Name_____

**MULTIPLE CHOICE.  Choose the one alternative that best completes the statement or answers the question.**

**The NSC (Not So Consistent) Corporation has just completed its first year of business. The following chart shows its monthly profit (or loss).**

| Month | Profit (Loss) in Dollars |
|---|---|
| January | –14,526 |
| February | 1874 |
| March | –8977 |
| April | –14,107 |
| May | 14,073 |
| June | 14,632 |
| July | –13,834 |
| August | –13,170 |
| September | –4860 |
| October | 6630 |
| November | –3338 |
| December | –974 |

1) The loss was greatest in                                                                                          1) _____
    A) June                 B) November          C) December          D) January

2) The loss with the greatest absolute value occurred in                                     2) _____
    A) June                 B) December          C) February          D) January

3) List the months in which a profit was made in order from least profitable month to most profitable     3) _____
    month.
    A) September, November, February, December
    B) December, February, November, September
    C) February, October, May, June
    D) June, May, October, February

4) The absolute value of the profit or loss was greatest in                                   4) _____
    A) December          B) February          C) June            D) January

5) The absolute value of the profit or loss was smallest in                                   5) _____
    A) December          B) January           C) June            D) February

**Solve the problem.**

6) The stock market gained 25 points on Tuesday and lost 56 points on Wednesday. Find the     6) _____
    difference between these changes.
    A) 31 points          B) 81 points          C) –81 points        D) –31 points

7) Nikki is fishing from a bank 28 feet above water level. In this location, the fish tend to feed at 46 feet     7) _____
    below the surface. How long must Nikki's fish line be to reach the fish?
    A) –28 feet          B) 74 feet           C) 18 feet           D) –18 feet

8) Wayne has $14.60 in his wallet. Janice has a debt note for $16.19 in her wallet. Find the difference between these amounts.

    A) –$1.59          B) $1.59          C) –$30.79          D) $30.79

8) _____

9) Company A showed a profit of $83,840 last year, while Company B had a loss of $70,170. Find the difference between these amounts.

    A) $154,010          B) $13,670          C) –$13,670          D) –$154,010

9) _____

10) The temperature at a science station was –30° at 8 am. At 3 pm, it was 31°. By how many degrees did the temperature rise?

    A) by 1°          B) by –1°          C) by 61°          D) by –61°

10) _____

11) The ocean surface is at 0 ft elevation. A diver is underwater at an elevation of –142 ft near a rock formation. In this area, the ocean floor has an elevation of –317 ft. The rock formation rises to a peak 223 above the ocean floor. How many feet below the top of the rock formation is the diver?

    A) 48 ft          B) 94 ft          C) 81 ft          D) 175 ft

11) _____

12) After one round in a card game, your score was –31 points. After the second round, your total score was 37 points. How many points did you gain in the second game?

    A) 68 points          B) –6 points          C) 37 points          D) 6 points

12) _____

13) In a certain location, the highest temperature recorded was 102°F. The lowest temperature recorded was 121 degrees less than the highest. What was the lowest temperature?

    A) 0°F          B) –19°F          C) 19°F          D) –138°F

13) _____

14) An approximation of the amount in billions of dollars that Americans have spent on their pets from 2001 to 2006 can be obtained by substituting a given year for x in the expression 1.747x – 3311. Approximate the amount spent in 2002. Round the answer to the nearest tenth.

    A) $3684 billion          B) $186.5 billion          C) $187.5 billion          D) $6803.5 billion

14) _____

15) An approximation of the amount in billions of dollars that Americans have spent on their pets from 1993 to 2006 can be obtained by substituting a given year for x in the expression 1.768x – 3352. How has the amount Americans have spent on their pets changed from 1993 to 2006?

    A) It has decreased.                    B) It does not really change.
    C) It has increased a little.             D) It has largely increased.

15) _____

16) Find the corresponding Celsius temperature for a temperature of 66°F. Round to the nearest tenth, if necessary.

    A) 150.8°C          B) 33.1°C          C) 18.9°C          D) 61.2°C

16) _____

17) Find the corresponding Fahrenheit temperature for a temperature of 80°C. Round to the nearest tenth, if necessary.

    A) 26.7°F          B) 201.6°F          C) 62.2°F          D) 176°F

17) _____

18) What is the perimeter of a rectangle of length 50 ft and width 13 ft?

    A) 252 ft          B) 126 ft          C) 63 ft          D) 113 ft

18) _____

19) What is the area of a square with side 3.5 cm?

    A) 42 cm$^2$          B) 7 cm$^2$          C) 49 cm$^2$          D) 12.25 cm$^2$

19) _____

20) Find the area of a triangle with height 16 m and base 13 m.  20) _____

    A) 104 m$^2$          B) 416 m$^2$          C) 14.5 m$^2$          D) 208 m$^2$

21) Find the surface area of a cylinder with a radius of 4 cm and a height of 50 cm. Use 3.14 for $\pi$.  21) _____

    A) 6280 cm$^2$          B) 1281.12 cm$^2$          C) 1256 cm$^2$          D) 1356.48 cm$^2$

22) Jay drove 305 km at an average rate of 61 km/hr. How long did the trip take?  22) _____

    A) 6 hr          B) 5 hr          C) $\frac{1}{5}$ hr          D) 4 hr

23) Janet drove 272 km, and the trip took 4 hr. At what average rate was Janet traveling?  23) _____

    A) $\frac{1}{68}$ km/hr          B) 68 km/hr          C) 1088 km/hr          D) 69 km/hr

24) The area of a trapezoid is 77 square feet. If the bases are 7 ft and 15 ft, find the altitude of the trapezoid.  24) _____

    A) 4 ft          B) 1.5 ft          C) 7 ft          D) 14 ft

25) A circle has a circumference of $22\pi$ m. Find the radius of the circle.  25) _____

    A) 11 m          B) 6 m          C) 4 m          D) 22 m

26) Find the simple interest if $3000 is borrowed at 11.7% for 9 months (0.75 yr).  26) _____

    A) $468.00          B) $192.31          C) $26,325.00          D) $263.25

27) Find the simple interest if $2700 is invested at 12.1% for 4.5 years.  27) _____

    A) $326.70          B) $72.60          C) $1470.15          D) $1004.13

28) Find the total amount in an account if $2800 is invested at 19% simple interest for 2.5 years.  28) _____

    A) $1330.00          B) $3332.00          C) $3168.42          D) $4130.00

29) Find the total amount that must be repaid if $4400 is borrowed at 18% simple interest for 1.5 years.  29) _____

    A) $4766.67          B) $5588.00          C) $5192.00          D) $1188.00

30) A chemical solution contains 9% salt. How much salt is in 3.5 ml of solution? Round your answer to three decimal places, if necessary.  30) _____

    A) 0.315 ml          B) 38.889 ml          C) 3.15 ml          D) 3.889 ml

31) During one year, the Larsons' real estate bill included $574 for local schools. Of this amount, $215 went to the high school district. What percent did the Larsons pay to the high school district? Round your answer to two decimal places.  31) _____

    A) 35.90%          B) 37.28%          C) 62.54%          D) 37.46%

32) A mixture of chlorine and water contains a total of 85 gallons of liquid. There are 67 gallons of pure chlorine in the mixture. (i) What percent of the mixture is water? (ii) What percent of the mixture is chlorine? Round your answer to the nearest percent, if necessary.  32) _____

    A) (i) 24% water; (ii) 76% chlorine          B) (i) 79% water; (ii) 21% chlorine

    C) (i) 21% water; (ii) 79% chlorine          D) (i) 67% water; (ii) 33% chlorine

33) The graph shows the percent of students at a local high school who were enrolled in a foreign language class each school year during the 1980s.

