

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

Use inductive reasoning to predict the next line in the pattern.

1) $9 \times 9 = 81$ 1) _____

$99 \times 99 = 9801$

$999 \times 999 = 998,001$

A) $999 \times 9999 = 99,980,001$

B) $9999 \times 9999 = 999,001$

C) $9999 \times 9999 = 1,000,001$

D) $9999 \times 9999 = 99,980,001$

2) $(1 \times 9) - 5 = 4$ 2) _____

$(21 \times 9) - 5 = 184$

$(321 \times 9) - 5 = 2884$

A) $(4321 \times 9) - 5 = 3883$

B) $(432 \times 9) - 5 = 38,884$

C) $(4321 \times 9) - 5 = 38,884$

D) $(4321 \times 9) - 5 = 28,884$

3) $6 \times 8 = 7 \times 9 - 15$ 3) _____

$8 \times 10 = 9 \times 11 - 19$

A) $10 \times 12 = 11 \times 13 - 21$

B) $10 \times 12 = 13 \times 19 - 23$

C) $10 \times 12 = 11 \times 13 + 21$

D) $10 \times 12 = 11 \times 13 - 23$

4) $(7 \times 1) \times (2 \times 1) = 14$ 4) _____

$(7 \times 10) \times (2 \times 2) = 280$

$(7 \times 100) \times (2 \times 3) = 4200$

A) $(7 \times 1000) \times (2 \times 4) = 5600$

B) $(7 \times 1000) \times (2 \times 4) = 49,000$

C) $(7 \times 1000) \times (2 \times 4) = 63,000$

D) $(7 \times 1000) \times (2 \times 4) = 56,000$

5) $9 \times 10 = 11 \times 12 - (9 + 10 + 11 + 12)$ 5) _____

$10 \times 11 = 12 \times 13 - (10 + 11 + 12 + 13)$

A) $11 \times 12 = 13 \times 14 - (11 + 12 + 13 + 14)$

B) $12 \times 13 = 14 \times 15 - (11 + 10 + 9 + 8)$

C) $12 \times 13 = 14 \times 15 - (12 + 13 + 14 + 15)$

D) $11 \times 12 = 13 \times 14 - (9 + 10 + 11 + 12 + 13 + 14)$

6) $18 + 81 = 99$ 6) _____

$19 + 91 = 110$

A) $20 + 101 = 162$

B) $20 + 101 = 121$

C) $88 + 33 = 121$

D) $101 + 20 = 121$

7) $40 - 9 = 31$ 7) _____

$400 - 89 = 311$

$4000 - 789 = 3211$

A) $400,000 - 6789 = 33,211$

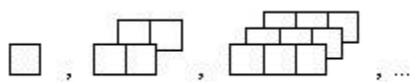
B) $4000 - 6789 = 33,211$

C) $40,000 - 6789 = 33,211$

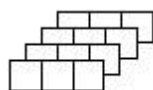
D) $40,000 - 6789 = 393,211$

Draw the next figure in the pattern.

8) 8) _____

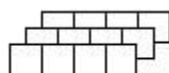


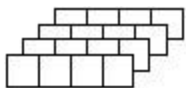
A)



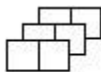
C)

B)





D)



9)



A)



B)



C)



D)



9) _____

10)



A)



C)



B)

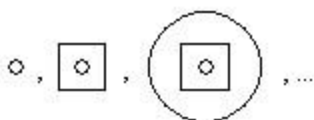


D)

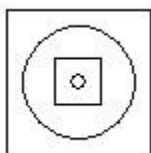


10) _____

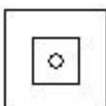
11)



A)



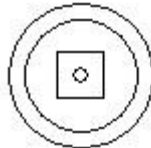
C)



B)

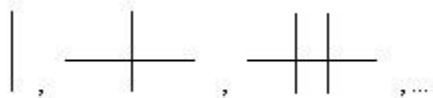


D)

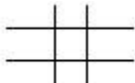


11) _____

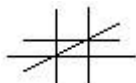
12)



A)



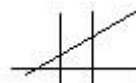
B)



C)

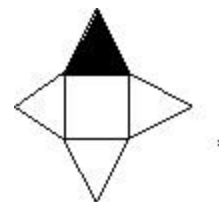


D)



