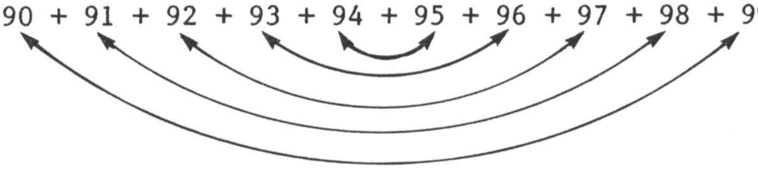
1. (A) $\frac{3\times 5}{9\times 11} \times \frac{7\times 9\times 11}{3\times 5\times 7} = \frac{3\times 5\times 7\times 9\times 11}{3\times 5\times 7\times 9\times 11} = 1.$

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 $5\times 189 = 945$.

$90 + 91 + 92 + 93 + 94 + 95 + 96 + 97 + 98 + 99$

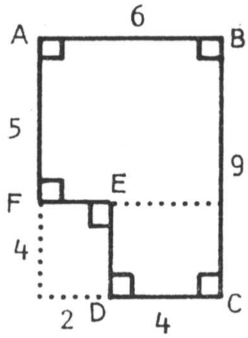


3. (D) $\frac{10^7}{5\times 10^4} = \frac{10\times 10^6}{5\times 10^4} = 2\times 10^2 = 200.$

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 $\frac{1}{2} \times \frac{2}{3} \times \frac{3}{4} \times \ldots \times \frac{8}{9} \times \frac{9}{10} = \frac{1}{10}$ 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 minutes $= \frac{45}{60} = \frac{3}{4}$ hour and 30 minutes $= \frac{1}{2}$ hour. Since distance = rate × time, your total distance is

$$4 \times \frac{3}{4} + 10 \times \frac{1}{2} = 3 + 5 = 8 \text{ miles.}$$

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 × \$20 = \$.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 that $11.00.

OR

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

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

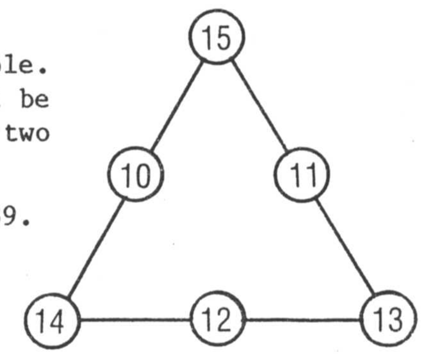
OR

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.