33) _____
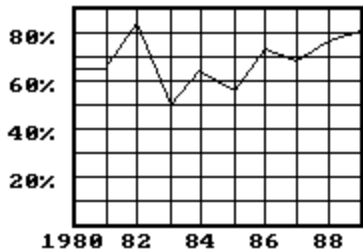


What is the best estimate for the number of students taking a language in 1982 if a total of 2930 students were enrolled in the school?

 A) 66 students     B) 2382 students     C) 2432 students     D) 498 students

34) The graph shows the percent of students at a local high school who were enrolled in a foreign language class each school year during the 1980s.

34) _____
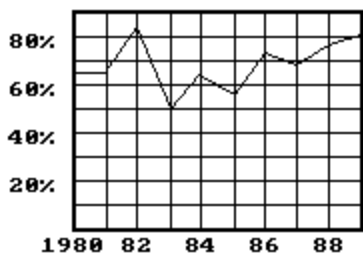


What is the best estimate for the number of students not taking a language in 1981 if a total of 3670 students were enrolled in the school?

 A) 1285 students     B) 2386 students     C) 5872 students     D) 1235 students

35) Find the length of a rectangular lot with a perimeter of 96 m if the length is 8 m more than the width.

35) _____

 A) 56 m     B) 20 m     C) 28 m     D) 48 m

36) A square plywood platform has a perimeter which is 8 times the length of a side, decreased by 20. Find the length of a side.

36) _____

 A) 1     B) 9     C) 5     D) 4

37) A rectangular Persian carpet has a perimeter of 176 inches. The length of the carpet is 22 in. more than the width. What are the dimensions of the carpet?

37) _____

 A) Width: 55 in.; length: 77 in.     B) Width: 77 in.; length: 99 in.
 C) Width: 66 in.; length: 88 in.     D) Width: 33 in.; length: 55 in.

38) A pie–shaped (triangular) lake–front lot has a perimeter of 1600 ft. One side is 200 ft longer than the shortest side, while the third side is 500 ft longer than the shortest side. Find the lengths of all three sides.

38) _____

 A) 300 ft, 500 ft, 800 ft     B) 100 ft, 200 ft, 300 ft
 C) 400 ft, 400 ft, 400 ft     D) 400 ft, 600 ft, 900 ft

39) Gloria collected 20 fantail and comet goldfish. There were 16 fewer fantails than comets. How many comets did Gloria have?

39) _____

 A) 2 comets     B) 18 comets     C) 4 comets     D) 17 comets

40) The two largest oil spills together released 233 million gallons of oil into the oceans. The smaller of    40) _____
the two released 29 million gallons less than the larger of the two. How many million gallons of oil
did the larger one release?
    A) 204 million gallons                            B) 80 million gallons
    C) 102 million gallons                            D) 131 million gallons

41) A biologist collected 128 fern and moss samples. There were 16 fewer ferns than moss samples.    41) _____
How many fern samples did the biologist collect?
    A) 72 fern samples                               B) 56 fern samples
    C) 44 fern samples                               D) 112 fern samples

42) In a recent school board election, the two candidates for president received 3063 votes. The loser    42) _____
received 695 fewer votes than the winner. How many votes did the winner receive?
    A) 1287 votes          B) 1184 votes          C) 1879 votes          D) 2368 votes

**Solve the percent problem.**
43) If Gloria received a 6 percent raise and is now making $26,500 a year, what was her salary before    43) _____
the raise?
    A) $24,500              B) $26,000             C) $25,500             D) $25,000

44) Stevie bought a stereo for $220 and put it on sale at his store at a 60% markup rate. What was the    44) _____
retail price of the stereo?
    A) $352.00              B) $320.00             C) $252.00             D) $440.00

45) An investor bought 100 shares of stock. The value of the shares went up 2% and then he sold them.    45) _____
How much did the investor pay for the 100 shares if he sold them for $1377?
    A) $1350               B) $1400              C) $1405              D) $1327

46) At the end of the day, a storekeeper had $1166 in the cash register, counting both the sale of goods    46) _____
and the sales tax of 6%. Find the amount that is the tax.
    A) $61                  B) $66                 C) $56                 D) $71

47) After receiving a discount of 13.5% on its bulk order of typewriter ribbons, John's Office Supply    47) _____
pays $6747. What was the price of the order before the discount?
    A) $7800               B) $7658              C) $6174              D) $5836

48) After spending $2850 for tables and $3650 for chairs, a convention center manager finds that 35% of    48) _____
his original budget remains. Find the amount that remains. Round your answer to the nearest
dollar, if necessary.
    A) $5615               B) $3500              C) $10,000            D) $2275

49) Midtown Antiques collects 4% sales tax on all sales. If total sales including tax are $1829.76, find the    49) _____
portion that is the tax. Round your answer to the nearest cent.
    A) $70.38              B) $73.19             C) $1759.38          D) $60.38

**Solve the investment problem.**
50) Mardi received an inheritance of $60,000. She invested part at 10% and deposited the remainder in    50) _____
tax–free bonds at 8%. Her total annual income from the investments was $5400. Find the amount
invested at 10%.
    A) $15,000              B) $30,000             C) $54,600            D) $29,000

51) Walt made an extra $10,000 last year from a part–time job. He invested part of the money at 7% and the rest at 9%. He made a total of $780 in interest. How much was invested at 9%?

   A) $8000          B) $6000          C) $4000          D) $5000

52) Roberto invested some money at 6%, and then invested $4000 more than twice this amount at 11%. His total annual income from the two investments was $4640. How much was invested at 11%?

   A) $3400          B) $30,000          C) $12,000          D) $34,000

**Solve the mixture problem.**

53) It is necessary to have a 40% antifreeze solution in the radiator of a certain car. The radiator now has 40 liters of 20% solution. How many liters of this should be drained and replaced with 100% antifreeze to get the desired strength?

   A) 13.3 liters          B) 16 liters          C) 20 liters          D) 10 liters

54) How many liters of a 50% alcohol solution must be mixed with 90 liters of a 80% solution to get a 70% solution?

   A) 13.5 liters          B) 45 liters          C) 135 liters          D) 4.5 liters

55) In a chemistry class, 3 liters of a 4% silver iodide solution must be mixed with a 10% solution to get a 6% solution. How many liters of the 10% solution are needed?

   A) 1.5 liters          B) 0.5 liters          C) 3 liters          D) 2.5 liters

56) A merchant has coffee worth $3 a pound that she wishes to mix with 50 pounds of coffee worth $6 a pound to get a mixture worth $4 a pound. How many pounds of the $3 coffee should be used?

   A) 100 lb          B) 75 lb          C) 50 lb          D) 150 lb

**Solve the problem.**

57) A salesperson has two job offers. Company A offers a weekly salary of $560 plus commission of 14% of sales. Company B offers a weekly salary of $1120 plus commission of 7% of sales. What is the amount of sales above which Company A's offer is the better of the two?

   A) $8100          B) $4000          C) $16,000          D) $8000

58) Company A rents copiers for a monthly charge of $200 plus 8 cents per copy. Company B rents copiers for a monthly charge of $400 plus 4 cents per copy. What is the number of copies above which Company A's charges are the higher of the two?

   A) 10,000 copies          B) 5100 copies          C) 5000 copies          D) 2500 copies

59) A car rental company has two rental rates. Rate 1 is $30 per day plus $.12 per mile. Rate 2 is $60 per day plus $.06 per mile. If you plan to rent for one day, how many miles would you need to drive to pay less by taking Rate 2?

   A) more than 600 miles          B) more than 1000 miles

   C) more than 250 miles          D) more than 500 miles

60) Jim has gotten scores of 75 and 98 on his first two tests. What score must he get on his third test to keep an average of 90 or greater?

