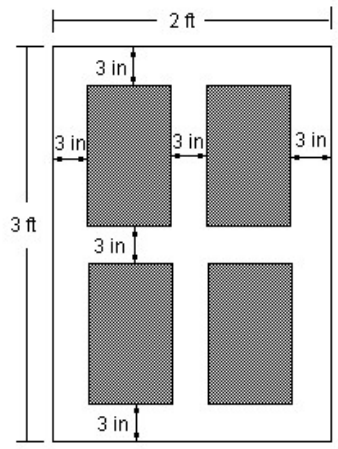
Section 31
25 Minutes 16 Questions

1. If x is 11 percent greater than 80, then x =

(A) 70.9
(B) 71.2
(C) 88.0
(D) 88.8
(E) 91.0

2. A certain car uses 12 gallons of gasoline in traveling 240 miles. In order for the car to travel the same distance using 10 gallons of gasoline, by how many miles per gallon must the car's gas mileage be increased?

(A) 2 (B) 4 (C) 6 (D) 8 (E) 10



3. The figure above represents a window, with the shaded regions representing the openings for the glass. If all line segments in the figure are either horizontal or vertical and the openings are all the same size, what are the dimensions, in inches, of each opening (1 foot = 12 inches)?

(A) 12.0 by 18.0
(B) 10.5 by 16.5
(C) 9.0 by 15.0
(D) 8.0 by 10.0
(E) 7.5 by 13.5

4. A farmer used 1,034 acres of land for beans, wheat, and corn in the ratio of 5 : 2 : 4, respectively. How many acres were used for corn?

(A) 188
(B) 258
(C) 376
(D) 470
(E) 517

5. If $2x^2 + 4x - 5 = x^2 + 2x + x^2 + 5$, then x^2 =

(A) 0
(B) 4
(C) 10
(D) 25
(E) 100

6. $\sqrt{80} + \sqrt{125}$ =

(A) $9\sqrt{5}$
(B) $20\sqrt{5}$
(C) $41\sqrt{5}$
(D) $\sqrt{205}$
(E) 100

7. A circle graph shows how the budget of a certain company was spent: 63 percent for salaries, 12 percent for research and development, 6 percent for utilities, 5 percent for equipment, 4 percent for supplies, and the remainder for transportation. If the area of each sector of the graph is proportional to the percent of the budget it represents, how many degrees of the circle are used to represent transportation?

(A) 10°
(B) 18°
(C) 36°
(D) 90°
(E) 324°

8. What is the area of a square with perimeter P?

(A) $16P^2$
(B) $4P$
(C) $\frac{P^2}{4}$

(D) $\frac{P}{16}$

(E) $\frac{P^2}{16}$

9. A certain ball was dropped from a window 8 meters above a sidewalk. On each bounce it rose straight up exactly one-half the distance of the previous fall. After the third bounce the ball was caught when it reached a height of exactly 1 meter above the sidewalk. How many meters did the ball travel in all?

(A) 21
(B) 19
(C) 17
(D) 15
(E) 13

10. A certain store sells all maps at one price and all books at another price. On Monday the store sold 12 maps and 10 books for a total of \$38.00, and on Tuesday the store sold 20 maps and 15 books for a total of \$60.00. At this store, how much less does a map sell for than a book?

(A) \$0.25
(B) \$0.50
(C) \$0.75
(D) \$1.00
(E) \$l.25

11. Which of the following procedures is always equivalent to adding 5 given numbers and then dividing the sum by 5 ?

I. Multiplying the 5 numbers and then finding the 5th root of the product.
II. Adding the 5 numbers, doubling the sum, and then moving the decimal point one place to the left.
III. Ordering the 5 numbers numerically and then selecting the middle number.

(A) None
(B) I only
(C) II only
(D) III only
(E) I and III

12. A certain company has records stored with a record-storage firm in 15-inch by 12-inch by 10-inch boxes. The boxes occupy 1.08 million cubic inches of space. If the company pays \$0.25 per box per month for record storage, what is the total amount that the company pays each month for record storage?

(A) \$150
(B) \$300
(C) \$600
(D) \$1,200
(E) \$2,400

13. If a 3-digit integer is selected at random from the integers 100 through 199, inclusive, what is the probability that the first digit and the last digit of the integer are each equal to one more than the middle digit?

(A) $\frac{2}{225}$
(B) $\frac{1}{111}$
(C) $\frac{1}{110}$
(D) $\frac{1}{100}$
(E) $\frac{1}{50}$

14. Mr. Kramer, the losing candidate in a two-candidate election, received 942,568 votes, which was exactly 40 percent of all the votes cast. Approximately what percent of the remaining votes would he need to have received in order to have won at least 50 percent of all the votes cast?

(A) 10%
(B) 12%
(C) 15%
(D) 17%
(E) 20%

15. Which of the following inequalities is equivalent to $-2 < x < 4$?

(A) $|x - 2| < 4$

(B) $|x-1|<3$
(C) $|x+1|<3$
(D) $|x+2|<4$
(E) None of the above

16. If the average (arithmetic mean) of 5 positive temperatures is x degrees Fahrenheit, then the sum of the 3 greatest of these temperatures, in degrees Fahrenheit, could be

(A) $6x$
(B) $4x$
(C) $\frac{5x}{3}$
(D) $\frac{3x}{2}$
(E) $\frac{3x}{5}$

Section 32
25 Minutes 16 Questions

1. A certain taxi fare consists of an initial charge of \$1.25 and an additional charge of \$0.25 for each $\frac{1}{5}$ mile traveled. What is the total fare for a trip of 2.4 miles?

(A) \$4.25
(B) \$3.00
(C) \$2.25
(D) \$1.85
(E) \$1.75

2. If $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$ for all numbers a, b, c, and d, then $\begin{vmatrix} 3 & 5 \\ -2 & 4 \end{vmatrix} =$

(A) –22
(B) –2
(C) 2
(D) 7
(E) 22

3. If the area of a square region having sides of length 6 centimeters is equal to the area of a rectangular region having width 2.5 centimeters, then the length of the rectangle, in centimeters, is

(A) 8.5
(B) 9.5
(C) 9.6
(D) 10.5
(E) 14.4

4. The total cost for Company X to produce a batch of tools is \$10,000 plus \$3 per tool. Each tool sells for \$8. The gross profit earned from producing and selling these tools is the total income from sales minus the total production cost. If a batch of 20,000 tools is produced and sold, then Company X's gross profit per tool is

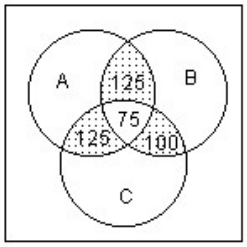
(A) \$3.00
(B) \$3.75
(C) \$4.50
(D) \$5.00
(E) \$5.50

5. Of the following, which is most nearly equal to $\sqrt{10}$?

(A) 3.1
(B) 3.2
(C) 3.3
(D) 3.4
(E) 3.5

6. Exactly $\frac{1}{3}$ of the children in a certain class are girls. If there are 18 boys in the class, how many girls are in the class?

(A) 6
(B) 9
(C) 12
(D) 24
(E) 27



Questions 7-8: refer to the following information

In a marketing survey for products *A, B*, and *C*, 1,000 people were asked which of the products, if any, they use. The three circular regions in the diagram above represent the numbers of people who use products *A, B,* and *C*, according to the survey results. Of the people surveyed, a total of 400 use *A*, a total of 400 use *B*, and a total of 450 use *C*.

