it travel in  $t$  minutes? (1 kilometer = 1,000 meters)

(A)  $\frac{60kt}{1,000}$

(B)  $\frac{60kt}{100}$

(C)  $\frac{1,000kt}{60}$

(D)  $6,000kt$

(E)  $60,000kt$

Distance( ) = Rate( ) \* Time( )

k meters 가 가 t minutes kilometers 가 .

K meters 1,000 60 .

(A)

22. Mason and Kathy, who both work in the evening wish to arrange for an evening off together. Each evening that Mason is off is followed by 3 evenings that he is at work, and each evening that Kathy is off is followed by 5 evenings that she is at work. If Mason will be off this evening, and Kathy will be off tomorrow evening, how many evenings must pass before they have an evening off together?
- (A) 10 (B) 12 (C) 24 (D) 28
- ☒ (E) So long as they continue this working pattern, they will never have the same evening off.

Mason 4 , Kathy 5 .  
가 . 가 .  
☞ (E)

23. On a certain 10-question test, each question after the first question is worth 2 points more than the previous question. If the greatest number of points that can be scored on the test is 100, how many points is the eighth question worth?
- (A) 9 (B) 14 ☒ (C) 15 (D) 19 (E) 33

10 test 1 2  
가 100 8  
.  
10S( ) + (2 + 4 + 6 + ... + 18) = 100 ⇒ S = 1( ) 2×7 = 14 15.  
☞ (C)

24. A certain car dealership sells only full-size and mid-size cars. One of its sales representatives receives an annual salary of \$15,000. He also receives a commission of \$800 for each full-size car he sells and \$500 for each midsize car he sells. What is the least number of cars he must sell in a year to receive total annual earnings of exactly \$25,000?
- (A) 7 (B) 12 (C) 13 ☒ (D) 14 (E) 17

\$ 15,000 \$25,000  
\$10,000 commission .  
가 commission a full size car  
.  
\$ 800x + \$ 500y = \$10,000 X가 12 가  
\$9,600 .  
☞ (D)

25. A school supply store sells only one kind of desk and one kind of chair, at a uniform cost per desk or per chair. If the total cost of 3 desks and 1 chair is twice that of 1 desk and 3 chairs then the total cost of 4 desks and 1 chair is how many times that of 1 desk and 4 chairs?

(A) 5      (B) 3      (C)  $\frac{8}{3}$       (D)  $\frac{5}{2}$       (E)  $\frac{7}{3}$

$$3\text{Desk} + \text{Chair} = 2(\text{D} + 3\text{C}) \Rightarrow \text{D} = 5\text{C}$$

$$4\text{D} + \text{C} = x(\text{D} + 4\text{C}) \Rightarrow \text{D} = 5\text{C} \qquad 21\text{C} = x(9\text{C}) \Rightarrow x = 7/3$$

 (E)


26. A merchant paid \$300 for a shipment of  $x$  identical calculators. The merchant used 2 of the calculators as demonstrators and sold each of the others for \$5 more than the average (arithmetic mean) cost of the  $x$  calculators. If the total revenue from the sale of the calculators was \$120 more than the cost of the shipment, how many calculators were in the shipment?

(A) 24      (B) 25      (C) 26      (D) 28      (E) 30

$$\text{Total revenue} = \$120 + \text{the cost of shipment} \Rightarrow \text{Total Revenue} - \text{the cost of shipment} = \$120$$

$$\$5(x - 2) - (\$300/x) \times 2 = \$120 \Rightarrow x = 30$$

$$(\$300/x) \times 2, \quad x$$

 (E)

27. A manufacturer can save  $x$  dollars per unit in production costs by overproducing in certain seasons. If storage costs for the excess are  $y$  dollars per unit per day ( $x > y$ ), which of the following expresses the maximum number of days that  $n$  excess units can be stored before the storage costs exceed the savings on the excess units?