   A) At least 96          B) At least 86.5          C) At least 87.7          D) At least 97

61) A bag of marbles has twice as many blue marbles as green marbles, and the bag has at least 12 marbles in it. At least how many green marbles does it have?
   A) At least 4 green marbles                 B) At least 6 green marbles
   C) At least 8 green marbles                 D) At least 5 green marbles

61) _____

62) Jon has 828 points in his math class. He must have 88% of the 1100 points possible by the end of the term to receive credit for the class. What is the minimum number of additional points he must earn by the end of the term to receive credit for the class?
   A) 968 points         B) 729 points         C) 140 points         D) 272 points

62) _____

63) Correct Computers, Inc. finds that the cost to make x laptop computers is $C = 1953x + 134{,}732$, while the revenue produced from them is $R = 3039x$ (C and R are in dollars). What is the smallest whole number of computers, x, that must be sold for the company to show a profit?
   A) 27         B) 125         C) 672,582,144         D) 146,318,952

63) _____

64) Fantastic Flags, Inc. finds that the cost to make x flags is $C = 19x + 12{,}379$, while the revenue produced from them is $R = 39x$ (C and R are in dollars). What is the smallest whole number of flags, x, that must be sold for the company to show a profit?
   A) 214         B) 619         C) 717,982         D) 247,580

64) _____

65) Behemoth Back Packs, Inc. finds that the cost to make x back packs is $C = 137x + 4394$, while the revenue produced from them is $R = 181x$ (C and R are in dollars). What is the smallest whole number of back packs, x, that must be sold for the company to show a profit?
   A) 1,397,292         B) 100         C) 193,336         D) 14

65) _____

66) Pizzicato Pizza, Inc. finds that the cost to make x pizzas (with one topping) is $C = 3x + 2485$, while the revenue produced from them is $R = 13x$ (C and R are in dollars). What is the smallest whole number of pizzas, x, that must be sold for the company to show a profit?
   A) 39,760         B) 156         C) 24,850         D) 249

66) _____

67) Miraculous Music, Inc. finds that the cost to make x compact discs is $C = 7x + 19{,}649$, while the revenue produced from them is $R = 14x$ (C and R are in dollars). What is the smallest whole number of compact discs, x, that must be sold for the company to show a profit?
   A) 137,543         B) 2808         C) 936         D) 412,629

67) _____

**Each of six decorators has to paint a room (walls only) and put a wallpaper border around the room at the ceiling. One gallon of paint covers 400 sq ft, and one roll of border contains five yards. Each decorator has one gallon of paint and three rolls of border.**

68) The list gives the names of each decorator and the size of the room.

68) _____

| Mary | 9' x 12' |
|------|----------|
| John | 10' x 12' |
| Irina | 12' x 12' |
| Ajay | 12' x 13' |
| Rosa | 14' x 17' |
| Manuel | 13' x 15' |

Give the names of the decorators who will have both enough paint and enough border for their rooms. (Assume a ceiling height of 8' for each room.)
   A) {Irina, Ajay}         B) {Rosa, Manuel}         C) {Mary, John}         D) None

69) The list gives the name of each decorator and the size of the room.  69) _____

      Sue            9' x 12'
      Roger        10' x 12'
      Noriko      12' x 12'
      Sergey      12' x 13'
      Juanita     14' x 17'
      Manuel     13' x 15'

Give the names of the decorators who will have enough paint, but will not have enough border for their rooms. (Assume a ceiling height of 8' for each room.)
A) {Sue, Roger}                      B) {Noriko, Sergey}
C) {Juanita, Manuel}              D) None

70) The list gives the name of each decorator and the size of the room.  70) _____

      Sue        9' x 12'
      Sam       10' x 12'
      Noriko    12' x 12'
      Ajay      12' x 13'
      Juanita   14' x 17'
      Jose      13' x 15'

Give the names of the decorators who will not have enough paint, but will have enough border for their rooms. (Assume a ceiling height of 8' for each room.)
A) {Noriko, Ajay}     B) {Juanita, Jose}     C) {Sue, Sam}     D) None

71) The list gives the name of each decorator and the size of the room.  71) _____

      Mary       9' x 12'
      John       10' x 12'
      Yong Sun  12' x 12'
      Ajay      12' x 13'
      Rosa      14' x 17'
      Jose      13' x 15'

Give the names of the decorators who will have neither enough paint nor enough border. (Assume a ceiling height of 8' for each room.)
A) {Mary, John}                  B) {Yong Sun, Ajay}
C) {Rosa, Jose}                  D) None

72) The list gives the name of each decorator and the size of the room.
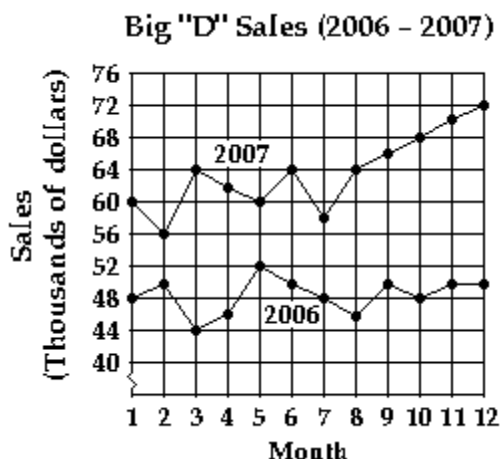
72) _____

    Jane          9' x 12'
    Roger       10' x 12'
    Noriko      12' x 12'
    Sun Woo    12' x 13'
    Consuela   14' x 17'
    Pedro       13' x 15'

Give the names of the decorators who will have either enough paint or enough border or both.
(Assume a ceiling height of 8' for each room.)
  A) {Jane, Roger, Noriko, Sun Woo}           B) All
  C) {Consuela, Pedro}                    D) None

**The graph shows sales in thousands of dollars for 1989 and 1990. Use it to answer the question.**



73) If the ordered pair (x, y) represents a point on the graph, what does x represent? What does y represent?

73) _____

  A) y represents the month;  x represents the sales in thousands of dollars.
  B) x represents the month;  y represents the sales in thousands of dollars.
  C) x represents the year 2006;  y represents the sales in thousands of dollars
  D) x represents the year 2006;  y represents the year 2007.

74) Estimate the sales in June 2006.

74) _____

  A) about $48 thousand               B) about $52 thousand
  C) about $50 thousand               D) about $64 thousand

75) Write an ordered pair (x, y) that gives approximately the sales in June 2006.

75) _____

  A) (June, 50)      B) (2006, 50)      C) (6, 50)      D) (50, 6)

**SHORT ANSWER.  Write the word or phrase that best completes each statement or answers the question.**

76) What does the ordered pair (10, 48) for 2006 mean in the context of this graph?

76) _____

**MULTIPLE CHOICE.  Choose the one alternative that best completes the statement or answers the question.**

77) Which month in 2006 had the lowest sales?

77) _____

  A) Month 3         B) Month 6         C) Month 2         D) Month 8

78) Which month in 2007 had the highest sales?                78) _____
    A) Month 12          B) Month 6          C) Month 5          D) Month 3

79) What month in 2006 had the highest sales?                79) _____
    A) Month 5          B) Month 3          C) Month 2          D) Month 12

80) What month in 2007 had the lowest sales?                80) _____
    A) Month 12          B) Month 5          C) Month 2          D) Month 3

**Solve the problem.**

81) Suppose the sales of a particular brand of appliance satisfy the linear model $y = 120x + 4600$, where   81) _____
y represents the number of sales in year x, with $x = 0$ corresponding to 1982. Find the number of
sales in 1997.
    A) 6280          B) 6400          C) 12,680          D) 12,800

82) Suppose $y = mx + b$ is a linear model for actual time as a function of estimated time, where y   82) _____
represents actual time and x represents estimated time and m and b are constants. If $m = 3.7$ and
$b = -2.4$, find y when x is 60 min.
    A) 68.88 min          B) 219.6 min          C) 51.12 min          D) 224.4 min

83) The linear model $C = 700x + 30,000$ represents the cost in dollars a company has in manufacturing x   83) _____
items during a month. Based on this, how much does it cost to produce 900 items?
    A) $660,000          B) $42.86          C) $0.05          D) $630,000

84) If the slope of the road shown is $\frac{2}{3}$, find the value for h if $v = 5$ ft.   84) _____
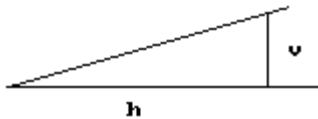


    A) 15 ft          B) 10 ft          C) $\frac{15}{2}$ ft          D) 5 ft

85) For the incline shown below, how many feet in the vertical direction correspond to 8 ft in the   85) _____
horizontal direction?