7. How many of the people surveyed use exactly one of the products?

(A) 75
(B) 100
(C) 150
(D) 250
(E) 325

8. What percent of the people surveyed use product *A* or product *B* or both, but not product *C*?

(A) 12.5%
(B) 17.5%
(C) 30%
(D) 40%
(E) 60%

9. If $x=\frac{a}{2}+\frac{b}{2^3}+\frac{c}{2^4}$, where *a, b,* and *c* are each equal to 0 or 1, then *x* could be each of the following EXCEPT

(A) $\frac{1}{16}$
(B) $\frac{3}{16}$
(C) $\frac{5}{16}$
(D) $\frac{10}{16}$
(E) $\frac{11}{16}$

10. The equation $\frac{M+6}{36}=\frac{p-7}{21}$ relates two temperature scales, where *M* is the number of degrees on one scale and *P* is the number of degrees on the other scale. Which of the following equations can be used to convert temperatures from the *P* scale to the *M* scale?

(A) $M=\frac{7}{12}P+13$
(B) $M=\frac{7}{12}P+21$
(C) $M=\frac{7}{12}P-12$
(D) $M=\frac{7}{12}P-13$
(E) $M=\frac{7}{12}P-18$

11. If *x* is a positive number and $\frac{1}{2}$ the square root of *x* is equal to 2*x*, then *x* =

(A) $\frac{1}{16}$

(B) $\frac{1}{4}$
(C) $\frac{1}{2}$
(D) 2
(E) 8

Score	Number of Students
83	5
70	6
92	3
	5
64	1

12. The incomplete table above shows a distribution of scores for a class of 20 students. If the average (arithmetic mean) score for the class is 78, what score is missing from the table ?

(A) 73
(B) 75
(C) 77
(D) 79
(E) 81

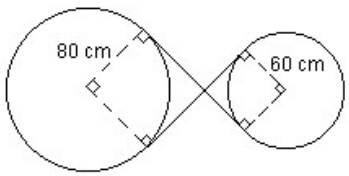
13. Carl drove from his home to the beach at an average speed of 80 kilometers per hour and returned home by the same route at an average speed of 70 kilometers per hour. If the trip home took $\frac{1}{2}$ hour longer than the trip to the beach, how many kilometers did Carl drive each way?

(A) 350
(B) 345
(C) 320
(D) 280
(E) 240

14. If $5x = 6y$ and $xy \neq 0$, what is the ratio of

$\frac{1}{5}x$ to $\frac{1}{6}y$?

(A) $\frac{25}{6}$
(B) $\frac{36}{25}$
(C) $\frac{6}{5}$
(D) $\frac{5}{6}$
(E) $\frac{25}{36}$



15. The figure above shows a cord around two circular disks. If the radii of the two disks are 80 centimeters and 60 centimeters, respectively, what is the total length, in centimeters, of the cord?

(A) 210 π
(B) 210 π + 280
(C) 280 π
(D) 280 π + 80
(E) 280 π + 280

16. If x, y, and z are positive integers and $3x = 4y = 7z$, then the least possible value of $x + y + z$ is

(A) 33
(B) 40
(C) 49
(D) 61
(E) 84

Section 33
25 Minutes 16 Questions

1. If p is an even integer and q is an odd integer, which of the following must be an odd integer?

(A) $\frac{p}{q}$
(B) pq
(C) $2p + q$
(D) $2(p + q)$
(E) $\frac{3p}{q}$

2. A certain college has a student-to-teacher ratio of 11 to 1. The average (arithmetic mean) annual salary for teachers is $26,000. If the college pays a total of $3,380,000 in annual salaries to its teachers, how many students does the college have ?

(A) 130
(B) 169
(C) 1,300
(D) 1,430
(E) 1,560

3. Last year if 97 percent of the revenues of a company came from domestic sources and the remaining revenues. totaling $450,000, came from foreign sources, what was the total of the company's revenues ?

(A) $ 1,350,000
(B) $ 1,500,000
(C) $ 4,500,000
(D) $ 15,000,000
(E) $ 150,000,000

4. Drum X is $\frac{1}{2}$ full of oil and drum Y, which has twice the capacity of drum X, is $\frac{2}{J}$ full of oil. If all of the oil in drum X is poured into drum Y. then drum Y will be filled to what fraction of its capacity ?

(A) $\frac{3}{4}$
(B) $\frac{5}{6}$
(C) $\frac{11}{12}$
(D) $\frac{7}{6}$
(E) $\frac{11}{6}$

5. In a certain population, there are 3 times as many people aged twenty-one or under as there are people over twenty-one. The ratio of those twenty-one or under to the total population is

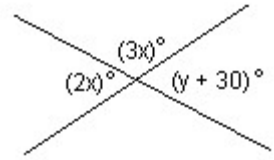
(A) 1 to 2
(B) 1 to 3
(C) 1 to 4
(D) 2 to 3
(E) 3 to 4

6. $\frac{2+2\sqrt{6}}{2} =$

(A) $\sqrt{6}$
(B) $2\sqrt{6}$
(C) $1+\sqrt{6}$
(D) $1+2\sqrt{6}$
(E) $2+\sqrt{6}$

7. A certain telescope increases the visual range at a particular location from 90 kilometers to 150 kilometers. By what percent is the visual range increased by using the telescope ?

(A) 30%
(B) $33\frac{1}{2}\%$
(C) 40%
(D) 60%
(E) $66\frac{2}{3}\%$



Note: Figure not drawn to scale.

8. In the figure above, the value of y is

(A) 6
(B) 12
(C) 24
(D) 36
(E) 42

9. A part-time employee whose hourly wage was increased by 25 percent decided to reduce the number of hours worked per week so that the employee's total weekly income would remain unchanged. By what percent should the number of hours worked be reduced?

(A) 12.5%
(B) 20%
(C) 25%
(D) 50%
(E) 75%

10. if $x > 0$, $\frac{x}{50}+\frac{x}{25}$ is what percent of x ?

(A) 6%
(B) 25%
(C) $37\frac{1}{2}$ %
(D) 60%
(E) 75%

11. If the operation $\otimes$ is defined for all a and b by the equation $a \otimes b = \frac{a^2 b}{3}$, then $2 \otimes (3 \otimes -1) =$

(A) 4
(B) 2
(C) $-\frac{4}{3}$
(D) -2
(E) -4

12. A factory that employs 1,000 assembly-line workers pays each of these workers \$5 per hour for the first 40 hours worked during a week and $1\frac{1}{2}$ time that rate for hours in excess of 40. What was the total payroll for the assembly-line workers for a week in which 30 percent of them worked 20 hours, 50 percent worked 40 hours, and the rest worked 50 hours?

(A) \$180,000
(B) \$185,000
(C) \$190,000
(D) \$200,000
(E) \$205,000

13. If $x \neq 2$, then $\frac{3x^2(x-2)-x+2}{x-2} =$

(A) $3x^2 - x + 2$
(B) $3x^2 + 1$
(C) $3x^2$
(D) $3x^2 - 1$
(E) $3x^2 - 2$

14. In a certain school, 40 more than $\frac{1}{3}$ of all the students are taking a science course and $\frac{1}{4}$ of those taking a science course are taking physics. If $\frac{1}{8}$ of all the students in the school are taking physics, how many students are in the school ?