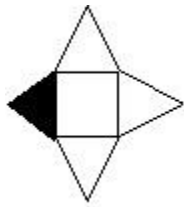
12) _____

13)

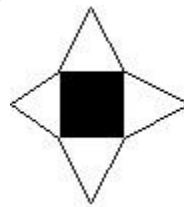


13)

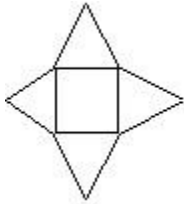
A)



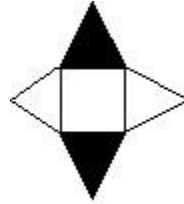
B)



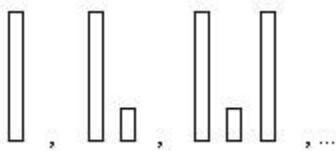
C)



D)



14)



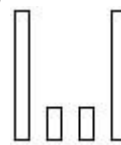
A)



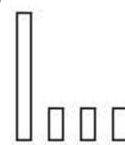
B)



C)



D)



14) _____

Use inductive reasoning to predict the next number in the sequence.

15) 2, 8, 14, 20, 26

A) 28

B) 31

C) 32

D) 38

15) _____

16) 27, 23, 19, 15, 11

A) 4

B) 2

C) 7

D) 0

16) _____

17) 6, -18, 54, -162, 486

A) 810

B) - 810

C) - 1458

D) 1458

17) _____

18) 0, 4, 4, 0, -4, ...

A) 8

B) 4

C) - 4

D) 0

18) _____

19) $1, -\frac{1}{3}, \frac{1}{9}, -\frac{1}{27}, \frac{1}{81}, \dots$

A) $\frac{1}{243}$

B) $\frac{1}{729}$

C) $\frac{1}{243}$

D) $\frac{1}{729}$

19) _____

20) 3, 5, 6, 10, 12, 20, ...

A) 18

B) 24

C) 30

D) 40

20) _____

Solve the problem using inductive reasoning.

21) Find the next term in the following sequence.

F, S, S, M, T

A) T

B) F

C) W

D) S

21) _____

22) Find the next term in the following sequence.

T, F, S, E, T, T, F

A) F

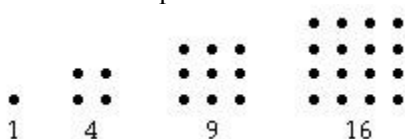
B) E

C) T

D) S

22) _____

23) Find the 4th square number that corresponds to the following dot sequence.



A) $s_4 = 10$

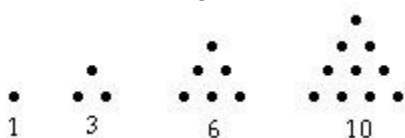
B) $s_4 = 25$

C) $s_4 = 16$

D) $s_4 = 8$

23) _____

24) Find the 4th triangular number that corresponds to the following dot sequence.



A) $t_4 = 6$

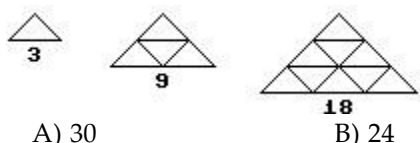
B) $t_4 = 20$

C) $t_4 = 8$

D) $t_4 = 10$

24) _____

25) How many line segments are used in the next figure?



A) 30

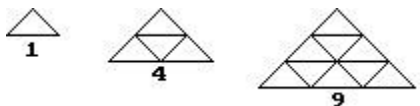
B) 24

C) 36

D) 27

25) _____

26) How many triangles are in the next figure?



A) 36

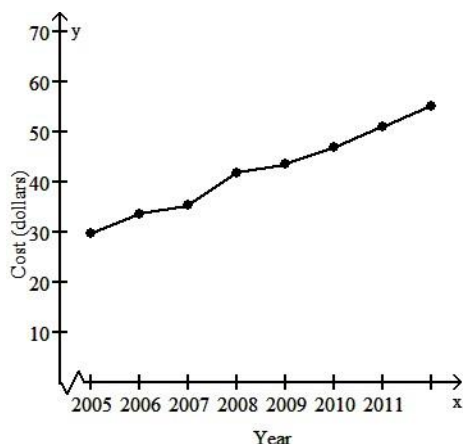
B) 12

C) 16

D) 18

26) _____

27) The following graph shows the average monthly cost for satellite television for each year from 2005 through 2012. Assuming the trend continues, use the graph to predict the average monthly cost for satellite TV in 2016.



