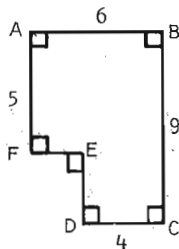
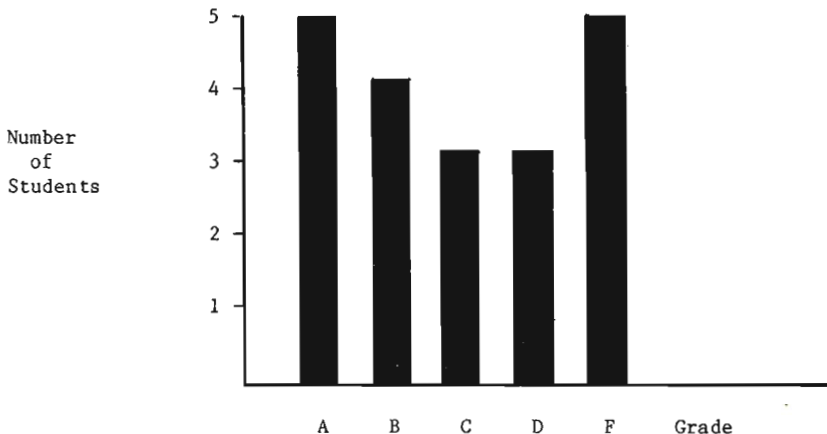


1. $\frac{3 \times 5}{9 \times 11} \times \frac{7 \times 9 \times 11}{3 \times 5 \times 7} =$
- A) 1 B) 0 C) 49 D) $\frac{1}{49}$ E) 50
2. $90 + 91 + 92 + 93 + 94 + 95 + 96 + 97 + 98 + 99 =$
- A) 845 B) 945 C) 1005 D) 1025 E) 1045
3. $\frac{10^7}{5 \times 10^4} =$
- A) .002 B) .2 C) 20 D) 200 E) 2000

4. The area of polygon ABCDEF, in square units, is
- A) .24 B) 30 C) 46
- D) 66 E) 74



5.



The bar graph shows the grades in a mathematics class for the last grading period. If A, B, C and D are satisfactory grades, what fraction of the grades shown in the graph are satisfactory?

- A) $\frac{1}{2}$ B) $\frac{2}{3}$ C) $\frac{3}{4}$ D) $\frac{4}{5}$ E) $\frac{9}{10}$

6. A ream of paper containing 500 sheets is 5 cm thick. Approximately how many sheets of this type of paper would there be in a stack 7.5 cm high?

A) 250 B) 550 C) 667 D) 750 E) 1250

7. A "stair-step" figure is made up of alternating black and white squares in each row. Rows 1 through 4 are shown. All rows begin and end with a white square. The number of black squares in the 37th row is



A) 34 B) 35 C) 36 D) 37 E) 38

8. If $a = -2$, the largest number in the set $\{-3a, 4a, \frac{24}{a}, a^2, 1\}$ is

A) $-3a$ B) $4a$ C) $\frac{24}{a}$ D) a^2 E) 1

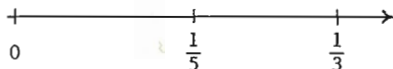
9. The product of the 9 factors $(1 - \frac{1}{2})(1 - \frac{1}{3})(1 - \frac{1}{4}) \dots (1 - \frac{1}{10}) =$

A) $\frac{1}{10}$ B) $\frac{1}{9}$ C) $\frac{1}{2}$ D) $\frac{10}{11}$ E) $\frac{11}{2}$

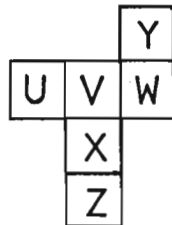
10. The fraction halfway between $\frac{1}{5}$ and $\frac{1}{3}$ (on the number line) is

A) $\frac{1}{4}$ B) $\frac{2}{15}$ C) $\frac{4}{15}$

D) $\frac{53}{200}$ E) $\frac{8}{15}$



11. A piece of paper containing six joined squares labeled as shown in the diagram is folded along the edges of the squares to form a cube. The label of the face opposite the face labeled X is