(A) 240
(B) 300
(C) 480
(D) 720
(E)960

15. If $d > 0$ and $0 < 1 - \frac{c}{d} < 1$, which of the following must be true ?

I. $c > 0$
II. $\frac{c}{d} < 1$

III. $c^2 + d^2 > 1$

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

16. The inside dimensions of a rectangular wooden box are 6 inches by 8 inches by 10 inches. A cylindrical cannister is to be placed inside the box so that it stands upright when the closed box rests on one of its six faces. Of all such cannisters that could be used, what is the radius, in inches, of the one that has maximum volume?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 8

Section 34
25 Minutes 16 Questions

1. $\dfrac{\frac{1}{2}}{\frac{1}{4}+\frac{1}{6}} =$

(A) $\frac{6}{5}$
(B) $\frac{5}{6}$
(C) $\frac{5}{24}$
(D) $\frac{1}{5}$
(E) $\frac{1}{12}$

2. Kelly and Chris packed several boxes with books. If Chris packed 60 percent of the total number of boxes, what was the ratio of the number of boxes Kelly packed to the number of boxes Chris packed?

(A) 1 to 6
(B) 1 to 4
(C) 2 to 5
(D) 3 to 5
(E) 2 to 3

3. A train travels from New York City to Chicago, a distance of approximately 840 miles, at an average rate of 60 miles per hour and arrives in Chicago at 6:00 in the evening, Chicago time. At what hour in the morning, New York City time, did the train depart for Chicago ? (Note: Chicago time is one hour earlier than New York City time.)

(A) 4:00
(B) 5.00
(C) 6:00
(D) 7.00
(E) 8:00

4. Of the following, which is the closest approximation of $\dfrac{50.2 \times 0.49}{199.8}$?

(A) $\frac{1}{10}$
(B) $\frac{1}{8}$
(C) $\frac{1}{4}$
(D) $\frac{5}{4}$
(E) $\frac{25}{2}$

5. Last year Manfred received 26 paychecks. Each of his first 6 paychecks was \$750; each of his remaining paychecks was \$30 more than each of his first 6 paychecks. To the nearest dollar, what was the average (arithmetic mean) amount of his paychecks for the year ?

(A) \$752
(B) \$755
(C) \$765
(D) \$773
(E) \$775

6. A certain pair of used shoes can be repaired for \$12.50 and will last for 1 year. A pair of the same kind of shoes can be purchased new for \$28.00 and will last for 2 years. The average cost per year of the new shoes is what percent greater than the cost of repairing the used shoes?

(A) 3%
(B) 5%
(C) 12%
(D) 15%
(E) 24%

7. In a certain brick wall, each row of bricks above the bottom row contains one less brick than the row just below it. If there are 5 rows in all and a total of 75 bricks in the wall, how many bricks does the bottom row contain ?

(A) 14
(B) 15
(C) 16
(D) 17
(E) 18

8. If 25 percent of p is equal to 10 percent of q, and $pq \neq 0$, then p is what percent of q ?

(A) 2.5%
(B) 15%
(C) 20%
(D) 35%
(E) 40%

9. If the length of an edge of cube X is twice the length of an edge of cube Y, what is the ratio of the volume of cube Y to the volume of cube X ?

(A) $\frac{1}{2}$
(B) $\frac{1}{4}$
(C) $\frac{1}{6}$
(D) $\frac{1}{8}$
(E) $\frac{1}{11}$

10. $(\sqrt{2}+1)(\sqrt{2}-1)(\sqrt{3}+1)(\sqrt{3}-1) =$

(A) 2
(B) 3
(C) $2\sqrt{6}$
(D) 5
(E) 6

11. In a certain calculus class, the ratio of the number of mathematics majors to the number of students who are not mathematics majors is 2 to 5. If 2 more mathematics majors were to enter the class, the ratio would be 1 to 2. How many students are in the class?

(A) 10
(B) 12
(C) 21
(D) 28
(E) 35

12. Machines A and B always operate independently and at their respective constant rates. When working alone,

machine A can fill a production lot in 5 hours, and machine B can fill the same lot in x hours. When the two machines operate simultaneously to fill the production lot, it takes them 2 hours to complete the job. What is the value of x?

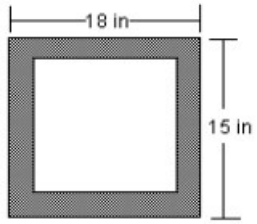
(A) $3\frac{1}{3}$
(B) 3
(C) $2\frac{1}{2}$
(D) $2\frac{1}{3}$
(E) $1\frac{1}{2}$

13. In the xy-coordinate system, if (a, b) and $(a + 3, b + k)$ are two points on the line defined by the equation $x = 3y - 7$, then k =

(A) 9
(B) 3
(C) $\frac{7}{3}$
(D) 1
(E) $\frac{1}{3}$

14. What is the units digit of $(13)^4 (17)^2 (29)^3$

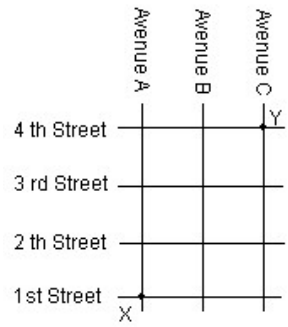
(A) 9 (B) 7 (C) 5 (D) 3 (E) 1



Note : Figure not drawn to scale.

15. The shaded region in the figure above represents a rectangular frame with length 18 inches and width 15 inches. The frame encloses a rectangular picture that has the same area as the frame itself. If the length and width of the picture have the same ratio as the length and width of the frame, what is the length of the picture, in inches?

(A) $9\sqrt{2}$
(B) $\frac{3}{2}$
(C) $\frac{9}{\sqrt{2}}$
(D) $15\left(1 - \frac{1}{\sqrt{2}}\right)$
(E) $\frac{9}{2}$



16. Pat will walk from intersection X to intersection Y along a route that is confined to the square grid of four streets and three avenues shown in the map above. How many routes from X to Y can Pat take that have the minimum possible length?

(A) 6
(B) 8
(C) 10
(D) 14
(E) 16

Section 35
25 Minutes 16 Questions

1. If $\frac{4}{5-\frac{a}{b}}=1$, which of the following must be true ?

(A) $a = 0$
(B) $b = 0$
(C) $a = 1$
(D) $b = 1$
(E) $a = b$

2. $y = kx + 3$

In the equation above, k is a constant. If $y = 17$ when $x = 2$, what is the value of y when $x = 4$?

(A) 34
(B) 31
(C) 14
(D) 11
(E) 7

3. In 1989 the price of a new model S car was x dollars. If the price of the model S car increased each year by 10 percent of the previous year's price, what was the price of the car, in dollars, in 1991 ?

(A) $1.10x$
(B) $1.20x$
(C) $1.21x$
(D) $1.25x$
(E) $1.33x$

4. If n is a prime number greater than 3, what is the remainder when n^2 is divided by 12?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 5

5. NOT SCORED

6. If a subscription for 10 issues of a magazine costs \$24.00 and represents a saving of 20 percent of the cover prices, what is the cover price per issue?

(A) \$1.98
(B) \$2.40
(C) \$2.80
(D) \$2.86
(E) \$3.00

7. Each edge of a cubical block of wood measures 2 inches. What is the surface area of the block in square inches ?

(A) 4
(B) 8
(C) 12
(D)16
(E)24

CREATE YOUR OWN SUNDAE
12 Ice Cream Flavors
10 Kinds of Candies
8 Liquid Toppings
5 Kinds of Nuts
With or Without Whipped Cream

8. If a customer makes exactly one selection from each of the five categories shown in the table above, what is the greatest possible number of different ice cream sundaes that a customer can create ?