    A) 32 ft          B) 2 ft          C) 3 ft          D) 4 ft

86) A motorcycle daredevil is planning a stunt to perform at a county fair. A ramp must be built to give   86) _____
him a 20% grade, or slope. If the vertical height at the end of the ramp must be 16 ft to assure that
the stunt is a success, what must be the length of the horizontal run?



    A) 2.88 ft          B) 80 ft          C) 16 ft          D) 288 ft

**Solve the problem. Round your answer, as needed.**

87) The rate of return of certain investments increases as the risk factor of the investment increases. An investment with a risk factor of 2 has a rate of return of 5.0%. An investment with a risk factor of 16 has a rate of return of 17.0%. What is the average rate of return per unit of risk?

    A) 0.86% per unit risk                                 B) 1.36% per unit risk

    C) 1.17% per unit risk                                 D) 0.73% per unit risk

87) _____

88) A deep sea diving bell is being lowered at a constant rate. After 8 minutes, the bell is at a depth of 400 ft. After 50 minutes the bell is at a depth of 1300 ft. What is the average rate of lowering per minute?

    A) 0.05 ft per minute                                 B) 21.4 ft per minute

    C) 18.0 ft per minute                                 D) 26.0 ft per minute

88) _____

89) The table below shows the weight for a calf raised by a local rancher. Use the information to determine the average rate of change in the calf's weight per day.

89) _____

## Calf's Weight

| Day | Weight (in lbs) |
|-----|-----------------|
| 1   | 505             |
| 5   | 525             |
| 15  | 575             |
| 25  | 625             |
| 40  | 700             |

    A) 500 lbs per day         B) $\frac{1}{5}$ lb per day         C) 50 lbs per day         D) 5 lbs per day

**Solve the problem.**

90) It costs $28 per hour plus a flat fee of $15 for a plumber to make a house call. What is an equation of the form $y = mx + b$ for this situation?

    A) $y = 15x + 28$         B) $y = 28x$         C) $y = 15x$         D) $y = 28x + 15$

90) _____

91) Using a phone card to make a long distance call costs a flat fee of $0.42 plus $0.17 per minute starting with the first minute. What is an equation of the form $y = mx + b$ for this situation?

    A) $y = 0.17x + 0.42$         B) $y = 0.17x$         C) $y = 0.42x$         D) $y = 0.42x + 0.17$

91) _____

92) The number of births in County A has been increasing in recent years. Using the information given   92) _____
on the bar graph for the years 1960 and 1990, find an equation to model the number of births y for
the year x. Let x = 0 correspond to the year 1960.



Year
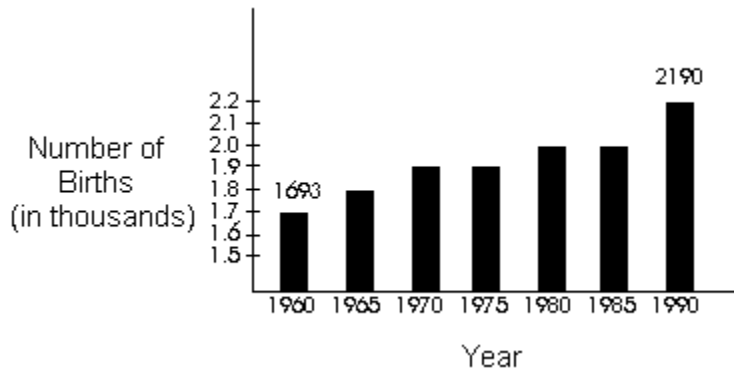
A) $y = \dfrac{30}{497}x + \dfrac{930140}{497}$

B) $y = \dfrac{497}{30}x + 1693$

C) $y = \dfrac{497}{1990}x + 1693$

D) $y = \dfrac{1990}{497}x - 2190$

93) Let x represent the number of pounds of apples sold at $1.12 per pound, and let y represent the   93) _____
total price paid for the apples. Write an equation for this situation. Then give the ordered pair
with an x–value of 8 associated with this equation.
   A) y = 1.12x;  (8, 8.96)                          B) y = 1.12 + x;  (8, 9.12)
   C) x = 1.12y;  (8, 7.14)                          D) x = 1.12 + y;  (8, 6.88)

94) Let x represent the number of gallons of gas sold at $2.40 per gallon, and let y represent the total   94) _____
cost of the gasoline (in dollars). Write an equation for this situation. Then give the ordered pair
with an x–value of 19 associated with this equation.
   A) y = 2.40x;  (19, 45.60)                        B) y = 2.40 + x;  (19, 21.40)
   C) x = 2.40 + y;  (19, 16.60)                     D) x = 2.40y;  (19, 7.92)

95) It costs $20 per hour plus a flat fee of $24 for a plumber to make a house call. Find the total cost to   95) _____
have a plumber come to a house for 10 hours.
   A) $260              B) $224              C) $490              D) $200

96) Using a phone card to make a long distance call costs a flat fee of $0.61 plus $0.21 per minute   96) _____
starting with the first minute. Find the total cost of a phone call which lasts 12 minutes.
   A) $3.13             B) $2.52             C) $12.13            D) $7.53

97) It costs $43 per hour plus a flat fee of $19 for a plumber to make a house call. Find the number of   97) _____
hours a plumber worked if the total cost was $406.
   A) 13               B) 5                C) 17               D) 9

98) Suppose the sales of a particular brand of appliance satisfy the relationship S(x) = 90x + 3400, where   98) _____
S(x) represents the number of sales in year x, with x = 0 corresponding to 1982. Find the number of
sales in 1990.
   A) 8150             B) 4120             C) 8240             D) 4030

12

99) The mathematical model C(x) = 600x + 40,000 represents the cost in dollars a company has in manufacturing x items during a month. Based on this, how much does it cost to produce 100 items?

    A) $0.67               B) $60,000              C) $66.67              D) $100,000

99) _____

100) (a) All items in an ice cream truck cost $1.00 per item. Fill in the chart with the correct response for the total cost C(x) if x items are purchased. (b). Write the linear function which gives C(x).

| x | C(x) |
|---|---|
| 0 | |
| 1 | |
| 2 | |
| 3 | |

    A) (a) $1.00; $2.00; $3.00; $4.00  (b) C(x) = 1.00x + 1.00
    B) (a) $0; $1.00; $2.00; $3.00  (b) C(x) = 1.00x
    C) (a) $0; $1.00; $1.00; $1.00  (b) C(x) = 1.00
    D) None of the above

100) _____

101) It has been determined that the number of fish f(t) that can be caught in t minutes in a certain pond using a certain bait is f(t) = .23t + 1, for t > 10. Find the number of fish that can be caught if you fish for 32 minutes. Round your answer to the nearest whole number.

    A) 36               B) 34              C) 8              D) 18

101) _____

102) Suppose the sales of a particular brand of appliance are modeled by the linear function S(x) = 220x + 2700, where S(x) represents the number of sales in year x, with x = 0 corresponding to 1982. Find the number of sales in 1992.