A) \$55

B) \$59

C) \$62

D) \$66

27) _____

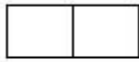
SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

28) How many rectangles are there in the last two figures?

28) _____



1 rectangle



3 rectangles



10 rectangles



36 rectangles

29) How many rectangles are there in the last two figures?

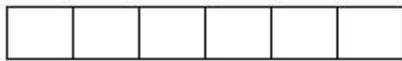
29) _____



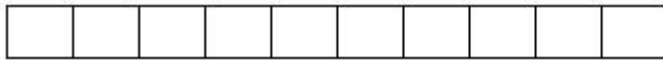
1 rectangle



3 rectangles



10 rectangles



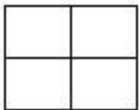
36 rectangles

30) In how many ways can you exactly cover the last two diagrams with "dominoes" that are just the size of two small squares?

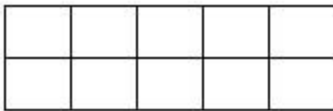
30) _____



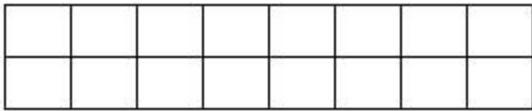
1 way



2 ways



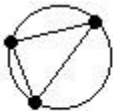
8 ways



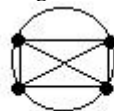
67 ways

31) How many line segments are determined by joining dots on the last two circles?

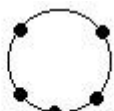
31) _____



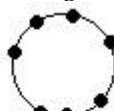
3 segments



10 segments



15 segments



21 segments

32) Find the number of games played in a round robin tournament for the given numbers of teams. In a round robin tournament every team plays every other team once.

Number of teams	Number of games
2 teams	1 game
3 teams	3 games
4 teams	6 games
5 teams	10 games
6 teams	15 games
7 teams	21 games
n teams	$\frac{n(n-1)}{2}$ games

teams. 32)

Find the
number
of games
played in
a round
robin
tournam
ent
involvin
g 16
teams.

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

Estimate the answer by rounding.

33) $98 + 37 + 66 + 62 + 18$

33) _____

A) 280

B) 281

C) 300

D) 290

34) $57 - 24$

34) _____

A) 40

B) 80

C) 30

D) 33

35) $948 + 809 + 649 + 352 + 105$

35) _____

A) 2800

B) 2900

C) 2860

D) 2863

36) $870 - 137$

36) _____

A) 1000

B) 733

C) 700

D) 800

37) $816 - 557$

37) _____

A) 300

B) 259

C) 200

D) 260

38) 122×6929

38) _____

A) 140,000

B) 1,200,000

C) 700,000

D) 600,000

39) $61,688 \div 484$

39) _____

A) 1100

B) 120

C) 1200

D) 110

40) $\frac{32,478}{476}$

40) _____

A) 50

B) 500

C) 60

D) 600

Estimate the answer to the problem.

41) Each gallon of shingle stain covers 120 square feet. How many gallons should you buy to cover 658 square feet?

41) _____

A) 6 gal

B) 4 gal

C) 5 gal

D) 7 gal

42) One cook can make enough food for 350 people a night. How many cooks are needed to feed 1239 people a night?

42) _____

A) 3 cooks

B) 6 cooks

C) 4 cooks

D) 5 cooks

43) David's company has to ship 1982 boxes of sprinklers. If a truck can hold 550 boxes, how many trucks does he need to ship all the boxes?