A) Z B) U C) V D) W E) Y

12. A square and a triangle have equal perimeters. The lengths of the three sides of the triangle are 6.2 cm, 8.3 cm and 9.5 cm. The area of the square is

A) 24 cm^2 B) 36 cm^2 C) 48 cm^2 D) 64 cm^2 E) 144 cm^2

13. If you walk for 45 minutes at a rate of 4 mph and then run for 30 minutes at a rate of 10 mph, how many miles have you gone at the end of one hour and 15 minutes?
- A) 3.5 miles B) 8 miles C) 9 miles D) $25\frac{1}{3}$ miles E) 480 miles
14. The difference between a 6.5% sales tax and a 6% sales tax on an item priced at \$20 before tax is
- A) \$.01 B) \$.10 C) \$.50 D) \$1 E) \$10
15. How many whole numbers between 100 and 400 contain the digit 2 ?
- A) 100 B) 120 C) 138 D) 140 E) 148
16. The ratio of boys to girls in Mr. Brown's math class is 2:3. If there are 30 students in the class, how many more girls than boys are in the class?
- A) 1 B) 3 C) 5 D) 6 E) 10
17. If your average score on your first six mathematics tests was 84 and your average score on your first seven mathematics tests was 85, then your score on the seventh test was
- A) 86 B) 88 C) 90 D) 91 E) 92
18. Nine copies of a certain pamphlet cost less than \$10.00 while ten copies of the same pamphlet (at the same price) cost more than \$11.00. How much does one copy of this pamphlet cost?
- A) \$1.07 B) \$1.08 C) \$1.09 D) \$1.10 E) \$1.11
19. If the length and width of a rectangle are each increased by 10%, then the perimeter of the rectangle is increased by
- A) 1% B) 10% C) 20% D) 21% E) 40%
20. In a certain year, January had exactly four Tuesdays and four Saturdays. On what day did January 1 fall that year?
- A) Monday B) Tuesday C) Wednesday D) Friday E) Saturday

21. Mr. Green receives a 10% raise every year. His salary after four such raises has gone up by what percent?

- A) less than 40% B) 40% C) 44% D) 45% E) More than 45%

22. Assume every 7-digit whole number is a possible telephone number except those which begin with 0 or 1. What fraction of telephone numbers begin with 9 and end with 0?

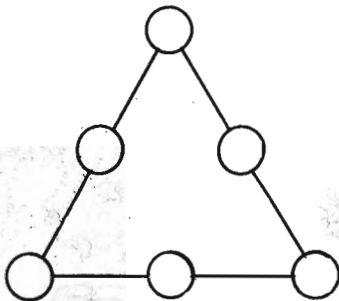
- A) $\frac{1}{63}$ B) $\frac{1}{80}$ C) $\frac{1}{81}$ D) $\frac{1}{90}$ E) $\frac{1}{100}$

23. King Middle School has 1200 students. Each student takes 5 classes a day. Each teacher teaches 4 classes. Each class has 30 students and 1 teacher. How many teachers are there at King Middle School?

- A) 30 B) 32 C) 40 D) 45 E) 50

24. In a magic triangle, each of the six whole numbers 10 - 15 is placed in one of the circles so that the sum, S , of the three numbers on each side of the triangle is the same. The largest possible value for S is

- A) 36 B) 37 C) 38
D) 39 E) 40



25. Five cards are lying on a table as shown. Each card has a letter on one side and a whole number on the other side. Jane said, "If a vowel is on one side of any card, then an even number is on the other side." Mary showed Jane was wrong by turning over one card. Which card did Mary turn over?