(A)  $x - y$       (B)  $(x - y)n$       (C)  $\frac{x}{y}$       (D)  $\frac{xn}{y}$       (E)  $\frac{x}{yn}$

D ,

$$nx = ynD \Rightarrow D = \frac{x}{y}$$


 (C)



- (A) \$5,750    **(B) \$5,250**    (C) \$4,500    (D) \$3,250    (E) \$2,200

$$\text{\$ } 1,300 \times (5/2) = \text{\$ } 3,250$$

( ) \$3,250      \$2,000

 (B)

- defective switches are rejected and  $\frac{1}{20}$  of the nondefective switches are rejected by mistake.

**defective?**

- (A) 4%      (B) 5%      (C) 6.25%      (D) 11%      (E) 16%

$$\frac{1}{5} \text{ 가 } \quad , \quad \frac{4}{5} \text{ 가 } \quad \frac{1}{20}$$

(defective and rejected) :

$$\frac{1}{5} \times \frac{4}{5} = 0.16 (16\%), \quad 20\% \left( \frac{1}{5} \right) \text{가} \quad 20\% - 16\% = 4\%$$

(not defective and rejected) :

$$\frac{4}{5} \times \frac{1}{20} = 0.04, \quad 4\%$$

16%, 4%가

80%가

4%가

percent 가 defective 가

$$\frac{\text{part}}{\text{whole}} = \frac{4\%(\text{defective \& sold})}{(80\% - 4\%) + 4\%} = 5\%$$

 (B)

30. In Company  $X$ , 30 percent of the employees live over ten miles from work and 60 percent of the employees who live over ten miles from work are in car pools. If 40 percent of the employees of Company  $X$  are in car pools, what percent of the employees of Company  $X$  live ten miles or less from work and are in car pools?
- (A) 12%      (B) 20%      (C) 22%      (D) 28%      (E) 32%

	10 miles	10 miles	Total
Car pool	30% $\times$ 60%	40 - 18 = 22%	40%
Not Car pool			
	30%		

10miles      car pool      percent      .      !

(C)

31. A garment order consists of jackets costing \$36 each and shirts costing \$26 each. If the total cost of the order is \$1,200, and if the average (arithmetic mean) cost per garment is \$30, how many more shirts than jackets are in the order?

(A) 32      (B) 22      (C) 18      (D) 13      (E) 8

jacket 가 \$36, shirt 가 \$26      \$30      , jacket 2  
shirt 3      .      가      \$30      .

$$36 \times N + 26 \times 1.5N = 1,200 \Rightarrow N(\text{jackets}) = 16, \quad \text{shirts} \quad 16 \times 1.5 = 24$$

$$24 - 16 = 8$$

(E)

32. The front wheels of a toy truck are 4 inches in circumference. The back wheels are 7 inches in circumference. If the truck travels in a straight line without slippage, how many inches will the truck have traveled when the front wheels have made 12 more revolutions than the back wheels?

(A) 112      (B) 64      (C) 48      (D) 36      (E) 28

가 4 inches,      가 7inches      가      12

가      가 4  
(28inches)      7      (28inches)      3

28 inches 3  
 3 revolution : 28 inches = 12  
 revolution : X  
 $X = 112$   
 (A)

33. A club sold an average (arithmetic mean) of 92 raffle tickets per member. Among the female members, the average number sold was 84, and among the male members, the average number sold was 96. What was the ratio of the number of male members to the number of female members in the club?

(A) 1 : 1 (B) 1 : 2 (C) 1 : 3 (D) 2 : 1 (E) 3 : 1

1 92 ticket , 96 84  
 1 4 8  
 1 2 ticket  
 (D)

34. A team won 40 percent of the 15 games it has already played. If the team were to win 75 percent of its remaining games, it will have won 60 percent of all its games. How many remaining games are there?

