***Exercise 3***

**Solve the following.**

1. What is the number of zeros at the end of the product of the numbers from 1 to 100?

***Answer*** : 127

2. A fast typist can type some matter in 2 hours and a slow typist can type the same in 3 hours. If both type combinely, in how much time will they finish?

***Answer*** : 1 hr 12 min

***Explanation :*** The fast typist's work done in 1 hr = 1/2

The slow typist's work done in 1 hr = 1/3

If they work combinely, work done in 1 hr = 1/2+1/3 = 5/6

So, the work will be completed in 6/5 hours. i.e., 1+1/5 hours = 1hr 12 min

3. Gavaskar's average in his first 50 innings was 50. After the 51st innings, his average was 51. How many runs did he score in his 51st innings. (supposing that he lost his wicket in his 51st innings)

***Answer*** : 101

***Explanation*** : Total score after 50 innings = 50\*50 = 2500

Total score after 51 innings = 51\*51 = 2601

So, runs made in the 51st innings = 2601-2500 = 101

If he had not lost his wicket in his 51st innings, he would have scored an unbeaten 50 in his 51st innings.

4. Out of 80 coins, one is counterfeit. What is the minimum number of weighings needed to find out the counterfeit coin?

***Answer*** : 4

5. What can you conclude from the statement : All green are blue, all blue are red. ?

1. some blue are green
2. some red are green
3. some green are not red
4. all red are blue
   1. i or ii but not both
   2. i & ii only
   3. iii or iv but not both
   4. iii & iv

***Answer*** : (b)

6. A rectangular plate with length 8 inches, breadth 11 inches and thickness 2 inches is available. What is the length of the circular rod with diameter 8 inches and equal to the volume of the rectangular plate?

***Answer*** : 3.5 inches

***Explanation*** : Volume of the circular rod (cylinder) = Volume of the rectangular plate

(22/7)\*4\*4\*h = 8\*11\*2

h = 7/2 = 3.5

7. What is the sum of all numbers between 100 and 1000 which are divisible by 14 ?

***Answer*** : 35392

***Explanation*** : The number closest to 100 which is greater than 100 and divisible by 14 is 112, which is the first term of the series which has to be summed.

The number closest to 1000 which is less than 1000 and divisible by 14 is 994, which is the last term of the series.

112 + 126 + .... + 994 = 14(8+9+ ... + 71) = 35392

8. If s(a) denotes square root of a, find the value of s(12+s(12+s(12+ ...... upto infinity.

***Answer*** : 4

***Explanation*** : Let x = s(12+s(12+s(12+.....

We can write x = s(12+x). i.e., x^2 = 12 + x. Solving this quadratic equation, we get x = -3 or x=4. Sum cannot be -ve and hence sum = 4.

9. A cylindrical container has a radius of eight inches with a height of three inches. Compute how many inches should be added to either the radius or height to give the same increase in volume?

***Answer*** : 16/3 inches

***Explanation*** : Let x be the amount of increase. The volume will increase by the same amount if the radius increased or the height is increased.

So, the effect on increasing height is equal to the effect on increasing the radius.

i.e., (22/7)\*8\*8\*(3+x) = (22/7)\*(8+x)\*(8+x)\*3

Solving the quadratic equation we get the x = 0 or 16/3. The possible increase would be by 16/3 inches.

10. With just six weights and a balance scale, you can weigh any unit number of kgs from 1 to 364. What could be the six weights?

***Answer*** : 1, 3, 9, 27, 81, 243 (All powers of 3)

11. Diophantus passed one sixth of his life in childhood, one twelfth in youth, and one seventh more as a bachelor; five years after his marriage a son was born who died four years before his father at half his final age. How old is Diophantus?

***Answer*** : 84 years

***Explanation*** : x/6 + x/12 + x/7 + 5 + x/2 + 4 = x

12 . If time at this moment is 9 P.M., what will be the time 23999999992 hours later?

***Answer*** : 1 P.M.

***Explanation*** : 24 billion hours later, it would be 9 P.M. and 8 hours before that it would be 1 P.M.

13. How big will an angle of one and a half degree look through a glass that magnifies things three times?

***Answer*** : 1 1/2 degrees

***Explanation*** : The magnifying glass cannot increase the magnitude of an angle.

14. Divide 45 into four parts such that when 2 is added to the first part, 2 is subtracted from the second part, 2 is multiplied by the third part and the fourth part is divided by two, all result in the same number.

***Answer***: 8, 12, 5, 20

***Explanation***: a + b + c + d =45; a+2 = b-2 = 2c = d/2; a=b-4; c = (b-2)/2; d = 2(b-2); b-4 + b + (b-2)/2 + 2(b-2) = 45;

15. I drove 60 km at 30 kmph and then an additional 60 km at 50 kmph. Compute my average speed over my 120 km.

***Answer*** : 37 1/2

***Explanation*** : Time reqd for the first 60 km = 120 min.; Time reqd for the second 60 km = 72 min.; Total time reqd = 192 min

Avg speed = (60\*120)/192 = 37 1/2

*Questions 16 and 17 are based on the following :*

Five executives of European Corporation hold a Conference in Rome

Mr. A converses in Spanish & Italian

Mr. B, a spaniard, knows English also

Mr. C knows English and belongs to Italy

Mr. D converses in French and Spanish

Mr. E , a native of Italy knows French

16. Which of the following can act as interpreter if Mr. C & Mr. D wish to converse

a) only Mr. A b) Only Mr. B c) Mr. A & Mr. B d) Any of the other three

***Answer*** : d) Any of the other three.

***Explanation*** : From the data given, we can infer the following.

A knows Spanish, Italian

B knows Spanish, English

C knows Italian, English

D knows Spanish, French

E knows Italian, French

To act as an interpreter between C and D, a person has to know one of the combinations Italian&Spanish, Italian&French, English&Spanish, English&French

A, B, and E know atleast one of the combinations.