(A) 9,600
(B) 4,800
(C) 2,400
(D) 800
(E) 400

9. The average (arithmetic mean) of 4 positive integers is 50. If the average of 2 of these integers is 45, what is the greatest possible value that one of the other 2 integers can have ?

(A) 55
(B) 65
(C) 100
(D) 109
(E) 115

10. Machine A working alone can complete a job in $3\frac{1}{2}$ hours. Machine B working

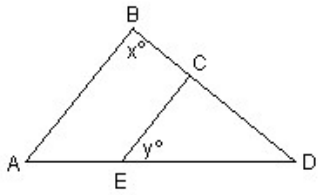
alone can do the same job in $4\frac{2}{3}$ hours.

How long will it take both machines working together at their respective constant rates to complete the job?

(A) 1 hr 10 min
(B) 2 hr
(C) 4 hr 5 min
(D) 7 hr
(E) 8 hr 10 min

11. What is the smallest positive integer n for which 324 is a factor of 6^n ?

(A) 2
(B) 3
(C) 4
(D) 5
(E) 6



Note: Figure not drawn to scale.

12. In the figure above, if *AB // CE, CE = DE,* and $y = 45$, then $x =$

(A) 45
(B) 60
(C) 67.5
(D) 112.5
(E) 135

From \ To	A	B	C	D	E	F
A		3	3	2	7	3
B	3		3	4	5	5
C	3	3		1	2	4
D	2	4	1		5	5
E	7	5	2	5		6
F	3	5	4	5	6	

13. The table above shows the cost, in dollars, of traveling to and from cities *A, B, C, D, E*, and *F*. *A* sales representative wants to leave from *A*, travel to *C, E*, and *F*, and return to *A*. If the first city that the sales representative travels to must be *E*, what is the minimum possible cost for the entire trip?

(A) $ 13
(B) $14
(C) $16
(D) $18
(E) $20

14. A retailer sold an appliance for 30 percent above cost, which represented a gross profit of $21.00. For what price did the retailer sell the appliance?

(A) $27.30,
(B) $51.00
(C) $63.00
(D) $70.00
(E) $91.00

15. How many integers between 324,700 and 458,600 have tens digit 1 and units digit 3?

(A) 10,300
(B) 10,030
(C) 1,353
(D) 1,352
(E) 1,339

16. A breakfast that consists of 1 ounce of corn puffs and 8 ounces of fruit *X* provides 257 calories. When 8 ounces of fruit *Y* is substituted for the 8 ounces of fruit *X*, the total number of calories is reduced to 185. If fruit *X* provides 1.8 times as many calories as fruit *Y*, how many calories does 8 ounces of fruit *Y* alone provide ?

(A) 11.25
(B) 72
(C) 90
(D) 95
(E) 129.6

Section 36
25 Minutes 16 Questions

1. Of the people who responded to a market survey, 120 preferred Brand *X* and the rest preferred Brand *Y*. If the respondents indicated a preference for Brand *X* over Brand *Y* by a ratio of 3 to 1, how many people responded to the survey ?

(A) 80
(B) 160
(C) 240
(D) 360
(E) 480

2. $(x+3y)^2 =$

(A) x^2+3y^2
(B) x^2+9y^2
(C) $x^2+3xy+3y^2$
(D) $x^2+3xy+9y^2$
(E) $x^2+6xy+9y^2$

3. At Company *K*, 15 percent of the employees are secretaries and 60 percent are salespeople. If there are 45 other employees of Company *K*, how many employees does Company *K* have?

(A) 160
(B) 180
(C) 190
(D) 200
(E) 400

4. $\dfrac{1}{1+\dfrac{1}{3}}-\dfrac{1}{1+\dfrac{1}{2}}=$

(A) $-\dfrac{1}{3}$
(B) $-\dfrac{1}{6}$
(C) $-\dfrac{1}{12}$
(D) $\dfrac{1}{12}$
(E) $\dfrac{1}{3}$

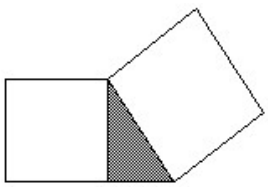
5. If x and y are negative integers, which of the following must be true?

I. $x - y < 0$
II. $\dfrac{x}{y} > y$
III. $x^2 > y$

(A) I only
(B) II only
(C) III only
(D) I and III
(E) II and III

6. A certain hotel has 1,400 single rooms and 420 double rooms. Each room is cleaned by one person. If one person can clean a single room every 15 minutes and a double room every 20 minutes, how many cleaning persons are needed to clean all the rooms if each person works for exactly 7 hours?

(A) 65
(B) 70
(C) 80
(D) 90
(E) 265



7. In the figure above, the two square regions have areas 16 and 25, respectively. What is the area of the shaded triangular region?

(A) 6
(B) 8
(C) 9
(D) 12
(E) 15

8. If the consumer price index for a sample of goods and services purchased in Dallas rose from 100 at the end of 1967 to *x* at

the end of 1985, what was the average (arithmetic mean) annual increase in the index over this period ?

(A) $\frac{x+100}{18}$

(B) $\frac{x}{18}$

(C) $\frac{100-x}{18}$

(D) $\frac{x-100}{18}$

(E) $\frac{100x}{18}$

9. At a certain instant in time, the number of cars, *N,* traveling on a portion of a certain highway can be estimated by the formula $N=\frac{20Ld}{600+s^2}$, where L is the number of lanes in the same direction, d is the length of the portion of the highway, in feet, and s is the average speed of the cars, in miles per hour. Based on the formula, what is the estimated number of cars traveling on a $\frac{1}{2}$ mile portion of the highway if the highway has 2 lanes in the same direction and the average speed of the cars is 40 miles per hour?

(5,280 feet =1 mile)

(A) 155
(B) 96
(C) 80
(D) 48
(E) 24

10. In how many different ways can 3 people be assigned to fill 3 different positions so that each person is assigned to exactly one position?

(A) Twelve
(B) Nine
(C) Six
(D) Three
(E) One

11. A point on the edge of a fan blade that is rotating in a plane is 10 centimeters from the center of the fan. What is the distance traveled, in centimeters, by this point in 15 seconds when the fan runs at the rate of 300 revolutions per minute ?

(A) 750 π
(B) 1,500 π
(C) 1,875 π
(D) 3,000 π
(E) 7,500 π

12. A 2-year certificate of deposit is purchased for k dollars. If the certificate earns interest at an annual rate of 6 percent compounded quarterly, which of the following represents the value, in dollars, of the certificate at the end of the 2 years ?

(A) $(1.06)^2k$
(B) $(1.06)^8k$
(C) $(1.015)^2k$
(D) $(1.015)^8k$
(E) $(1.03)^4k$

13. If the sum of the first n positive integers is S, what is the sum of the first n positive <u>even</u> integers, in terms of S ?

(A) $\frac{S}{2}$
(B) S
(C) $2S$
(D) $2S + 2$
(E) $4S$

14. If x and y are positive numbers and $z = xy^2$, a 50 percent increase in x and a 20 percent decrease in y would result in which of the following changes in z?

(A) A decrease of 4%
(B) A decrease of 14%
(C) An increase of 4%
(D) An increase of 20%
(E) An increase of 30%

15. If it is 6:27 in the evening on a certain day, what time in the morning was it exactly 2,880,717 minutes earlier? (Assume standard time in one location.)