    A) 4680               B) 9800              C) 4900              D) 9580

102) _____

103) Suppose f(x) = mx + b is a mathematical model for actual time as a function of estimated time, where f(x) represents actual time and x represents estimated time and m and b are constants. If m = 4.6 and b = –0.6, find f(x) when x is 60 min.

    A) 276.6 min        B) 275.4 min        C) 62.76 min        D) 57.24 min

103) _____

104) The mathematical model C(x) = 400x + 70,000 represents the cost in dollars a company has in manufacturing x items during a month. Based on this, how much does it cost to produce 100 items?

    A) $40,000         B) $1.75           C) $110,000        D) $175.00

104) _____

105) The function $P(d) = 1 + \dfrac{d}{33}$ gives the pressure, in atmospheres (atm), at a depth d feet in the sea.

Find the pressure at 31 feet. Do not round your answer.

    A) $\dfrac{32}{33}$ atm        B) $\dfrac{31}{33}$ atm        C) $\dfrac{64}{33}$ atm        D) $\dfrac{2}{33}$ atm

105) _____

106) Carlos doesn't trust banks, so his savings are hidden under his mattress. Alla has her savings in an investment at simple interest. During which years would Carlos's savings be more than Alla's?



    A) 1986 – 1989             B) 1989             C) 1989 – 1996             D) 1986 – 1988

107) Hsien–Ta doesn't trust banks, so his savings are hidden under his mattress. Betsy has her savings in an investment at simple interest. During which year did they have the same amount?
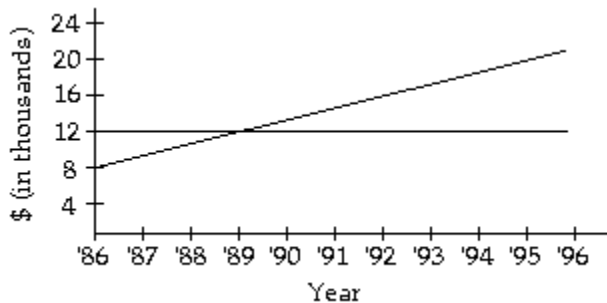


    A) 1988             B) 1986             C) 1989             D) 1996

108) The graphs below represent the supply and demand for a product at various prices per unit. At approximately what price does supply equal demand?



    A) $900             B) $400             C) $177             D) $650

106) _____

107) _____

108) _____

109) The graphs below represent the supply and demand for a product at various prices per unit.     109) _____
Approximately how many units should be produced so that supply equals demand?



A) 2250 units          B) 42,900 units          C) 42.9 units          D) 2255 units

110) A company manufactures three products. The graph shows the production from 1986 to 1996.     110) _____
During which year did the production of B equal the production of C?
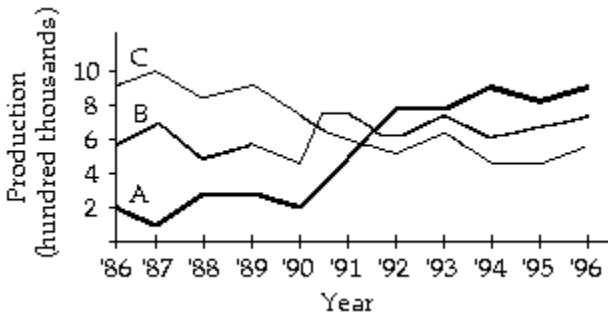


A) 850,000          B) 1990          C) 800,000          D) 1996

111) A company manufactures three products. The graph shows the production from 1986 to 1996. What     111) _____
was the approximate level of production when the production of C equaled the production of A?



A) 500,000          B) 800,000          C) 400,000          D) 600,000

15

112) After retirement, Kelly's company offers her two options for receiving her retirement pension. According the the first plan, she will receive monthly payments from a variable annuity that initially pays $700 per month then decreases each month at a rate of $25 per month per year. Optionally, she may choose a plan that pays her a fixed amount of $500 per month for the rest of her life. The monthly payments for the two plans are illustrated in the graph below. After how many years does the variable plan pay less per month than the fixed plan?

112) _____



Years after retirement
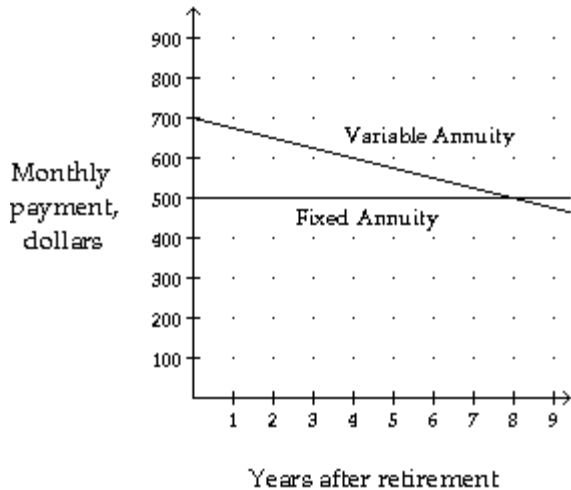
A) Up to 8 years                                            B) 9 years
C) 8 years                                                  D) The variable plan always pays less.

113) After retirement, Kelly's company offers her two options for receiving her retirement pension. According the the first plan, she will receive monthly payments from a variable annuity that initially pays $700 per month then decreases each month at a rate of $25 per month per year. Optionally, she may choose a plan that pays her a fixed amount of $500 per month for the rest of her life. The monthly payments for the two plans are illustrated in the graph below. If Kelly's remaining life expectancy is 20  years, which plan would be the better choice?

113) _____



Years after retirement
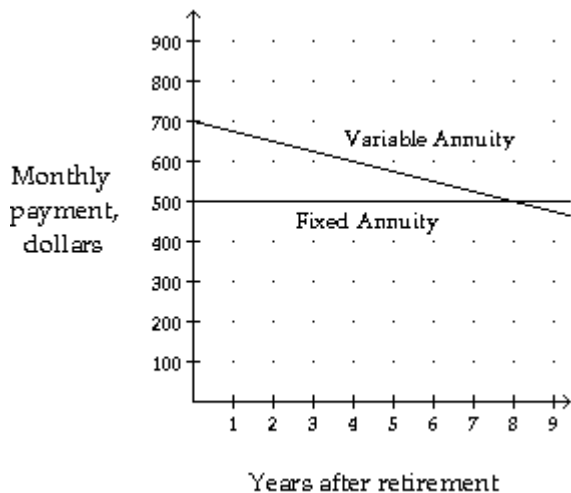
A) The fixed annuity
B) The variable annuity
C) Both plans are equally attractive.

114) Momma's ice cream shop sells three types of ice cream: soft–serve, chunky, and nonfat. Location I sells 18 gal of soft–serve, 100 gal of chunky, and 30 gal of nonfat ice cream each day. Location II sells 22 gal of soft–serve and Location III sells 60 gal of soft–serve each day. Daily sales of chunky ice cream are 90 gal at Location II and 120 gal at Location III. At Location II, 18 gal of nonfat are sold each day, and 40 gal of nonfat are sold each day at Location III. Write a 3 × 3 matrix that shows the sales figures for the three locations, with the rows representing the three locations.

114) _____

A)
$$\begin{bmatrix} 18 & 100 & 30 \\ 22 & 90 & 18 \\ 60 & 120 & 40 \end{bmatrix}$$

B)
$$\begin{bmatrix} 18 & 100 & 30 \\ 22 & 90 & 18 \\ 60 & 40 & 120 \end{bmatrix}$$

C)
$$\begin{bmatrix} 18 & 22 & 60 \\ 100 & 90 & 120 \\ 30 & 18 & 40 \end{bmatrix}$$

D)
$$\begin{bmatrix} 18 & 90 & 30 \\ 22 & 100 & 18 \\ 60 & 120 & 40 \end{bmatrix}$$

115) Momma's ice cream shop sells three types of ice cream: soft–serve, chunky, and nonfat. Location I sells 40 gal of soft–serve, 80 gal of chunky, and 30 gal of nonfat ice cream each day. Location II sells 19 gal of soft–serve and Location III sells 60 gal of soft–serve each day. Daily sales of chunky ice cream are 90 gal at Location II and 120 gal at Location III. At Location II, 11 gal of nonfat are sold each day, and 40 gal of nonfat are sold each day at Location III.