(A) 12 (B) 20 (C) 24 (D) 30 (E) 45

15 6 40% ,  
 75% 60%가 . 40%  
 15 60%가 3  
 15 (n) 75%가 60%  
 15% 15% 3  
 $n \times \frac{15}{100} = 3(n)$   $\Rightarrow n = 20$   
 2 n 가 :  
 $6 \text{ games} + 0.75(n) = (15 + n)0.6$  ,  $n = 20$   
 (B)

35. In a quality control process it has been determined that all of the engines that fail inspection are faulty, but approximately  $\frac{1}{6}$  of the faulty engines pass inspection. If, in a group of 1,000 engines, 100 fail inspection, approximately how many faulty engines pass inspection?
- (A) 16      (B) 20      (C) 50      (D) 70      (E) 120

 $\frac{5}{6}$ 

100

가 F ,

$$F \times (5/6) = 100 ,$$

$$120 .$$



(B)

36. If an organization were to sell  $n$  tickets for a theater production, the total revenue from ticket sales would be 20 percent greater than the total costs of the production. If the organization actually sold all but 5 percent of the  $n$  tickets, the total revenue from ticket sales was what percent greater than the total costs of the production?

(A) 4%      (B) 10%      (C) 14%      (D) 15%      (E) 18%

ticket 가 P , cost C ,

$$P \times N = 1.2C, \quad \text{ticket } 95\%$$

$$0.95 \times (N \times P) = 0.95 \times 1.2C = 1.14C$$



(C)

37. Jeff drove to work from his home averaging 40 miles per hour, and was 12 minutes late. The next day he left home for work at the same time, took the same route, averaging 48 miles per hour, and was 7 minutes late. How far in miles is it from Jeff's home to his work?

(A) 20.0      (B) 24.5      (C) 30.0      (D) 37.5      (E) 40.0

40miles

48miles

20%

가

,

5

D

$$D = ( \quad ) \times ( \quad ),$$

$$D = S \times H = 1.2S \times xH$$

48miles

$$\frac{5}{6}H \text{ 가}$$

$$\frac{1}{6}H \quad 40\text{miles} \quad 48\text{miles}$$

$$5 \quad 40 \text{ mile} \quad 30 \quad 20\text{mile}$$

2

$$T \text{ 가 } 12 \quad 7 \quad T$$

$$: 40 \text{ miles}(T + 12 \text{ minutes}) = 48\text{miles}(T+7\text{minutes})$$

$$T= 18 \text{ minutes}$$

$$T$$

$$\text{hours} \quad \text{minutes} \quad \text{hours} \quad !!!$$



(A)

38. If a motorist had driven 1 hour longer on a certain day and at an average rate of 5 miles per hour faster, he would have covered 70 more miles than he actually did. How many more miles would he have covered than he actually did if he had driven 2 hours longer and at an average rate of 10 miles per hour faster on that day?

(A) 100 (B) 120 (C) 140 (D) 150 (E) 160

$$5 \text{ miles}$$

$$\text{가 } 70\text{miles} \text{ 가}$$

$$h, s : h \times s = D$$

$$\text{가 } \Rightarrow (s+5) \times (1 \times h) = D + 70 \text{ (miles)} \quad h \times s = D$$

$$S + 5h = 65 \quad 10\text{miles} \quad 2$$

$$(s+10) \times (2 \times h) = D + X, \quad X, \text{ ① } h \times s = D, \text{ ② } S + 5h = 65$$

① ②

X



(D)

39. When a certain stretch of highway was rebuilt and straightened, the distance along the stretch was decreased by 20 percent and the speed limit was increased by 25 percent. By what percent was the driving time along this stretch reduced for a person who always drives at the speed limit?

(A) 16% (B) 36% (C)  $37\frac{1}{2}\%$  (D) 45% (E)  $56\frac{1}{4}\%$

$$(\text{distance}) = (\text{speed}) \times (\text{time}), \quad = / = 0.8 \quad / 5/4$$



(B)

40. Solution  $Y$  is 30 percent liquid  $X$  and 70 percent water. If 2 kilograms of water evaporate from 8 kilograms of solution  $Y$  and 2 kilograms of solution  $Y$  are added to the remaining 6 kilograms of liquid, what percent of this new solution is liquid  $X$ ?