(A) 6:22
(B) 6:24
(C) 6:27
(D) 6:30
(E) 6:32

16. If n is an integer, which of the following CANNOT be a factor of $3n + 4$?

(A) 4
(B) 5
(C) 6
(D) 7
(E) 8

Section 37
25 Minutes 16 Questions

1. A bakery opened yesterday with its daily supply of 40 dozen rolls. Half of the rolls were sold by noon, and 80 percent of the remaining rolls were sold between noon and closing time. How many dozen rolls had not been sold when the bakery closed yesterday ?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

2. What is the combined area, in square inches, of the front and back of a rectangular sheet of paper measuring $8\frac{1}{2}$ inches by 11 inches ?

(A) 38
(B) 44
(C) 88
(D) 176
(E) 187

3. 150 is what percent of 30 ?

(A) 5%
(B) 20%
(C) 50%
(D) 200%
(E) 500%

4. $\frac{7}{\frac{1}{5}}+\frac{5}{\frac{1}{7}}=$

(A) $\frac{35}{74}$
(B) $\frac{74}{35}$
(C) 35
(D) 70
(E) 74

5. From January 1, 1991, to January 1, 1993, the number of people enrolled in health maintenance organizations increased by

15 percent. The enrollment on January 1, 1993, was 45 million. How many million people, to the nearest million, were enrolled in health maintenance organizations on January 1, 1991 ?

(A) 38
(B) 39
(C) 40
(D) 41
(E) 42

6. If $\frac{p}{q} < 1$, and p and q are positive integers, which of the following must be greater than 1?

(A) $\sqrt{\frac{p}{q}}$
(B) $\frac{p}{q^2}$
(C) $\frac{p}{2q}$
(D) $\frac{q}{p^2}$
(E) $\frac{q}{p}$

7. If a 2-digit positive integer has its digits reversed, the resulting integer differs from the original by 27. By how much do the two digits differ?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 7

8. It would take one machine 4 hours to complete a large production order and another machine 3 hours to complete the same order. How many hours would it take both machines, working simultaneously at their respective constant rates, to complete the order ?

(A) $\frac{7}{12}$
(B) $1\frac{1}{2}$
(C) $1\frac{5}{7}$
(D) $3\frac{1}{2}$
(E) 7

9. R is the set of positive odd integers less than 50, and S is the set of the squares of the integers in R. How many elements does the intersection of R and S contain ?

(A) None
(B) Two
(C) Four
(D) Five
(E) Seven

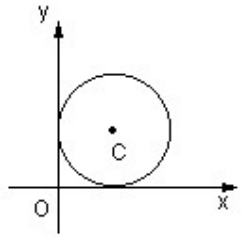
10. To mail a package, the rate is x cents for the first pound and y cents for each additional pound, where $x > y$. Two packages weighing 3 pounds and 5 pounds, respactively, can be mailed separately or combined as one package. Which method is cheaper, and how much money is saved ?

(A) Combined, with a saving of $x - y$ cents
(B) Combined, with a saving of $y - x$ cents
(C) Combined, with a saving of x cents
(D) Separately, with a saving of $x - y$ cents
(E) Separately, with a saving of y cents

11. If money is invested at r percent interest, com-pounded annually, the amount of the investment will double in approximately $\frac{70}{r}$ years. If Pat's parents invested $5,000 in a long-term bond that pays 8 percent interest, compounded annually, what will be the approximate total amount of the investment 18 years later, when Pat is ready for college ?

(A) $20,000
(B) $15,000
(C) $12,000
(D) $10,000

(E) \$9,000

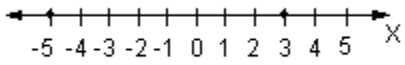


12. The circle with center C shown above is tangent to both axes. If the distance from O to C is equal to k, what is the radius of the circle, in terms of k ?

(A) k
(B) $\frac{k}{\sqrt{2}}$
(C) $\frac{k}{\sqrt{3}}$
(D) $\frac{k}{2}$
(E) $\frac{k}{3}$

13. On a recent trip, Cindy drove her car 290 miles, rounded to the nearest 10 miles, and used 12 gallons of gasoline, rounded to the nearest gallon. The actual number of miles per gallon that Cindy's car got on this trip must have been between

(A) $\frac{290}{12.5}$ and $\frac{290}{11.5}$
(B) $\frac{295}{12}$ and $\frac{285}{11.5}$
(C) $\frac{285}{12}$ and $\frac{295}{12}$
(D) $\frac{285}{12.5}$ and $\frac{295}{11.5}$
(E) $\frac{295}{12.5}$ and $\frac{285}{11.5}$



14. Which of the following inequalities is an algebraic expression for the shaded part of the number line above?

(A) $|x| \leq 3$
(B) $|x| \leq 5$
(C) $|x-2| \leq 3$
(D) $|x-1| \leq 4$
(E) $|x+1| \leq 4$

15. In an electric circuit, two resistors with resistances x and y are connected in parallel. In this case, if r is the combined resistance of these two resistors, then the reciprocal of r is equal to the sum of the reciprocals of x and y. What is r in terms of x and y ?

(A) xy
(B) $x + y$
(C) $\frac{1}{x+y}$
(D) $\frac{xy}{x+y}$
(E) $\frac{x+y}{xy}$

16. Xavier, Yvonne, and Zelda each try independently to solve a problem. If their individual probabilities for success are $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{5}{8}$, respectively, what is the probability that Xavier and Yvonne, but not Zelda, will solve the problem ?

(A) $\frac{11}{8}$
(B) $\frac{7}{8}$
(C) $\frac{9}{64}$
(D) $\frac{5}{64}$
(E) $\frac{3}{64}$

Section 38
25 Minutes 16 Questions

1. A retail appliance store priced a video recorder at 20 percent above the wholesale cost of $200. If a store employee applied the 10 percent employee discount to the retail price to buy the recorder, how much did the employee pay for the recorder?

(A) $198
(B) $216
(C) $220
(D) $230
(E) $240

2. The ratio 2 to $\frac{1}{3}$ is equal to the ratio

(A) 6 to 1
(B) 5 to 1
(C) 3 to 2
(D) 2 to 3
(E) 1 to 6

3. $y = 248 - 398x$

Which of the following values of x gives the greatest value of y in the equation above?

(A) 200
(B) 100
(C) 0.5
(D) 0
(E) -1

4. A factory has 500 workers, 15 percent of whom are women. If 50 additional workers are to be hired and all of the present workers remain, how many of the additional workers must be women in order to raise the percent of women employees to 20 percent?

(A) 3
(B) 10
(C) 25
(D) 30
(E) 35

5. If $\frac{1}{x} - \frac{1}{x+1} = \frac{1}{x+4}$, then x could be

(A) 0
(B) –1
(C) –2
(D)-3
(E) -4

6. In a small snack shop, the average (arithmetic mean) revenue was $400 per day over a 10-day period. During this period, if the average daily revenue was $360 for the first 6 days, what was the average daily revenue for the last 4 days?

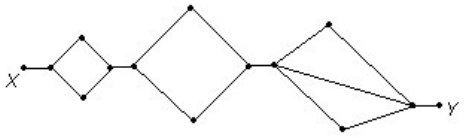
(A) $420
(B) $440
(C) $450
(D) $460
(E) $480

7. A certain country had a total annual expenditure of $\$1.2\times10^{12}$ last year. If the population of the country was 240 million last year, what was the per capita expenditure ?