43) _____

A) 5 trucks

B) 2 trucks

C) 4 trucks

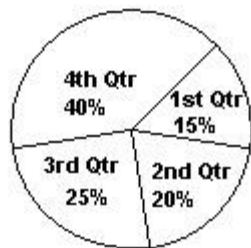
D) 3 trucks

- 44) A particular freight elevator can safely carry 1164 pounds. How many 120-pound bundles of wood can be safely carried by this elevator? 44) _____
 A) 5 bundles B) 7 bundles C) 8 bundles D) 9 bundles
- 45) Each gallon of porch and deck paint covers 200 square feet. How many gallons are needed to cover 961 square feet? 45) _____
 A) 4 gal B) 6 gal C) 5 gal D) 3 gal
- 46) Jane runs 1 2 miles a day. Without finding the exact answer, estimate the total number of miles Jane runs in 5 8 days. 46) _____
 A) 1200 mi B) 600 mi C) 500 mi D) 3000 mi
- 47) An appliance store sells 2 8 refrigerators a week. Without finding the exact amount, calculate the total amount of money the store makes in a week if each refrigerator costs \$8 4 6. 47) _____
 A) \$24,000 B) \$16,000 C) \$18,000 D) \$27,000
- 48) James' drive from home to work is 30.1 miles one way. If in a month he goes to work 22 days, then how many miles does he drive going from home to work and back in one month? 48) _____
 A) 1750 mi B) 1500 mi C) 900 mi D) 1200 mi
- 49) A mobile library has 893 books in its collection. If there are 19 shelves in the library, then how many books, on average, are stacked on each shelf? 49) _____
 A) 60 books B) 50 books C) 55 books D) 46 books
- 50) Ingred is planning a vacation to Colorado. Her round-trip airfare from Chicago, Illinois, to Denver, Colorado, totals \$153. Car rental is \$56 per day and her hotel is a total of \$113 per day, and she estimates a total of \$50 per day for food, gas, and miscellaneous items. If Ingred is planning on staying four full days and nights, estimate her total expenses. 50) _____
 A) \$370 B) \$1030 C) \$1280 D) \$1080

Estimate the answer from the table or graph.

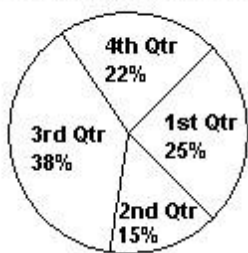
- 51) The profit earnings for ABC company are reported quarterly. The earnings as a percentage of the yearly earnings for 2012 are shown in the pie chart. If the total earnings for the year were \$410,000, what were the earnings for the third quarter? 51) _____

% Earnings of ABC Company



- A) \$164,000 B) \$205,000 C) \$102,500 D) \$82,000
- 52) The profit earnings for XYZ company are reported quarterly. The earnings as a percentage of the yearly earnings for 2012 are shown in the pie chart. If the earnings in the first quarter were \$58,000, what were the earnings for the whole year?

52) **% Earnings of XYZ Company**



- A) \$290,000 B) \$29,000 C) \$232,000 D) \$116,000

- 53) A retail store has items such that they fall under the categories of clothes, housewares, jewelry, and other. The percentage floor space allocated for displaying each category of items is shown in the pie chart. If the floor space allocated to clothes is 22,000 ft^2 , what is the floor space allocated to jewelry?

53) _____

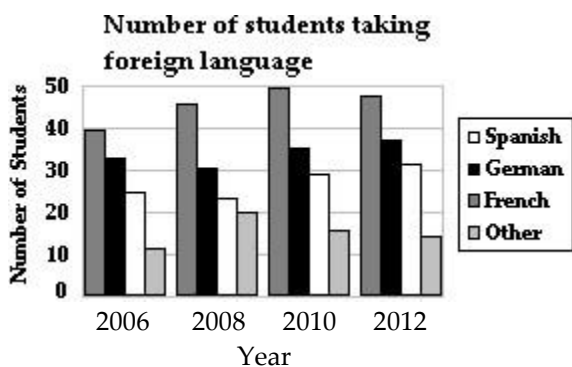
% Floor space



- A) 11,000 ft^2 B) 66,000 ft^2 C) 44,000 ft^2 D) 5500 ft^2

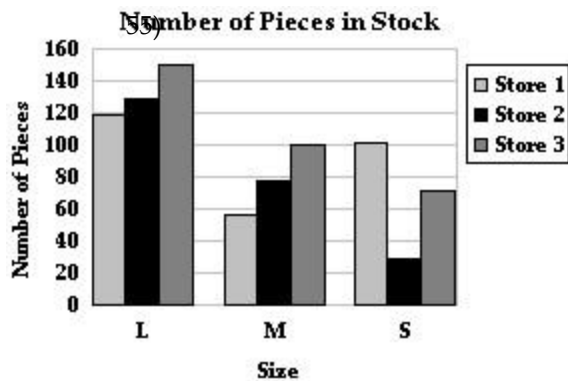
- 54) The number of students at Alder High School who studied foreign languages in different years is shown in the bar graph. What is the total number of students who studied a foreign language in 2012? (Assume no student studied two foreign languages).