(A) 30% (B)  $33\frac{1}{3}\%$  (C)  $37\frac{1}{2}\%$  (D) 40% (E) 50%

$Y$  : liquid 30%, water 70%

⇒(1) 8 kilograms  $Y$  2Kg  $Y$ :

Liquid  $X$  :  $8(Kg) \times 0.3 = 2.4(Kg)$  ( )  
 :  $5.6Kg (= 8kg \times 70\%) - 2Kg = 3.6Kg$  (2 Kg )

⇒(2) 2Kg solution  $Y$

Liquid  $X$  :  $2(Kg) \times 0.3 = 0.6(Kg)$   
 :  $2(Kg) \times 0.7 = 1.4(Kg)$

⇒(3) 6 kilograms (8kilograms 2 kilograms )  $Y$  2

kilograms  $Y$  (8 kilograms)  
 Liquid  $X$  :  $2.4(Kg) + 0.6(Kg) = 3.0(Kg)$   
 :  $3.6(Kg) + 1.4(Kg) = 5.0(Kg)$

Liquid  $X$  percent =  $\frac{3.0}{8.0} \times 100 = \frac{75}{2}$

⌚ (C) .

41. How many gallons of water must be mixed with 1 gallon of a 15-percent salt solution to obtain a 10-percent salt solution?

(A) 0.50 (B) 0.67 (C) 1.00 (D) 1.50 (E) 2.00

: 1 gallon, 0.15 gallon  
 : 10% 0.15 gallon 1.5gallon 10%  
 0.50 .

⌚ (A)

42. The seating chart of an airplane shown 30 rows of seats. Each row has 3 seats on each side of the center aisle, and one of the seats on each side is a window seat. The view from the window seats in 5 of the rows is obscured by the wings of the airplane. If the first person to be assigned a seat is assigned a window seat and the window seat is assigned randomly, what is the probability that the person will get a seat with an unobscured view?

(A)  $\frac{1}{6}$  (B)  $\frac{1}{3}$  (C)  $\frac{2}{3}$  (D)  $\frac{5}{6}$  (E)  $\frac{17}{18}$

: 180 ( 6 30 )  
가 : 30  
가 : 150 / 180

 (C)

43. One week a certain truck rental lot had a total of 20 trucks, all of which were on the lot Monday morning. If 50 percent of the trucks that were rented out during the week were returned to the lot on or before Saturday morning of that week, and if there were at least 12 trucks on the lot that Saturday morning, what is the greatest number of different trucks that could have been rented out during the week?

(A) 18 (B) 16 (C) 12 (D) 8 (E) 4

20 truck rental 50%가  
12 truck  
50%가  
18 가 9 가  
2 11 가 18  
. 16 가 8 가 4 가  
12 가

 (B)

44. A car traveled 462 miles per tankful of gasoline on the highway and 336 miles per tankful of gasoline in the city. If the car traveled 6 fewer miles per gallon in the city than on the highway, how many miles per gallon did the car travel in the city?

(A) 14      (B) 16      (C) 21      (D) 22      (E) 27

$$\text{per gallon 가 } x : \frac{462}{x} = \frac{336}{x-6} \Rightarrow x = 22$$

$$\text{per gallon 가 } 22 - 6 = 16$$



(B)

45. On a 20-mile course Pat bicycled at an average rate of 30 miles per hour for the first 12 minutes and, without a break, ran the rest of the distance at an average rate of 8 miles per hour. How many minutes did Pat take to cover the entire course?

(A) 75      (B) 105      (C) 117      (D) 150      (E) 162

$$\begin{aligned} & 20\text{mile} \quad 12 \quad 30\text{mile} \quad , \quad 8\text{mile} \quad 20\text{mile} \\ & \quad \quad \quad \cdot \\ & 12 \quad 1/5 \quad \cdot 30\text{mile} \quad 12 \quad 6\text{mile} \quad 14\text{mile} \\ & 8\text{mile} \quad \cdot 14\text{mile} \quad 8\text{mile} \\ & 1(3/4)\text{가} \quad \cdot 12 \quad 1(3/4) \quad 105 \quad 117 \end{aligned}$$



(C)

46. An investor bought  $n$  shares of Company X stock at \$75 per share. She sold 60 percent of the shares for \$120 per share and the rest at a later date for \$70 per share. If her gross profit on the sale of the  $n$  shares of stock was \$7,500, how many shares did she buy?