(A) $500
(B) $1,000
(C) $2,000
(D) $3,000
(E) $5,000

8. A certain rectangular window is twice as long as it is wide. If its perimeter is 10 feet, then its dimensions in feet are

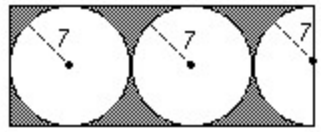
(A) $\frac{3}{2}$ by $\frac{7}{2}$
(B) $\frac{5}{3}$ by $\frac{10}{3}$
(C) 2 by 4
(D) 3 by 6
(E) $\frac{10}{3}$ by $\frac{20}{3}$



9. The diagram above shows the various paths along which a mouse can travel from point X, where it is released, to point

Y. where it is rewarded with a food pellet. How many different paths from *X* to *Y* can the mouse take if it goes directly from *X* to *Y* without retracing any point along a path?

(A) 6
(B) 7
(C) 12
(D) 14
(E) 17



10. The rectangular region above contains two circles and a semicircle, each with a radius of 7. If $\frac{22}{7}$ is used as an approximation for π, then the area of the shaded region is approximately

(A) 105
(B) 210
(C) 380
(D) 385
(E) 405

11. If the operation $\odot$ is defined by $x \odot y = \sqrt{xy}$ for all positive numbers x and y, then $(5 \odot 45) \odot 60 =$

(A) 30
(B) 60
(C) 90
(D) $30\sqrt{15}$
(E) $60\sqrt{15}$

12. A bar over a sequence of digits in a decimal indicates that the sequence repeats indefinitely. What is the value of $(10^4 - 10^2)(0.00\overline{12})$?

(A) 0
(B) $0.\overline{12}$
(C) 1.2
(D) 10
(E) 12

13. At a loading dock, each worker on the night crew loaded $\frac{3}{4}$ as many boxes as each worker on the day crew. If the night crew has $\frac{4}{5}$ as many workers as the day crew, what fraction of all the boxes loaded by the two crews did the day crew load?

(A) $\frac{1}{2}$
(B) $\frac{2}{5}$
(C) $\frac{3}{5}$
(D) $\frac{4}{5}$
(E) $\frac{5}{8}$

14. $\left(\frac{1}{2}\right)^{-3}\left(\frac{1}{4}\right)^{-2}\left(\frac{1}{16}\right)^{-1} =$

(A) $\left(\frac{1}{2}\right)^{-18}$
(B) $\left(\frac{1}{2}\right)^{-11}$
(C) $\left(\frac{1}{2}\right)^{-6}$
(D) $\left(\frac{1}{8}\right)^{-11}$
(E) $\left(\frac{1}{8}\right)^{-6}$

15. In a certain game, a large container is filled with red, yellow, green, and blue beads worth, respectively, 7, 5, 3, and 2 points each. A number of beads are then removed from the container. If the product of the point values of the removed beads is 147,000, how many red beads were removed?

(A) 5

(B) 4
(C) 3
(D) 2
(E) 0

16. Seed mixture *X* is 40 percent ryegrass and 60 percent bluegrass by weight; seed mixture *Y* is 25 percent ryegrass and 75 percent fescue. If a mixture of *X* and *Y* contains 30 percent ryegrass, what percent of the weight of this mixture is *X*?

(A) 10%
(B) $33\frac{1}{3}\%$
(C) 40%
(D) 50%
(E) $66\frac{2}{3}\%$

Section 39
25 Minutes 16 Questions

1. $\sqrt{784} =$

(A) 28
(B) 32
(C) 38
(D) 56
(E) 112

2. A total of *x* tourists were transported by bus to a certain museum. If there were *y* tourists on each bus, which of the following expresses the number of buses used?

(A) xy
(B) $\frac{x}{y}$
(C) $\frac{y}{x}$
(D) $x - y$
(E) y^x

3. If *n* is an integer, which of the following must be even ?

(A) $n + 1$
(B) $n + 2$
(C) $2n$
(D) $2n + 1$
(E) n^2

4. $\frac{1}{0.75-1} =$

(A) -4
(B) -0.25
(C) 0.25
(D) 0.75
(E) 4

5. Sixty percent of the members of a study group are women, and 45 percent of those women are lawyers. If one member of the study group is to be selected at random, what is the probability that the member selected is a woman lawyer?

(A) 0.10
(B) 0.15
(C) 0.27

(D) 0.33
(E) 0.45

6. The dimensions of a rectangular floor are 16 feet by 20 feet. When a rectangular rug is placed on the floor, a strip of floor 3 feet wide is exposed on all sides. What are the dimensions of the rug, in feet?

(A) 10 by 14
(B) 10 by 17
(C) 13 by 14
(D) 13 by 17
(E) 14 by 16

7. Harry started a 6-mile hike with a full 10-cup canteen of water and finished the hike in 2 hours with 1 cup of water remaining in the canteen. If the canteen leaked at the rate of 1 cup per hour and Harry drank 3 cups of water during the last mile, how many cups did he drink per mile during the first 5 miles of the hike?

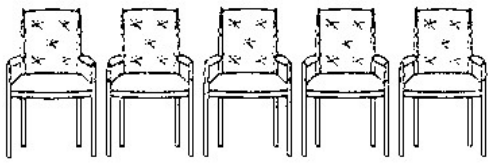
(A) $\frac{4}{5}$
(B) $\frac{5}{6}$
(C) 1
(D) $\frac{6}{5}$
(E) $\frac{5}{4}$

8. The original retail price of an appliance was 60 percent more than its wholesale cost. If the appliance was actually sold for 20 percent less than the original retail price, then it was sold for what percent more than its wholesale cost?

(A) 20%
(B) 28%
(C) 36%
(D) 40%
(E) 42%

9. If y is an integer, then the least possible value of $|23 - 5y|$ is

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5



10. The president of a country and 4 other dignitaries are scheduled to sit in a row on the 5 chairs represented above. If the president must sit in the center chair, how many different seating arrangements are possible for the 5 people?

(A) 4
(B) 5
(C) 20
(D) 24
(E) 120

11. If the sum of two positive integers is 24 and the difference of their squares is 48, what is the product of the two integers?

(A) 108
(B) 119
(C) 128
(D) 135
(E) 143

12. The volume of a sphere with radius r is $\frac{4}{3}\pi r^3$ and the surface area is $4\pi r^2$. If a spherical balloon has a volume of 972π cubic centimeters, what is the surface area of the balloon in square centimeters?

(A) 324
(B) 729
(C) 243 π
(D) 324 π
(E) 729 π

13. On a certain scale of intensity, each increment of 10 in magnitude represents a tenfold increase in intensity. On this scale, an intensity corresponding to a magnitude of 165 is how many times an intensity corresponding to a magnitude of 125?

(A) 40
(B) 100

(C) 400
(D) 1,000
(E) 10,000

14. If the perimeter of square region S and the perimeter of circular region C are equal, then the ratio of the area of S to the area of C is closest to

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

15. On a Saturday night, each of the rooms at a certain motel was rented for either $40 or $60. If 10 of the rooms that were rented for $60 had instead been rented for $40, then the total rent the motel charged for that night would have been reduced by 25 percent. What was the total rent the motel actually charged for that night ?