115) _____

Write a 3 × 3 matrix that shows the sales figures for the three locations, with the rows representing the three locations. The incomes per gallon for soft–serve, chunky, and nonfat ice cream are $7, $4, and $7, respectively. Write a 3 × 1 matrix displaying the incomes. Find a matrix product that gives the daily income at each of the three locations.

A)
$$\begin{bmatrix} 850 \\ 530 \\ 1180 \end{bmatrix}$$

B)
$$\begin{bmatrix} 7 \\ 4 \\ 7 \end{bmatrix}$$

C)
$$\begin{bmatrix} 810 \\ 570 \\ 1180 \end{bmatrix}$$

D)
$$\begin{bmatrix} 833 \\ 1160 \\ 567 \end{bmatrix}$$

116) Mike's Bait Shop sells three types of lures: discount, normal, and professional. Location I sells 11 discount lures, 100 regular lures, and 30 professional lures each day. Location II sells 37 discount lures and Location III sells 60 discount lures each day. Daily sales of regular lures are 90 at Location II and 120 at Location III. At Location II, 21 expert lures are sold each day, and 40 expert lures are sold each day at Location III. Write a 3 × 3 matrix that shows the sales figures for the three locations, with the rows representing the three locations.

116) _____

A)
$$\begin{bmatrix} 11 & 100 & 30 \\ 21 & 37 & 90 \\ 60 & 120 & 40 \end{bmatrix}$$

B)
$$\begin{bmatrix} 100 & 11 & 30 \\ 37 & 90 & 21 \\ 60 & 120 & 40 \end{bmatrix}$$

C)
$$\begin{bmatrix} 11 & 100 & 30 \\ 37 & 90 & 21 \\ 60 & 120 & 40 \end{bmatrix}$$

D)
$$\begin{bmatrix} 11 & 100 & 21 \\ 37 & 90 & 30 \\ 60 & 120 & 40 \end{bmatrix}$$

117) Mike's Bait Shop sells three types of lures: discount, normal, and professional. Location I sells 36 discount lures, 100 regular lures, and 30 professional lures each day. Location II sells 20 discount lures and Location III sells 60 discount lures each day. Daily sales of regular lures are 90 at Location II and 120 at Location III. At Location II, 18 expert lures are sold each day, and 40 expert lures are sold each day at Location III.

Write a 3 × 3 matrix that shows the sales figures for the three locations, with the rows representing the three locations. The incomes per lure for discount, normal, and professional lures are $3, $9, and $14, respectively. Write a 3 × 1 matrix displaying the incomes. Find a matrix product that gives the daily income at each of the three locations.

A)
$$\begin{bmatrix} 1428 \\ 1980 \\ 812 \end{bmatrix}$$

B)
$$\begin{bmatrix} 1428 \\ 1122 \\ 1820 \end{bmatrix}$$

C)
$$\begin{bmatrix} 1320 \\ 2790 \\ 812 \end{bmatrix}$$

D)
$$\begin{bmatrix} 1428 \\ 2790 \\ 812 \end{bmatrix}$$

Le Boulangerie, a bakery, sells four main items: sweet rolls, bread, cakes, and pies. The amount of
each ingredient (in cups, except for eggs) required for these items is given by matrix A.

$$
\begin{array}{c}
\\
\text{Rolls (doz)} \\
\text{Bread (loaf)} \\
\text{Cake} \\
\text{Pie (crust)}
\end{array}
\begin{array}{ccccc}
\text{Eggs} & \text{Flour} & \text{Sugar} & \text{Shortening} & \text{Milk} \\
\left[\begin{array}{ccccc}
1 & 2 & \frac{1}{4} & \frac{1}{4} & 1 \\
3 & 1 & 0 & \frac{1}{4} & 0 \\
3 & 2 & 2 & 1 & 1 \\
4 & 3 & 0 & \frac{1}{3} & 0
\end{array}\right] = A
\end{array}
$$

The cost (in cents) for each ingredient when purchased in large lots or small lots is given in matrix B.

$$
\begin{array}{c}
\\
\text{Eggs} \\
\text{Flour} \\
\text{Sugar} \\
\text{Shortening} \\
\text{Milk}
\end{array}
\begin{array}{cc}
\overset{\text{Cost}}{\text{Large Lot} \quad \text{Small Lot}} \\
\left[\begin{array}{cc}
4 & 5 \\
7 & 10 \\
12 & 12 \\
15 & 16 \\
4 & 6
\end{array}\right] = B
\end{array}
$$

Use matrix multiplication to find a matrix giving the comparative cost per bakery item for the two purchase options.

A)
$$
\begin{bmatrix}
31.75 & 38 \\
0 & 0 \\
69 & 81 \\
0 & 0
\end{bmatrix}
$$

B)
$$
\begin{bmatrix}
29.75 & 38 \\
22.75 & 30 \\
68 & 81 \\
42 & 58.33
\end{bmatrix}
$$

C)
$$
\begin{bmatrix}
28.75 & 38 \\
22.75 & 29 \\
69 & 81 \\
42 & 55.33
\end{bmatrix}
$$

D) These matrices cannot be multiplied.

119) Le Boulangerie, a bakery, sells four main items: sweet rolls, bread, cakes, and pies. The amount of       119) _____
each ingredient (in cups, except for eggs) required for these items is given by matrix A.

$$
\begin{array}{c}
\phantom{x} \\
\begin{bmatrix} \text{Rolls} \\ \text{(doz)} \\ \text{Bread} \\ \text{(loaf)} \\ \text{Cake} \\ \text{Pie} \\ \text{(crust)} \end{bmatrix}
\end{array}
\begin{array}{ccccc}
\text{Eggs} & \text{Flour} & \text{Sugar} & \text{Shortening} & \text{Milk} \\
\end{array}
\begin{bmatrix}
2 & 2 & \dfrac{1}{4} & \dfrac{1}{4} & 1 \\[2mm]
3 & 3 & 0 & \dfrac{1}{4} & 0 \\[2mm]
3 & 4 & 2 & 1 & 1 \\[2mm]
3 & 1 & 0 & \dfrac{1}{3} & 0
\end{bmatrix} = A
$$

Suppose a day's orders consist of 20 dozen sweet rolls, 200 loaves of bread, 50 cakes, and 60 pies.
Write the orders as a 1 × 4 matrix and, using matrix multiplication, write as a matrix the amount of
each ingredient needed to fill the day's orders.

A) $\begin{bmatrix} 790 & 720 & 150 & 125 & 250 \end{bmatrix}$ 　　　　　　　B) $\begin{bmatrix} 970 & 846 & 135 & 125 & 70 \end{bmatrix}$

C) $\begin{bmatrix} 970 & 900 & 105 & 125 & 70 \end{bmatrix}$ 　　　　　　　D) These matrices cannot be multiplied.

120) Le Boulangerie, a bakery, sells four main items: sweet rolls, bread, cakes, and pies. The amount of each ingredient (in cups, except for eggs) required for these items is given by matrix A.

120) _____

$$
A = \begin{array}{c}
\text{Rolls (doz)} \\
\text{Bread (loaf)} \\
\text{Cake} \\
\text{Pie (crust)}
\end{array}
\begin{bmatrix}
1 & 1 & \frac{1}{4} & \frac{1}{4} & 1 \\
4 & 2 & 0 & \frac{1}{4} & 0 \\
1 & 4 & 2 & 1 & 1 \\
4 & 3 & 0 & \frac{1}{3} & 0
\end{bmatrix}
$$

with columns: Eggs, Flour, Sugar, Shortening, Milk

The cost (in cents) for each ingredient when purchased in large lots or small lots is given in matrix B.