(A) 375      (B) 300      (C) 100      (D) 95      (E) 75

$$\begin{aligned} & \text{Company X} \quad \$75 \quad n \quad 60\% \quad \$120 \quad \$70 \\ & \quad \$7,500 \end{aligned}$$

$$\$45 \times (3/5)n + \$5(2/5)n = \$7,500$$



(B)



47. In 1982 a certain company had losses of \$10,000 per month. In the first three months of 1983, this company had gains of \$4,000 per month. On the average, what would the company need to gain per month in the remainder of 1983 in order to break even over this two-year period?

(A) \$9,000 (B) \$10,800 (C) \$12,000 (D) \$13,500 (E) \$18,000

1982 \$10,000 1983 1/4 \$4,000  
'82,'83 break even '83  
'82 \$ 120,000 '83 1/4 \$12,000 break even  
\$108,000/8( )

 (C)

48. An author received \$0.80 in royalties for each of the first 100,000 copies of her book sold, and \$0.60 in royalties for each additional copy sold. If she received a total of \$260,000 in royalties, how many copies of her book were sold?

(A) 130,000 (B) 300,000 (C) 380,000 (D) 400,000 (E) 420,000

{ \$260,000 - ( \$0.8 × 100,000 ) } / 0.6 = 30,000 , 3 10,000 가

 (D)

49. For each hour worked in excess of 40 hours per week, a mechanic is paid  $1\frac{1}{2}$  times her regular rate of \$12 per hour. Her gross pay for a week in which she works 52 hours is equal to her pay at the regular rate for how many hours?

(A) 58 (B) 64 (C) 66 (D) 70 (E) 78

40 \$12 1(1/2) , 52

1(1/2) 2/3 1

3/2 12 18

\$12

 (A)

50. Fifty percent of the subscribers to newspaper  $X$  are corporate managers and of these, 30 percent are in the financial field. If 40 percent of the subscribers who are corporate managers in the financial field are money managers, how many of the newspaper's 25,000 subscribers are corporate money managers in the financial field?
- (A) 1,500 (B) 3,000 (C) 3,750 (D) 7,500 (E) 8,750

50% 가 corporate manager , 30%가 finance . finance  
 corporate manager 40%가 money manager , 25,000  
 finance corporate money manager 가 .  
 Finance Corporate manager :  $50\% \times 30\%$   
 finance corporate money manager :  $50\% \times 30\% \times 40\%$   
 $25,000 \times 50\% \times 30\% \times 40\% = 1,500$

 (A)

51. Reggie had to type 90 letters. During the first day he typed  $\frac{1}{3}$  of the letters, and during the second day he typed  $\frac{2}{5}$  of the remaining letters. How many letters were still untyped at the end of the second day?
- (A) 36 (B) 32 (C) 24 (D) 18 (E) 12

:  $(1/3) \times 90$   
 :  $60 \times (2/5)$   
 :  $90 - (30+24) = 36$

 (A)

52. One karat signifies that  $\frac{1}{24}$  of an alloy is pure gold. If a certain ring is 14-karat gold, approximately what percent of the alloy composing the ring is not gold?
- (A) 14% (B) 24% (C) 42% (D) 55% (E) 58%

one-karat  $1/24$ 가  
 14-karat gold  $14/24$ 가 .

 (C)

53. At a certain pizzeria,  $\frac{1}{8}$  of the pizzas sold in one week were mushroom and  $\frac{1}{3}$  of the remaining pizzas sold were pepperoni. If  $n$  of the pizzas sold were pepperoni, how many were mushroom?
- (A)  $\frac{3}{8}n$  (B)  $\frac{3}{7}n$  (C)  $\frac{7}{16}n$  (D)  $\frac{7}{8}n$  (E)  $3n$

P ,

Mushroom:  $1/8P$

Pepperoni:  $7/8P \times 1/3 = 7/24P = n$

$1/8P = 7/24P \times 3/7 = 3/7n$

 (B)

54. Beth received  $\frac{3}{10}$  of the votes cast in a certain election. What fraction of the other votes cast would she have needed in order to have received  $\frac{1}{2}$  of the votes cast?
- (A)  $\frac{1}{5}$  (B)  $\frac{2}{7}$  (C)  $\frac{3}{10}$  (D)  $\frac{7}{20}$  (E)  $\frac{1}{2}$

가  $1/2$ 가  $2/10$  가 .