(A) $600
(B) $800
(C) $1,000
(D) $1,600
(E) $2,400

16. If n and k are integers whose product is 400, which of the following statements must be true?

(A) $n + k > 0$
(B) $n \neq k$
(C) Either n or k is a multiple of 10.
(D) If n is even, then k is odd.
(E) If n is odd , then k is even.

Section 40
25 Minutes 16 Questions

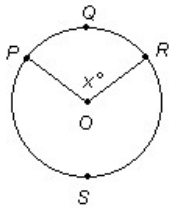
1. If x is negative, which of the following must be positive ?

I. x^2
II. $(-1)\,x$
III. $\frac{1}{x}$

(A) I only
(B) I and II only
(C) I and III only
(D) II and III only
(E) I, II, and III

2. The employees of Smith Enterprises received wage increases ranging from 30 cents to $87\frac{1}{2}$ cents per hour. What was the maximum wage increase for a 40-hour week?

(A) $12.00
(B) $23.00
(C) $34.80
(D) $35.00
(E) $35.20



3. If O is the center of the circle above and the length of arc RSP is twice the length of arc PQR, then x equals

(A) 60
(B) 100
(C) 120
(D) 150
(E) 240

4. The sum of 3 hours 45 minutes and 2 hours 55 minutes is approximately what percent of a day ?

(A) 14%

(B) 16%
(C) 24%
(D) 28%
(E) 72%

5. A salesman makes a 20 percent commission on the selling price of each set of encyclopedias he sells. If he sells 12 identical sets of encyclopedias and makes $1,800 in commissions, what is the selling price of each set?

(A) $300
(B) $600
(C) $750
(D) $900
(E) $1,080

6. If $x < 12$, then it must be true that

(A) $-x < -12$
(B) $-x - 2 < 14$
(C) $-x + 2 < -10$
(D) $x + 2 < 10$
(E) $x - 2 < 11$

7. The 10 households on a certain street have household incomes that range from $34,000 to $150,000 and an average (arithmetic mean) household income of $60,000. If the household with the highest income and the one with the lowest income are excluded, what is the average household income for the remaining 8 households?

(A) $41,600
(B) $47,000
(C) $52,000
(D) $61,000
(E) $75,000

8. If $x = y + 4$ and $x = 20 - y$, then $x^2 - y^2 =$

(A) 16
(B) 80
(C) 144
(D) 256
(E) 384

9. On level farmland, two runners leave at the same time from the intersection of two country roads. One runner jogs due north at a constant rate of 8 miles per hour while the second runner jogs due east at a constant rate that is 4 miles per hour faster than the first runner's rate. How far apart, to the nearest mile, will they be after $\frac{1}{2}$ hour ?

(A) 6
(B) 7
(C) 8
(D) 12
(E) 14

10. A square playground has the same area as a rectangular playground that is 30 meters longer but 20 meters narrower. What is the length, in meters, of a side of the square playground?

(A) $10\sqrt{5}$
(B) $10\sqrt{6}$
(C) 25
(D) 50
(E) 60

11. The price of a dress was first discounted by a certain percent and later by 25 percent of the discounted price. If these two discounts are equivalent to a single discount of 40 percent of the original price, what was the first discount ?

(A) 10%
(B) 15%
(C) 20%
(D) 30%
(E) 65%

12. If it is assumed that each of the n production workers in a factory assembles one instrument every t minutes, how many instruments does the factory assemble in 7.5 hours of production?

(A) $\frac{450n}{t}$
(B) $\frac{450t}{n}$
(C) $450nt$

(D) $\frac{7.5tn}{60}$

(E) $\frac{7.5n}{60t}$

13. What is the difference between the sixth and the fifth terms of the sequence 2, 4, 7, ... whose nth term is $n + 2^{n-1}$?

(A) 2
(B) 3
(C) 6
(D) 16
(E) 17

14. Which of the following could be the sum of the reciprocals of two different prime numbers?

(A) $\frac{7}{13}$

(B) $\frac{10}{21}$

(C) $\frac{11}{30}$

(D) $\frac{23}{50}$

(E) $\frac{19}{77}$

15. The rear wheels of a car crossed a certain line 0.5 second after the front wheels crossed the same line. If the centers of the front and rear wheels are 20 feet apart and the car traveled in a straight line at a constant speed, which of the following gives the speed of the car in miles per hour? (5,280 feet = 1 mile)

(A) $\left(\frac{20}{5{,}280}\right)\left(\frac{60^2}{0.5}\right)$

(B) $\left(\frac{20}{5{,}280}\right)\left(\frac{60}{0.5}\right)$

(C) $\left(\frac{20}{5{,}280}\right)\left(\frac{0.5}{60^2}\right)$

(D) $\frac{(20)(5{,}280)}{(60^2)(0.5)}$

(E) $\frac{(20)(5{,}280)}{(60)(0.5)}$

16. Working alone, a small pump takes twice as long as a large pump takes to fill an empty tank. Working together at their respective constant rates, the pumps can fill the tank in 6 hours. How many hours would it take the small pump to fill the tank working alone ?

(A) 8
(B) 9
(C) 12
(D) 15
(E) 18

Section 41
25 Minutes 16 Questions

1. A study based on a random sample revealed that, on average, 2 out of 5 adults have high blood pressure. If these results hold true for the 580,000 adults in City *A*, approximately how many adults in City *A* have high blood pressure ?

(A) 116,000
(B) 145,000
(C) 232,000
(D) 250,000
(E) 290,000

2. The sum $\frac{7}{8}+\frac{1}{9}$ is between

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

3. A certain state legislature consists of 124 members, each of whom is either a Democrat or a Republican. If there are 18 more Republicans than Democrats, how many Republicans are in the legislature ?

(A) 44
(B) 53
(C) 71
(D) 80
(E) 106

4. A certain psychologist charges \$30 more for the first hour of therapy than for each additional hour. If the total charge to a patient who receives 6 hours of therapy is \$300, what is the total charge to a patient who receives only 3 hours of therapy ?

(A) \$120
(B) \$135
(C) \$150
(D) \$165
(E) \$192

5. If $x + y = 1$ and $x - y = -1$, what is the value of xy?

(A) -2
(B) -1
(C) 0
(D) 1
(E) 2

6. NOT SCORED

7. If $(x^2+6x+9)+6(x+3)+9=0$, then $x =$

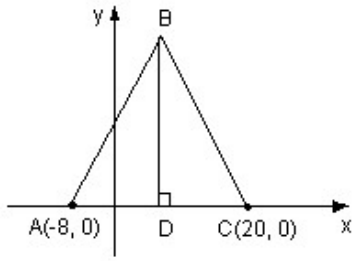
(A) -6 (B) -3 (C) 0 (D) 3 (E) 6

8. In 1982 and 1983, Company *B*'s operating expenses were \$12.0 million and \$14.0 million, respectively, and its revenues were \$15.6 million and \$18.8 million, respectively. What was the percent increase in Company *B*'s profit (revenues minus operating expenses) from 1982 to 1983 ?

(A) 3%
(B) $16\frac{2}{3}$ %
(C) 25%
(D) $33\frac{1}{3}$%
(E) 60%

9. If *a* and *b* are integers and $b \neq 0$, which of the following CANNOT equal 0 ?

(A) ab
(B) $a - b$
(C) $a + b$
(D) $ab - b^2$
(E) $a^2 + b^2$



AB = BC
AC = BD

10. What are the coordinates of point *B* in the *xy*-plane above ?

(A) (6, 12)
(B) (6, 28)
(C) (8, 20)
(D) (12, 20)
(E) (14, 28)

11. Last year 31 percent of Ace Book Company's sales revenue came from the sale of novels. Of the remaining revenue, $\frac{1}{3}$ was from the sale of biographies. The company's revenue from the sale of novels was approximately how many times its revenue from the sale of biographies?