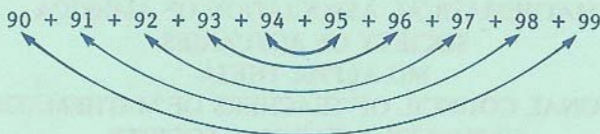
- A) 3 B) 4 C) 6
D) P E) Q

1. (A) $\frac{3 \times 5}{9 \times 11} \times \frac{7 \times 9 \times 11}{3 \times 5 \times 7} = \frac{3 \times 5 \times 7 \times 9 \times 11}{3 \times 5 \times 7 \times 9 \times 11} = 1.$

2. (B) By estimating, we see that the desired sum is between $10 \times 90 = 900$ and $10 \times 100 = 1000$, so it must be 945.

OR

Pair the numbers as shown. The sum of each pair is 189, so the desired sum is $5 \times 189 = 945.$



3. (D) $\frac{10^7}{5 \times 10^4} = \frac{10 \times 10^6}{5 \times 10^4} = 2 \times 10^2 = 200.$

OR

$$\frac{10^7}{5 \times 10^4} = \frac{10^3}{5} = \frac{1000}{5} = 200$$

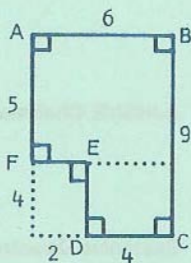
4. (C) The area is greater than $6 \times 5 = 30$ and less than $6 \times 9 = 54$ so (C) must be correct.

OR

Extending FE partitions the polygon into a rectangle and a square whose areas are 30 and 16 respectively.

OR

Extending AF and DC to form the large rectangle shows that area is $(6 \times 9) - (4 \times 2) = 54 - 8 = 46.$



5. (C) By reading the graph, there are 5 A's, 4 B's, 3 C's, 3 D's, and 5 F's. Thus the fraction of satisfactory grades is
- $$\frac{5 + 4 + 3 + 3}{20} = \frac{15}{20} = \frac{3}{4}$$

OR

By reading the graph, $\frac{5}{20} = \frac{1}{4}$ of the grades are not satisfactory so $1 - \frac{1}{4} = \frac{3}{4}$ of the grades are satisfactory.

6. (D) The 7.5 cm stack is "half again" as tall as the 5 cm stack, so it will contain $500 + \frac{1}{2}(500) = 500 + 250 = 750$ sheets.

OR

If n is the number of sheets of paper in the 7.5 cm stack, then $\frac{5}{500} = \frac{7.5}{n}$. Thus $n = 750$ sheets.

7. (C) The number of black squares is one less than the number of the row, so the 37th row contains 36 black squares.
8. (A) If $a = -2$, the set is $\{6, -8, -12, 4, 1\}$ so 6 = 3a is the largest. Notice that $4a$ and $\frac{24}{a}$ could be eliminated immediately since they are negative if a is negative.
9. (A) The desired product equals $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \dots \times \frac{8}{9} \times \frac{9}{10} = \frac{1}{10}$
 Notice that since $\frac{1}{2} \times \frac{2}{3} = \frac{1}{3}$, the product is less than $\frac{1}{3}$ so (C), (D) and (E) are easily eliminated.

10. (C) $\frac{\frac{1}{3} + \frac{1}{5}}{2} = \frac{\frac{8}{15}}{2} = \frac{4}{15}$

11. (E) If face X is placed on the bottom of the cube, then faces U, V, W and Z are the sides and face Y is the top.

12. (B) The perimeter of the triangle and the square is $6.2 + 8.3 + 9.5 = 24$ cm. Thus the length of the side of the square is 6 cm and the area is 36 cm^2 .
13. (B) To keep the units of miles and hours, first note $45 \text{ minutes} = \frac{45}{60} = \frac{3}{4}$ hour and $30 \text{ minutes} = \frac{1}{2}$ hour. Since $\text{distance} = \text{rate} \times \text{time}$, your total distance is $4 \times \frac{3}{4} + 10 \times \frac{1}{2} = 3 + 5 = 8$ miles. The distance is less than $4 + 10 = 14$ miles, so (D) and (E) can be easily eliminated.
14. (B) The difference is .5% of \$20 = $.005 \times \$20 = \0.10 .
15. (C) In addition to the 100 numbers from 200-299, there are 20 numbers ending in 2 (e.g., 112, 342) and 20 numbers with a ten's digit of 2 (e.g., 127, 325). But the numbers 122 and 322 are counted twice in this process, so there are a total of $100 + 20 + 20 - 2 = 138$.
16. (D) Since the ratio is 2:3, $\frac{2}{5}$ of the students are boys and $\frac{3}{5}$ of them are girls. Thus there are $\frac{1}{5}$ more girls than boys and $\frac{1}{5} \times 30 = 6$.
17. (D) To get an average of 85 on 7 tests, you needed a total of $7 \times 85 = 595$ points. After 6 tests, you had a total of $6 \times 84 = 504$ points. Thus you needed $595 - 504 = 91$ points on the seventh test.