$(7/10) \times X = 2/10$

 (B)

55. From January 1, 1980, to January 1, 1984, the number of employees of Company  $X$  declined by 700 per year. If the number of employees on January 1, 1984, was 80 percent of the number on January 1, 1980, how many employees did the company have on January 1, 1984?
- (A) 2,800 (B) 3,500 (C) 11,200 (D) 16,800 (E) 17,500

80 84 700 가 84 가  
 80 80% 84 .  
 80 84 700 가 2,800 가  
 . 84 가 80 80%  
 2,800 80 20%  
 : 80  $\Rightarrow 4 \Rightarrow (80 \times 0.8 (=80\%)) \times 4$

20% 가 .

80 (x) ,


$$x \times 0.2 = 2,800 \Rightarrow x = 14,000$$

84 .

$$14,000 \times 0.8(80\%) = 11,200$$

 (C) .

56. Both marble tiles and terra-cotta tiles are available in squares with 12-centimeter sides, but marble tiles cost  $x$  cents more per tile than terra-cotta tiles. How much more would it cost, in cents, to tile a rectangular floor 240 centimeters by 120 centimeters with marble tiles than with terra-cotta tiles?

 (A) 200x (B)  $360x$  (C)  $720x$  (D)  $2,400x$  (E)  $28,800 - 144x$

$$(240 \text{ cm} \times 120 \text{ cm}) / (12 \times 12) = 200$$


200

marble tile

가 terra-cotta tile 가 x cents (A) .

 (A)

57. If 6 machines ran at the same constant rate, they can complete a certain job in 8 hours. If only 5 of these machines run at this rate, how many more minutes will be required to complete the same job?

(A) 38 (B) 72 (C) 80 (D) 90  96

(word problems !)

$$N_1(6 \text{ machines}) \times H_1(8 \text{ hours}) = N_2(5 \text{ of these machines}) \times H_2(?) :$$

“=”

$$H_2 = 48/5 . \quad 48/5 \quad 8 \text{ hours} \quad 5 \text{ machines}$$

$$. 48/5 - 8 = 8/5 \text{ hours} . \text{ Hours} \quad \text{minutes}$$

$$(8/5) \times 60 = 96 \text{ minutes,}$$

2

(at the same constant rate) 6 가

8 , 5 가

( ) .

6 가 8 1

1/8 , 가 1/48 .

6 가 5 가 가 1 1/48

. 5 가 1 5/48

$$48/5$$

$$8$$

$$(8 \times 60) - \left(\frac{48}{5} \times 60\right) = 96$$

 (E)

58. An inlet pipe can fill an empty pool with water in 3 hours, and the pool's outlet pipe can empty a full pool in 4 hours. The water flows at constant rates through both pipes regardless of the water level in the pool. If both pipes were inadvertently left open, what fraction of the pool would be filled exactly 2 hours after water began to flow into the empty pool?

(A)  $\frac{1}{12}$  (B)  $\frac{1}{6}$  (C)  $\frac{1}{4}$  (D)  $\frac{1}{3}$  (E)  $\frac{1}{2}$

(an inlet pipe)

3

☐ 1 an empty pool  $\frac{1}{3}$

(an outlet pipe)

4

☐ 1 a full pool  $\frac{1}{4}$

$$\left(\frac{1}{3}\right) - \left(\frac{1}{4}\right) = \left(\frac{1}{12}\right)$$

$\frac{1}{3}$


,  $\frac{1}{4}$

가

$\frac{1}{12}$

2

$$\Rightarrow (1/12) \times 2 = 1/6$$

 (B)

59. Working alone,  $R$  can complete a certain kind of job in 9 hours.  $R$  and  $S$ , working together at their respective rates, can complete one of these jobs in 6 hours. In how many hours can  $S$ , working alone, complete one of these jobs?