54) _____



- A) 90 students B) 150 students C) 130 students D) 170 students

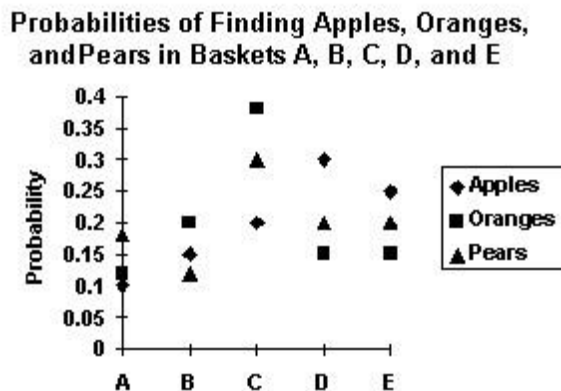
- 55) A retail chain has three stores that are carrying various sizes of a particular dress. The number of pieces of each size that a store has is shown in the graph below. If Store 1 sold 30 pieces of the large (L) size, how many does it still have?



- A) 120 pieces B) 1150 pieces C) 170 pieces D) 90 pieces

56) The probability of finding apples, oranges, and pears in each of baskets A, B, C, D, and E is shown in the graph given below. What is the probability of finding apples in one of the baskets A, B, or C?

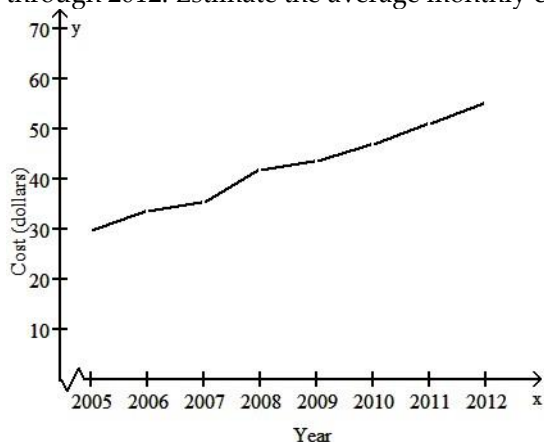
56) _____



- A) 0.45 B) 0.47 C) None D) 1

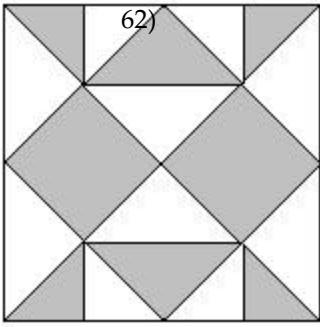
57) The graph shows the average monthly cost of a wireless phone service for the years 2005 through 2012. Estimate the average monthly cost of this wireless phone service in 2006.

57) _____



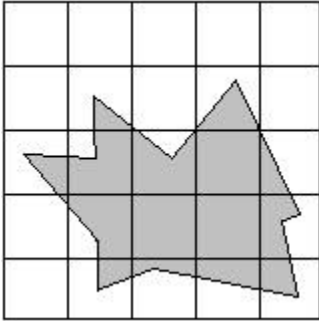
- A) \$44 B) \$34 C) \$37 D) \$31

58) The number of calories in different food items are given below. If Jeanne had a serving of salad and two slices of bread for lunch, what was her calorie intake?



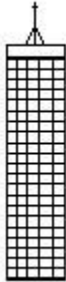
- A) 80% B) 40% C) 25% D) 50%

63) If each square represents one square unit, estimate the area of the shaded figure in square units. 63) _____



- A) 6 square units B) 7 square units C) 8 square units D) 10 square units

64) The height of the antenna on top of the building, shown in the figure below, is 75 feet. Estimate the total height of the building and antenna together. 64) _____



- A) 450 feet B) 525 feet C) 600 feet D) 375 feet

65) A small farm field is a square measuring 350 ft on a side. What is the perimeter of the field? If you double the length of each side of the field, what is the new perimeter? 65) _____

- A) 700 ft, 1400 ft B) 1400 ft, 2800 ft C) 700 ft, 2800 ft D) 350 ft, 1400 ft

66) An electric pole 12 ft high casts a shadow that is 6 ft long. What is the length of the shadow of a 20-ft pole? 66) _____