Cost

$$
B = \begin{array}{c}
\text{Eggs} \\
\text{Flour} \\
\text{Sugar} \\
\text{Shortening} \\
\text{Milk}
\end{array}
\begin{bmatrix}
4 & 5 \\
7 & 10 \\
12 & 12 \\
15 & 16 \\
4 & 6
\end{bmatrix}
$$

with columns: Large Lot, Small Lot

Suppose a day's orders consist of 20 dozen sweet rolls, 200 loaves of bread, 50 cakes, and 60 pies. Use matrix multiplication to find a matrix giving the costs under the two purchase options to fill the day's orders.

A) $\begin{bmatrix} 15,645 & 17,230 \end{bmatrix}$　　　　B) $\begin{bmatrix} 13,455 & 17,230 \end{bmatrix}$

C) $\begin{bmatrix} 14,715 & 18,850 \end{bmatrix}$　　　　D) These matrices cannot be multiplied.

**Perform the given matrix operation.**

121) A company makes 3 types of cable. Cable A requires 3 black, 3 white, and 2 red wires. B requires 1 black, 2 white, and 1 red. C requires 2 black, 1 white, and 2 red. The company used 100 black, 110 white and 80 red wires. How many of each type of cable were made?

121) _____

A) 20 A; 93 B; 10 C　　　　　　　B) 10 A; 20 B; 20 C
C) 20 A; 20 B; 83 C　　　　　　　D) 20 A; 20 B; 10 C

122) A company makes 3 types of cable. Cable A requires 3 black, 3 white, and 2 red wires. B requires 1 black, 2 white, and 1 red. C requires 2 black, 1 white, and 2 red. The company used 95 black, 100 white and 85 red wires. How many of each type of cable were made?

122) _____

A) 10 A; 25 B; 20 C　　　B) 53 A; 25 B; 17 C　　　C) 10 A; 17 B; 20 C　　　D) 25 A; 10 B; 20 C

123) A bakery sells three types of cakes, each requiring the amount of ingredients shown.  123) \_\_\_\_\_

$$
\begin{array}{c}
\quad\quad \text{Cake I} \quad \text{Cake II} \quad \text{Cake III}
\end{array}
$$

|  | Cake I | Cake II | Cake III |
|---|---|---|---|
| flour | 2 | 4 | 2 |
| sugar | 2 | 1 | 2 |
| eggs | 2 | 1 | 3 |

To fill its orders for these cakes, the bakery used 72 cups of flour, 48 cups of sugar, and 63 eggs.
How many cakes of each type were made?
  A) 29 Cake I; 8 Cake II; 12 Cake III          B) 15 Cake I; 8 Cake II; 5 Cake III
  C) 7 Cake I; 8 Cake II; 15 Cake III          D) 5 Cake I; 8 Cake II; 15 Cake III

124) A basketball fieldhouse seats 15,000. Courtside seats sell for $8, endzone for $6, and balcony for $5.  124) \_\_\_\_\_
Total revenue for a sell-out is $86,000. If half the courtside and balcony and all the endzone seats
are sold, the total revenue is $49,000. How many of each type of seat are there in the fieldhouse?
  A) 4,000 courtside; 3,000 endzone; 8,000 balcony
  B) 3,200 courtside; 1,800 endzone; 10,000 balcony
  C) 2,000 courtside; 5,000 endzone; 8,000 balcony
  D) 3,000 courtside; 2,000 endzone; 10,000 balcony

125) A bookstore is having a sale. All books included in the sale have a colored sticker on them to  125) \_\_\_\_\_
indicate the sale price. There are green stickers, red stickers, and orange stickers. Bob, Sue, and Fred
each make purchases of books that are on sale. Each row of the table gives information about the
numbers of book purchases and the total cost of the purchase (before taxes).

| Person | Green | Red | Orange | Total Cost |
|---|---|---|---|---|
| Bob | 1 | 2 | 2 | $30.38 |
| Sue | 1 | 3 | 2 | $37.25 |
| Fred | 1 | 2 | 3 | $36.22 |

Use this information to set up a matrix equation of the form AX = B, which can be solved to
determine the price for each type of sale book. Solve this matrix equation to find the price of a book
with an orange sticker.

Use the fact that for $A = \begin{bmatrix} 1 & 2 & 2 \\ 1 & 3 & 2 \\ 1 & 2 & 3 \end{bmatrix}$, $A^{-1} = \begin{bmatrix} 5 & -2 & -2 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$.

  A) $6.31          B) $5.84          C) $5.73          D) $5.48

126) A bookstore is having a sale. All books included in the sale have a colored sticker on them to indicate the sale price. There are green stickers, red stickers, and orange stickers. Bob, Sue, and Fred each make purchases of books that are on sale. Each row of the table gives information about the numbers of book purchases and the total cost of the purchase (before taxes).

| Person | Green | Red | Orange | Total Cost |
|--------|-------|-----|--------|------------|
| Bob | 1 | 2 | 2 | $29.24 |
| Sue | 1 | 3 | 2 | $36.11 |
| Fred | 1 | 2 | 3 | $34.51 |

Use this information to set up a matrix equation of the form AX = B, which can be solved to determine the price for each type of sale book. Solve this matrix equation to find the price of a book with a red sticker.

Use the fact that for $A = \begin{bmatrix} 1 & 2 & 2 \\ 1 & 3 & 2 \\ 1 & 2 & 3 \end{bmatrix}$, $A^{-1} = \begin{bmatrix} 5 & -2 & -2 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$.

A) $6.99      B) $6.87      C) $6.50      D) $6.79

126) _____

127) A bookstore is having a sale. All books included in the sale have a colored sticker on them to indicate the sale price. There are green stickers, red stickers, and orange stickers. Bob, Sue, and Fred each make purchases of books that are on sale. Each row of the table gives information about the numbers of book purchases and the total cost of the purchase (before taxes).

| Person | Green | Red | Orange | Total Cost |
|--------|-------|-----|--------|------------|
| Bob | 1 | 2 | 2 | $28.86 |
| Sue | 1 | 3 | 2 | $35.73 |
| Fred | 1 | 2 | 3 | $33.94 |

Use this information to set up a matrix equation of the form AX = B, which can be solved to determine the price for each type of sale book. Solve this matrix equation to find the price of a book with a green sticker.

Use the fact that for $A = \begin{bmatrix} 1 & 2 & 2 \\ 1 & 3 & 2 \\ 1 & 2 & 3 \end{bmatrix}$, $A^{-1} = \begin{bmatrix} 5 & -2 & -2 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$.

A) $4.99      B) $4.89      C) $4.96      D) $4.91

127) _____

128) Matt bought 3 pounds of oranges and 2 pounds of apples and paid $3.90, before tax. Andy bought 4 pounds of oranges and 3 pounds of apples and paid $5.47, before tax. Use this information to set up a matrix equation of the form AX = B, which can be solved to determine the price per pound for oranges and apples. Solve this matrix equation to find the price per pound of apples.

Use the fact that for $A = \begin{bmatrix} 3 & 2 \\ 4 & 3 \end{bmatrix}$, $A^{-1} = \begin{bmatrix} 3 & -2 \\ -4 & 3 \end{bmatrix}$.

A) $0.81 per pound                    B) $0.78 per pound
C) $0.72 per pound                    D) $0.85 per pound

128) _____

129) Matt bought 3 pounds of oranges and 2 pounds of apples and paid $3.94, before tax. Andy bought 4 pounds of oranges and 3 pounds of apples and paid $5.53, before tax. Use this information to set up a matrix equation of the form AX = B, which can be solved to determine the price per pound for oranges and apples. Solve this matrix equation to find the price per pound of oranges.