(A) 18 (B) 12 (C) 9 (D) 6 (E) 3

$R : 9$   $\frac{1}{9}$

$R + S$  가  $\frac{1}{6}$

$R$  6  $\frac{2}{3}$   $S$  가  $\frac{1}{3}$  6

$S$   $\frac{1}{18}$

 (A)

60. Machines  $A, B$ , and  $C$  working together, but independently, at their respective constant rates can do a certain job in  $1\frac{1}{2}$  hours. If  $A$  alone can do the job in 5 hours, and  $B$  alone can do the job in 3 hours, in how many hours can  $C$  alone do the job?

(A)  $1\frac{1}{3}$  (B)  $2\frac{1}{7}$  (C) 3 (D) 5 (E)  $7\frac{1}{2}$

(A+B+C)  $1(1/2)$  hours  $2/3$

A :  $1/5$   $1(1/2)$   $3/10$   
 B :  $1/3$   $1(1/2)$   $1/2$   
 C :  $3/2$   $1/5$   $1(1/2)$   $3/10$

 (E)

61. Bell  $X$  rings once every 12 minutes, bell  $Y$  once every 14 minutes, and bell  $Z$  once every 15 minutes. If, during a given day, the three bells ring at exactly the same instant, how many minutes will elapse before the three bells next ring simultaneously?

(A) 60 (B) 210 (C) 420 (D) 840 (E) 2,520

Bell X 12 , Bell Y 14 , Bell Z 15 3

 (C)

62. How many bits of computer memory will be required to store the integer  $x$ , where  $x = -\sqrt{810,000}$ , if each digit requires 4 bits of memory and the sign of  $x$  requires 1 bit?

(A) 25 (B) 24 (C) 17 (D) 13 (E) 12

4 , 1 가

$X = -\sqrt{810,000} = -900$

 (D)

63. Of the science books in a certain supply room, 50 are on botany, 65 are on zoology, 90 are on physics, 50 are on geology, and 110 are on chemistry. If science books are removed randomly from the supply room, how many must be removed to ensure that 80 of the books removed are on the same science?
- (A) 81      (B) 159      (C) 166      (D) 285      (E) 324

supply room 5 , supply room  
80  
.  
80 , Botany 50 , zoology 65 , geology 50 165  
.  
80 physics 79 , chemistry 79  
supply room physics chemistry .  
physics chemistry 80  
.  
physics physics가 80 ,  
chemistry chemistry가 80 .  
 $165 + 79 + 80 = 324$

(E)

64. In a certain game, a player can accumulate points only by scoring either an  $X$ , which counts 3 points, or a  $Y$ , which counts 2 points. If a player scored 24 points in the game and  $t$  points were made by scoring  $X$ 's how many different values could  $t$  have?
- (A) Four  
(B) Five  
(C) Six  
(D) Seven  
(E) Eight

3 points 2 points 24가  $3X + 2Y = 24$   
X 가(0, 6, 12, 18, 24) .  
24가 2Y 3X 가 가  
가 .  $X = 0, 2, 4, 6, 8$

(B)

65. An apartment building has 9 floors with  $2n$  apartments per floor. If  $\frac{1}{3}$  of the apartments are to have walls removed to form, in each case, one bigger apartment from two smaller ones, how many apartments will there be after the remodeling?
- (A)  $3n$  (B)  $5n$  (C)  $6n$  (D)  $12n$  (E)  $15n$

remodel  $18n$   $\frac{1}{3}$  가  
 $18n \cdot \frac{1}{3} = 6n$  가  $3n$  가  $18n - 3n = 15n$



(E)

66. One-fourth of a solution that was 10 percent sugar by weight was replaced by a second solution, resulting in a solution that was 16 percent sugar by weight. The second solution was what percent sugar by weight?
- (A) 34%  
 (B) 24%  
 (C) 22%  
 (D) 18%  
 (E) 8.5%

10%  $\frac{1}{4}$  16% ,  
 .  
 100g 10g  $\frac{1}{4}$  10% 7.5g  
 25g 가 16%가  
 100g 16g . 8.5g 가  
 25g 4 100g



(A)