(A) 1.3
(B) 1.5
(C) 2.1
(D) 2.5
(E) 3.1

12. Three musical tones have frequencies *x, y,* and *z*, respectively. If *x, y,* and *z* are positive, $\frac{x}{y} = \frac{y}{z}$, and $2x = z$, what is *y* in terms of *x* ?

(A) 2
(B) $(\sqrt{2})x$
(C) $\frac{1}{\sqrt{2}}x$
(D) $\frac{1}{2}x$
(E) $\frac{\sqrt{2}}{3}x$

LEAGUE RESULTS

Team	Number of Games Won
A	4
B	7
C	9
D	2
E	2
X	

13. According to the incomplete table above, if each of the 6 teams in the league played each of the other teams exactly twice and there were no ties, how many games did team *X* win? (Only 2 teams play in a game.)

(A) 4
(B) 5
(C) 6
(D) 8
(E) 10

14. When the integer *k* is divided by 12, the remainder is 3. Which of the following, when divided by 12, will have a remainder of 6 ?

I. $2k$
II. $6k$
III. $4k + 6$

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) I, II, and III

15. A rectangular tabletop consists of a piece of laminated wood bordered by a thin metal strip along its four edges. The surface area of the tabletop is x square feet, and the total length of the strip before it was attached was x feet. If the tabletop is 3 feet wide, what is its approximate length, in feet ?

(A) 12
(B) 10
(C) 9
(D) 8
(E) 6

16. For all real numbers v, the operation v^* is defined by the equation $v^* = v - \frac{v}{3}$. If $(v^*)^* = 8$, then $v =$

(A) 15
(B) 18
(C) 21
(D) 24
(E) 27

Section 42
25 Minutes 16 Questions

1. Which of the following fractions is equal to 0.16 ?

(A) $\frac{1}{4}$
(B) $\frac{4}{25}$
(C) $\frac{5}{8}$
(D) $\frac{8}{5}$
(E) $\frac{25}{4}$

2. There is a total of 120 marbles in a box, each of which is red, green, blue, or white. If one marble is drawn from the box at random, the probability that it will be white is $\frac{1}{4}$ and the probability that it will be green is $\frac{1}{3}$. What is the probability that the marble will be either red or blue ?

(A) $\frac{1}{6}$
(B) $\frac{1}{4}$
(C) $\frac{2}{7}$
(D) $\frac{1}{3}$
(E) $\frac{5}{12}$

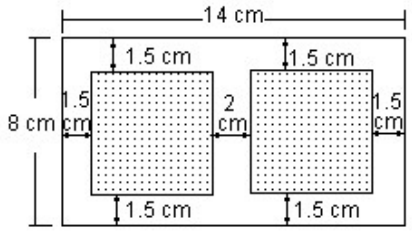
3. If x is a positive number less than 10, which of the following is least ?

(A) $x - 20$
(B) x
(C) 0
(D) $-x$
(E) $20 - x$

4. A computer programmer needs to print 148 documents. The documents have an average (arithmetic mean) length of 10

pages and the printer takes 15 seconds to print each page. Approximately how many hours will it take to print all the documents if they are printed without interruptions?

(A) $\frac{1}{2}$ hr
(B) 2 hr
(C) $2\frac{1}{2}$ hr
(D) 6 hr
(E) 24 hr



5. The figure above represents a frame; the shaded regions represent the openings in the frame. If all line segments in the figure are either horizontal or vertical and the openings are the same size, what are the dimensions of each opening ?

(A) 4.5 cm by 5 cm
(B) 4.5 cm by 6.5 cm
(C) 5 cm by 5.5 cm
(D) 5 cm by 9 cm
(E) 5 cm by 11 cm

6. In the first hour of a two-hour trip, a car traveled *d* kilometers, and in the second hour of the trip, the car traveled one-half that distance. What is the average rate at which the car traveled during the trip, in kilometers per hour?

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

7. Jaime earned enough money by selling seashells at 25 cents each to buy several used paperback books at 55 cents each. If he spent all of the money he earned selling seashells to buy the books, what is the least number of seashells he could have sold ?

(A) 5
(B) 11
(C) 17
(D) 25
(E) 30

8. In a certain sequence, the first term is 1, and each successive term is 1 more than the reciprocal of the term that immediately precedes it. What is the fifth term of the sequence?

(A) $\frac{3}{5}$
(B) $\frac{5}{8}$
(C) $\frac{8}{5}$
(D) $\frac{5}{3}$
(E) $\frac{9}{2}$

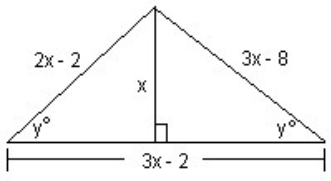
9. A wildlife preserve is being planned for 3,000 rhinoceroses. The preserve is to contain a total of 10,000 acres of watering area, plus 100 acres of grazing area for each rhinoceros. If the number of rhinoceroses is expected to increase by 10 percent, how many thousand acres should the preserve have in order to provide for the increased population?

(A) 340
(B) 330
(C) 320
(D) 310
(E) 300

10. For the positive numbers n, $n + 1$, $n + 2$, $n + 4$ and $n + 8$, the mean is how much greater than the median?

(A) 0

(B) 1
(C) $n + 1$
(D) $n + 2$
(E) $n + 3$

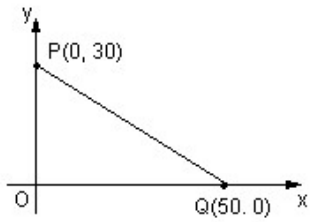


11. The figure above shows the dimensions of an isosceles triangle in terms of x. What is the area of the triangle?

(A) 24
(B) 30
(C) 48
(D) 60
(E) 96

12. In a certain animal population, for each of the first 3 months of life, the probability that an animal will die during that month is $\frac{1}{10}$. For a group of 200 newborn members of the population, approximately how many would be expected to survive the first 3 months of life?

(A) 140
(B) 146
(C) 152
(D) 162
(E) 170



13. In the figure above, how many of the points on line segment PQ have coordinates that are both integers?

(A) 5
(B) 8
(C) 10
(D) 11
(E) 20

14. What is the least number of digits (including repetitions) needed to express 10^{100} in decimal notation?

(A) 4
(B) 100
(C) 101
(D) 1,000
(E) 1,001

15. A group of 12 people plan to rent a van and agree to share equally the total cost of the rental, which is E dollars. If n of the people decide not to participate at the last minute, by how many dollars will each remaining person's share of the total cost increase?

(A) $\frac{E}{12-n}$
(B) $\frac{12-n}{E}$
(C) $\frac{E}{12(12-n)}$
(D) $\frac{nE}{12(12-n)}$
(E) $\frac{(12-n)E}{12n}$

16. The concentration of a certain chemical in a full water tank depends on the depth of the water. At a depth that is x feet below the top of the tank, the concentration is $3+\frac{4}{\sqrt{5-x}}$ parts per million, where $0 < x < 4$. To the nearest 0.1 foot, at what depth is the concentration equal to 6 parts per million?

(A) 2.4 ft
(B) 2.5 ft
(C) 2.8 ft
(D) 3.0 ft
(E) 3.2 ft