- A) 7 ft B) 10 ft C) 13 ft D) 2 ft

67) An airport parking lot charges \$4.50 for the first two hours of parking and \$1.00 for each additional half hour or part thereof. If Sam parks his car for 7 hours, how much does he pay for parking? 67) _____

- A) \$10.00 B) \$9.50 C) \$14.00 D) \$14.50

68) A telephone call from Texas, U.S.A. to Ontario, Canada costs \$1.50 for the first minute and \$0.50 for each additional minute. How much will a 25-minute call cost? 68) _____

- A) \$12.00 B) \$12.50 C) \$25.50 D) \$13.50

- 69) Jill took five courses this semester, each for four credit hours. She received a B (3 points), a B+ (3.5 points), an A (4 points), and a B+ (3.5 points) in four of the courses. If her GPA is 3.4, what was her grade in the fifth course? 69) _____
- A) B+ (3.5 points) B) D (1 point) C) B (3 points) D) C+ (2.5 points)

- 70) One gallon of a driveway sealant covers an area of 180 ft^2 . How many gallons of the sealant are needed to cover a 900 ft^2 driveway? 70) _____
- A) 2 gal B) 8 gal C) 5 gal D) 7 gal

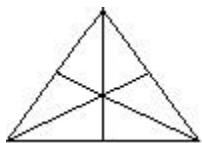
- 71) Margaret is saving \$21 every week so that she can have enough money to buy a bracelet she wants. The bracelet costs \$551. What is the minimum number of weeks she will have to save to be able to buy the bracelet? 71) _____
- A) 27 weeks B) 28 weeks C) 26 weeks D) 25 weeks

- 72) To make orange juice from concentrate powder, you need to mix 2.5 teaspoons of the concentrate in 16 ounces of water. How much concentrate powder do you need for 1 gallon of water? 72) _____
- A) 12.5 teaspoons B) 20 teaspoons C) 5 teaspoons D) 10 teaspoons

- 73) The cost of gasoline is \$4.40 per gallon. Jane's car gives a mileage of 35 miles per gallon. Approximately how much did Jane pay for gasoline for a trip of 491 miles? 73) _____
- A) \$57.20 B) \$61.73 C) \$79.20 D) \$70.40

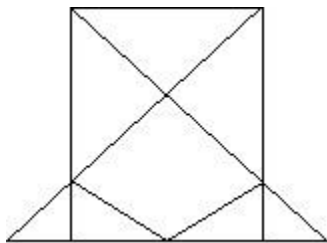
- 74) A rectangle has area of 2646 square meters. Its length and width are whole numbers. Which measurements give the smallest perimeter? 74) _____
- A) 1 m by 2646 m B) 6 m by 441 m C) 7 m by 378 m D) 42 m by 63 m

- 75) How many triangles (of any size) are there in the figure? 75) _____



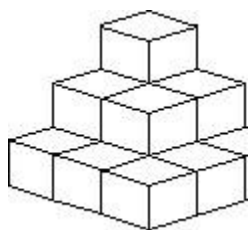
- A) 16 B) 13 C) 15 D) 19

- 76) How many triangles (of any size) are there in the figure? 76) _____



- A) 12 B) 10 C) 14 D) 9

- 77) How many cubes (of any size) are there in the figure?



77)

A) 15

B) 10

C) 9

D) 14

- 78) Missy and Adam work at different jobs. Missy earns \$7 per hour and Adam earns \$5 per hour. They each earn the same amount per week but Adam works 2 more hours. How many hours a week does Adam work?

A) 7 hr

B) 11 hr

C) 9 hr

D) 5 hr

- 79) A boxer takes 3 drinks of water between each round for the first four rounds of a championship fight. After the fourth round he starts to take his three drinks plus one additional drink between each of the remaining rounds. If he continues to increase his drinks by 1 after each round, how many drinks will he take between the 14th and 15th round?

A) 15 drinks

B) 14 drinks

C) 10 drinks

D) 19 drinks

- 80) An average library contains at least 50 and at most 250 books. How many library owners must be polled to be certain that at least two owners have the same number of books in their libraries?

A) 200 owners

B) 202 owners

C) 201 owners

D) 203 owners

- 81) An average newspaper contains at least 16 pages and at most 87 pages. How many newspapers must be collected to be certain that at least two newspapers have the same number of pages?