OR

If n was your score on the seventh test, then $\frac{6(84) + n}{7} = 85$
so $n = 91$.

OR

To raise your average by one point, you needed seven additional points on the seventh test, so your score was $84 + 7 = 91$.

18. (E) Only (E) satisfies the hypothesis that ten copies of the pamphlet cost more than \$11.00.

OR

If P is the price of the pamphlet, then $9P < 10$ and $10P > 11$ or $1.10 < P < 1.1111\dots$. Thus $P = \$1.11$.

19. (B) If $2(\ell + w)$ is the original perimeter, then the new perimeter is $2(1.1\ell + 1.1w) = 2.2(\ell + w)$ which is 10% more than $2(\ell + w)$.

20. (C) January has 31 days. Had January 1 fallen on a Monday or Tuesday, then there would have been five Tuesdays - 2, 9, 16, 23, 30 or 1, 8, 15, 22, 29. Likewise, had January 1 fallen on a Friday or Saturday, there would have been five Saturdays. Thus (C) is correct.

21. (E) If the initial salary is thought of as \$100 then the first 10% increase gives \$110. The second 10% increase gives $\$110 + \$11 = \$121$. The third increase gives $\$121 + \$12.10 = \$133.10$ and the fourth increase gives $\$133.10 + \$13.31 = \$146.41$ for an increase of 46.41%

OR

If S is the initial salary then the salary after four 10% increases is $(1.1)(1.1)(1.1)(1.1)S = 1.4641S$ for an increase of 46.41%.

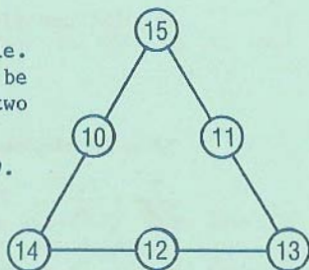
22. (B) There are 10 digits. Excluding 0 and 1 leaves 8 digits. Thus $\frac{1}{8}$ of all telephone numbers begin with 9. Of these, $\frac{1}{10}$ end with 0 giving $\frac{1}{8} \times \frac{1}{10} = \frac{1}{80}$ which begin with 9 and end with 0.

23. (E) There are $1200 \times 5 = 6000$ times a day a student attends a class. Thus there are $\frac{6000}{30} = 200$ times a day a teacher teaches a class, so there must be $\frac{200}{4} = 50$ teachers.

OR

If each student took 4 classes and each teacher taught 4 classes, then $\frac{1200}{30} = 40$ teachers would be required. But each student takes 5 classes, so $\frac{5}{4} \times 40 = 50$ teachers are needed.

24. (D) If the sum S is as large as possible, then the three largest numbers should be at the vertices so they each occur in two sums S . Thus
- $$S = \frac{2(13 + 14 + 15) + 10 + 11 + 12}{3} = 39.$$
- One such triangle is indicated.



25. (A) If Jane is wrong, then there is a card with a vowel on one side and an odd number on the other side. Such a card cannot have a consonant or an even number on either side. Thus the only card which could prove Jane wrong is the one with a "3" on one side. The other side would have to be a vowel.

OR

The easiest way for Mary to show Jane was wrong is for her to turn over a card showing a vowel, but there is no such card. But if Jane were correct, then so is the contrapositive: "If an odd number is on one side of a card, then a consonant is on the other side." Thus, Mary showed Jane was wrong by turning over the card marked with a 3.