129) _____

Use the fact that for $A = \begin{bmatrix} 3 & 2 \\ 4 & 3 \end{bmatrix}$, $A^{-1} = \begin{bmatrix} 3 & -2 \\ -4 & 3 \end{bmatrix}$.

A) $0.79 per pound
B) $0.72 per pound
C) $0.76 per pound
D) $0.74 per pound

**Solve the problem. Express your answer in scientific notation, rounding as needed.**

130) The national debt of a small country is $7,170,000,000 and the population is 2,881,000. What is the amount of debt per person?

130) _____

A) $2.49 \times 10^3$
B) $2.49 \times 10^6$
C) $2.49 \times 10^4$
D) $2.49 \times 10^2$

131) The earth is approximately 92,900,000 miles from the sun. If 1 mile = $1.61 \times 10^3$ m, what is the distance to the sun in meters?

131) _____

A) $1.50 \times 10^{11}$ m
B) $5.7 \times 10^{-10}$ m
C) $1.50 \times 10^{10}$ m
D) $5.7 \times 10^{10}$ m

132) The distance from the earth to the sun is 92,900,000 miles. How long would it take a rocket, traveling at $2.9 \times 10^3$ miles per hour, to reach the sun?

132) _____

A) $3.2 \times 10^4$ hr
B) $3.2 \times 10^5$ hr
C) $3.2 \times 10^3$ hr
D) $3.2 \times 10^2$ hr

133) If the speed of light is $3.00 \times 10^8$ m/sec, how long does it take light to travel $2.29 \times 10^{11}$ m, the distance from the sun to Mars?

133) _____

A) $7.6 \times 10^2$ sec
B) $7.6 \times 10^2$ min
C) 76 sec
D) $7.6 \times 10^3$ sec

134) A computer can do one calculation in $1.4 \times 10^{-7}$ seconds. How long would it take the computer to do a trillion ($10^{12}$) calculations?

134) _____

A) $1.4 \times 10^6$ sec
B) $1.4 \times 10^{12}$ sec
C) $1.4 \times 10^{-7}$ sec
D) $1.4 \times 10^5$ sec

135) Assume that the volume of the earth is $5 \times 10^{14}$ cubic meters and the volume of a bacterium is $2.5 \times 10^{-16}$ cubic meters. If the earth could be filled with bacteria, how many would it contain?

135) _____

A) $2.0 \times 10^{30}$ bacteria
B) $2.0 \times 10^{-30}$ bacteria
C) $5.0 \times 10^{31}$ bacteria
D) $5.0 \times 10^{-31}$ bacteria

**Answer the question.**

136) The function f(x) = 60x computes the number of minutes in x hours. The function g(x) = 24x computes the number of hours in x days. What is (f ∘ g)(x) and what does it compute?

136) _____

A) (f ∘ g)(x) = 1440x; it computes the number of minutes in x days.
B) (f ∘ g)(x) = 84x; it computes the number of minutes plus the number of days in x days.
C) (f ∘ g)(x) = $1440x^2$; it computes the number of minutes in x days.
D) (f ∘ g)(x) = 1440x; it computes the number of days in x minutes.

137) A balloon in the shape of a sphere is deflating. Given that t represents the time, in minutes, since it    137) _____
began losing air, the radius of the balloon (in cm) is r(t) = 15 – t. Let the equation $V(r) = \frac{4}{3}\pi r^3$
represent the volume of a sphere of radius r. Find and interpret (V ∘ r)(t).

A) $(V \circ r)(t) = \frac{4}{3}\pi(t - 15)^3$; this is the volume of the balloon (in cm$^3$) as a function of time (in
minutes).

B) $(V \circ r)(t) = \frac{4}{3}\pi(15 - t)^3$; this is the volume of the balloon (in cm$^3$) as a function of time (in
minutes).

C) $(V \circ r)(t) = \frac{4}{3}\pi(15 - t)^3$; this is the volume of the air lost by the balloon (in cm$^3$) as a function
of time (in minutes).

D) $(V \circ r)(t) = 15 - \frac{4}{3}\pi(15 - t)^3$; this is the volume of the air lost by the balloon (in cm$^3$) as a
function of time (in minutes).

**Solve the problem.**

138) A room has an area of 414 square feet. One dimension is 5 feet more than the other. Find the    138) _____
dimensions of the room.
    A) 20 feet, 25 feet     B) 23 feet, 28 feet     C) 18 feet, 23 feet     D) 13 feet, 18 feet

139) A triangular garden has an area of 96 square feet. Its height is 4 feet more than its base. Find the    139) _____
measure of the base.
    A) 8 feet     B) 16 feet     C) 24 feet     D) 12 feet

140) The printed matter on a 10 by 18 centimeter page of a book must cover 20 square centimeters. If all    140) _____
margins are to be the same width, how wide should they be?
    A) 2 cm     B) 5 cm     C) 8 cm     D) 4 cm

141) A rectangular garden is 12 feet by 5 feet. A gravel path of equal width is to be built around the    141) _____
garden. How wide can the path be if there is enough gravel for 138 square feet?
    A) 3 feet     B) 10 feet     C) 5 feet     D) 4 feet

142) A farmer has 220 meters of fencing and wants to enclose a rectangular area of 3000 square meters.    142) _____
What dimensions should he use?
    A) $\sqrt{3000}$ meters by $\sqrt{3000}$ meters     B) 60 meters by 50 meters
    C) 120 meters by 2 meters     D) 55 meters by 55 meters

143) A box with no top is to be constructed from a piece of cardboard whose width measures x cm and    143) _____
whose length measures 6 cm more than its width. The box is to be formed by cutting squares that
measure 3 cm on each side from the four corners, and then folding up the sides. If the volume of
the box will be 48 cm$^3$, what are the dimensions of the piece of cardboard?
    A) 20 cm by 14 cm     B) 23 cm by 17 cm     C) 14 cm by 8 cm     D) 32 cm by 17 cm

144) If an object is projected upward with an initial velocity of 48 ft per sec from a height h of 288 ft,    144) _____
then its height t sec after it is projected is defined by the equation h = –16t$^2$ + 48t + 288. How many
sec after it is projected will it hit the ground?
    A) 6 sec     B) 8 sec     C) 7 sec     D) 3 sec

1) D
2) D
3) C
4) C
5) A
6) B
7) B
8) D
9) A
10) C
11) A
12) A
13) B
14) B
15) D
16) C
17) D
18) B
19) D
20) A
21) D
22) B
23) B
24) C
25) A
26) D
27) C
28) D
29) B
30) A
31) D
32) C
33) C
34) A
35) C
36) C
37) D
38) A
39) B
40) D
41) B
42) C
43) D
44) A
45) A
46) B
47) A
48) B
49) A
50) B

51) C
52) D
53) D
54) B
55) A
56) A
57) D
58) C
59) D
60) D
61) A
62) C
63) B
64) B
65) B
66) D
67) B
68) C
69) B
70) D
71) C
72) A
73) B
74) C
75) C
76) In October 2006, the sales were about $48 thousand.
77) A
78) A
79) A
80) C
81) B
82) B
83) A
84) C
85) B
86) B
87) A
88) B
89) D
90) D
91) A
92) B
93) A
94) A
95) B
96) A
97) D
98) B
99) D
100) B

101) C
102) C
103) B
104) C
105) C
106) A
107) C
108) D
109) B
110) B
111) D
112) C
113) A
114) A
115) C
116) C
117) B
118) C
119) C
120) B
121) D
122) A
123) D
124) D
125) B
126) B
127) C
128) A
129) C
130) A
131) A
132) A
133) A
134) D
135) A
136) A
137) B
138) C
139) D
140) D
141) A
142) B
143) C
144) A