A) 72 newspapers

B) 71 newspapers

C) 70 newspapers

D) 73 newspapers

- 82) A cell has at least 3 and at most 47 nuclei. How many cells must a scientist view under his microscope to be certain that at least two cells have the same number of nuclei?

A) 45 cells

B) 44 cells

C) 46 cells

D) 47 cells

- 83) A yardstick measures $\frac{1}{2}$ by 2 by 36 inches. How many yardsticks will fit in a box 2 inches wide and 36 inches high, if the girth of the box is 24 inches?

A) 10 yardsticks

B) 40 yardsticks

C) 60 yardsticks

D) 48 yardsticks

- 84) A yardstick measures $\frac{1}{4}$ by 3 by 36 inches. How many yard sticks will fit in a box 3 inches wide and 36 inches high, if the girth of the box is 30 inches?

A) 24 yardsticks

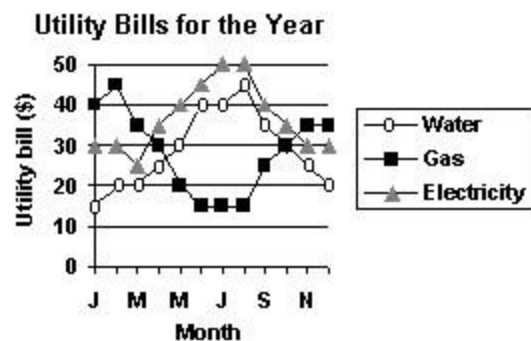
B) 120 yardsticks

C) 12 yardsticks

D) 96 yardsticks

Use the table or graph to answer the question.

- 85) Amy graphed her utility bills for the last year for her records. Estimate the total amount Amy paid for her utilities for the month of January.



A) \$125

B) \$105

C) \$75

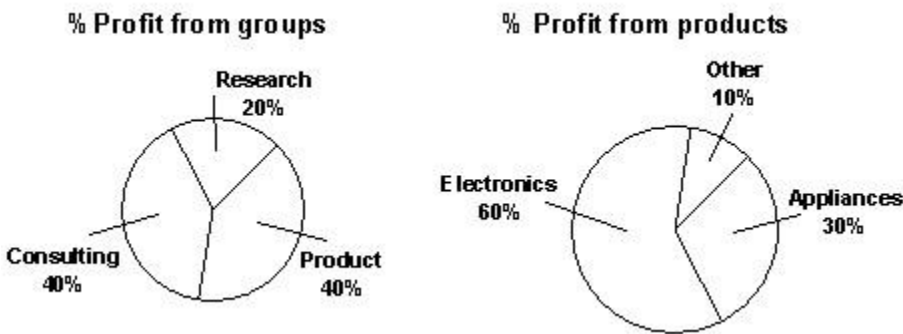
D) \$85

- 86) Company MRK declared profits of \$6,000,000 for the year 2012. The profits were from its three

gro ups

(research 86)

, product, and consulting) as shown in the pie chart. The profits from the product group were further categorized as shown in the second pie chart. How much was the profit from appliances?



- A) \$720,000
- B) \$1,800,000
- C) \$900,000
- D) \$1,200,000

87) A company decides the bonus it gives to its employees on the basis of the number of years of service as shown in the following table: 87) _____

Number of years of service	Bonus
1-3	5% of salary
3-8	8% of salary
8-15	13% of salary
15 or more	20% of salary

If Anne gets a bonus of \$4240 after working 4 years for this company, what is her salary?

A) \$42,400

B) \$10,600

C) \$26,500

D) \$53,000

- 88) The number of vacation days a company provides for its employees depends on the number of years of service as shown in the following table: 88) _____

Number of years of service	1	1-5	5-10	10 or more
Number of vacation days	4	10	12	20

If Jack took 15 vacation days last year, what is the minimum number of years he must have worked for the company?

A) 8

B) 10

C) 11

D) 9

- 89) The following chart shows an appliance store's average percent profit margin on certain items: 89) _____

Product category	Average profit margin, %
Washer/Dryer	17
Refrigerator	13
Stove	16
Microwave	40

What is the average profit for the store if it lists the price of a particular refrigerator at \$800?

A) \$320.00

B) \$104.00

C) \$92.04

D) \$640.00

Complete the magic (addition) square.

- 90) Use each number 13, 14, 15, 16, 17, 18, 19, 20, and 21 once. 90) _____

16		
15	17	
20	13	18

A)

16	19	14
15	17	21
20	13	18

B)

16	19	21
15	17	14
20	13	18

C)

16	21	14
15	17	19
20	13	18

D)

16	21	19
15	17	14
20	13	18

- 91) Use each number 12, 13, 14, 15, 16, 17, 18, 19, and 20 once. 91) _____

19		15
12	16	
	18	13

A)

19	14	15
12	16	20
17	18	13

B)

19	17	15
12	16	14
20	18	13

C)

19	14	15
12	16	17
20	18	13

D)

19	20	15
12	16	14
17	18	13

92) Use each number 22, 23, 24, 25, 26, 27, 28, 29, and 30 once.

92) _____

25		23
	26	28
	22	

A)

25	27	23
24	26	28
29	22	30

B)

25	29	23
24	26	28
27	22	30

C)

25	30	23
24	26	28
27	22	29

D)

25	30	23
24	26	28
29	22	27

93) Use each number 20, 21, 22, 23, 24, 25, 26, 27, and 28 once.

93) _____

	22	23
	24	28
		21

A)

25	22	23
20	24	28
27	26	21

B)

26	22	23
20	24	28
25	27	21

C)

27	22	23
20	24	28
25	26	21

D)

27	22	23
26	24	28
20	25	21

94) Use each number 26, 27, 28, 29, 30, 31, 32, 33, and 34 once.

94) _____

31		
	30	28
27	34	

A)

31	26	32
33	30	28
27	34	29

B)

31	29	32
33	30	28
27	34	26

C)

31	29	33
32	30	28
27	34	26

D)

31	26	33
32	30	28
27	34	29

95) Use each number 60, 61, 62, 63, 64, 65, 66, 67, and 68 once.

95) _____

61		65
		60
63	62	

A)

61	67	65
68	64	60
63	62	66

B)

61	66	65
68	64	60
63	62	67

C)

61	67	65
68	66	60
63	62	64

D)

61	66	65
67	64	60
63	62	68

- 1) D
- 2) C
- 3) D
- 4) D
- 5) A
- 6) B
- 7) C
- 8) C
- 9) D
- 10) A
- 11) A
- 12) A
- 13) A
- 14) B
- 15) C
- 16) C
- 17) C
- 18) C
- 19) C
- 20) B
- 21) C
- 22) D
- 23) C
- 24) D
- 25) A
- 26) C
- 27) D
- 28) $5 + 4 + 3 + 2 + 1 = 15$ rectangles
 $8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 36$ rectangles
- 29) $6 + 5 + 4 + 3 + 2 + 1 = 21$ rectangles
 $10 + 9 + 8 + 7 + 6 + 5 + 4 + 3 + 2 + 1 = 55$ rectangles
- 30) 8 ways
34 ways
- 31) $4 + 3 + 2 + 1 = 10$ segments
 $6 + 5 + 4 + 3 + 2 + 1 = 21$ segments
- 32) 6 teams: $5 + 4 + 3 + 2 + 1 = 15$ games
7 teams: $6 + 5 + 4 + 3 + 2 + 1 = 21$ games

$$\frac{n(n-1)}{2}$$
n teams : games
16 teams: 120 games
- 33) D
- 34) A
- 35) A
- 36) D
- 37) C
- 38) C
- 39) B
- 40) C
- 41) A
- 42) A
- 43) C

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- 44) D
- 45) C
- 46) B
- 47) A
- 48) D
- 49) B
- 50) B
- 51) C
- 52) C
- 53) A
- 54) C
- 55) D
- 56) A
- 57) B
- 58) A
- 59) D
- 60) B
- 61) A
- 62) D
- 63) C
- 64) B
- 65) B
- 66) B
- 67) D
- 68) D
- 69) C
- 70) C
- 71) A
- 72) B
- 73) B
- 74) D
- 75) A
- 76) C
- 77) A
- 78) A
- 79) B
- 80) B
- 81) D
- 82) C
- 83) D
- 84) B
- 85) D
- 86) A
- 87) D
- 88) B
- 89) B
- 90) C
- 91) A
- 92) D
- 93) C
- 94) D
- 95) B