17. If a 6th executive is brought in, to be understood by maximum number of original five he should be fluent in

a) English & French b) Italian & Spanish c) English & French d) French & Italian

***Answer*** : b) Italian & Spanish

***Explanation*** : No of executives who know

i) English is 2

ii) Spanish is 3

iii) Italian is 3

iv) French is 2

Italian & Spanish are spoken by the maximum no of executives. So, if the 6th executive is fluent in Italian & Spanish, he can communicate with all the original five because everybody knows either Spanish or Italian.

1. What is the sum of the first 25 natural odd numbers?

***Answer*** : 625

***Explanation*** : The sum of the first n natural odd nos is square(n).

1+3 = 4 = square(2) 1+3+5 = 9 = square(3)

1. The sum of any seven consecutive numbers is divisible by
2. 2 b) 7 c) 3 d) 11

***Exercise 3***

**Try the following.**

1. There are seventy clerks working in a company, of which 30 are females. Also, 30 clerks are married; 24 clerks are above 25 years of age; 19 married clerks are above 25 years, of which 7 are males; 12 males are above 25 years of age; and 15 males are married. How many bachelor girls are there and how many of these are above 25?
2. A man sailed off from the North Pole. After covering 2,000 miles in one direction he turned West, sailed 2,000 miles, turned North and sailed ahead another 2,000 miles till he met his friend. How far was he from the North Pole and in what direction?
3. Here is a series of comments on the ages of three persons J, R, S by themselves.

S : The difference between R's age and mine is three years.

J : R is the youngest.

R : Either I am 24 years old or J 25 or S 26.

J : All are above 24 years of age.

S : I am the eldest if and only if R is not the youngest.

R : S is elder to me.

J : I am the eldest.

R : S is not 27 years old.

S : The sum of my age and J's is two more than twice R's age.

One of the three had been telling a lie throughout whereas others had spoken the truth. Determine the ages of S,J,R.

1. In a group of five people, what is the probability of finding two persons with the same month of birth?
2. A father and his son go out for a 'walk-and-run' every morning around a track formed by an equilateral triangle. The father's walking speed is 2 mph and his running speed is 5 mph. The son's walking and running speeds are twice that of his father. Both start together from one apex of the triangle, the son going clockwise and the father anti-clockwise. Initially the father runs and the son walks for a certain period of time. Thereafter, as soon as the father starts walking, the son starts running. Both complete the course in 45 minutes. For how long does the father run? Where do the two cross each other?
3. The Director of Medical Services was on his annual visit to the ENT Hospital. While going through the out patients' records he came across the following data for a particular day : " Ear consultations 45; Nose 50; Throat 70; Ear and Nose 30; Nose and Throat 20; Ear and Throat 30; Ear, Nose and Throat 10; Total patients 100." Then he came to the conclusion that the records were bogus. Was he right?
4. Amongst Ram, Sham and Gobind are a doctor, a lawyer and a police officer. They are married to Radha, Gita and Sita (not in order). Each of the wives have a profession. Gobind's wife is an artist. Ram is not married to Gita. The lawyer's wife is a teacher. Radha is married to the police officer. Sita is an expert cook. Who's who?
5. What should come next?

1, 2, 4, 10, 16, 40, 64,

*Questions 9-12 are based on the following :*

Three adults – Roberto, Sarah and Vicky – will be traveling in a van with five children – Freddy, Hillary, Jonathan, Lupe, and Marta. The van has a driver’s seat and one passenger seat in the front, and two benches behind the front seats, one beach behind the other. Each bench has room for exactly three people. Everyone must sit in a seat or on a bench, and seating is subject to the following restrictions: An adult must sit on each bench.

Either Roberto or Sarah must sit in the driver’s seat.

Jonathan must sit immediately beside Marta.

1. Of the following, who can sit in the front passenger seat ?

(a) Jonathan (b) Lupe (c) Roberto (d) Sarah (e) Vicky

10. Which of the following groups of three can sit together on a bench?

(a) Freddy, Jonathan and Marta (b) Freddy, Jonathan and Vicky

(c) Freddy, Sarah and Vicky (d) Hillary, Lupe and Sarah

(e) Lupe, Marta and Roberto

1. If Freddy sits immediately beside Vicky, which of the following cannot be true ?
   1. Jonathan sits immediately beside Sarah
   2. Lupe sits immediately beside Vicky
   3. Hillary sits in the front passenger seat
   4. Freddy sits on the same bench as Hillary
   5. Hillary sits on the same bench as Roberto
2. If Sarah sits on a bench that is behind where Jonathan is sitting, which of the following must be true ?
   1. Hillary sits in a seat or on a bench that is in front of where Marta is sitting
   2. Lupe sits in a seat or on a bench that is in front of where Freddy is sitting
   3. Freddy sits on the same bench as Hillary
   4. Lupe sits on the same bench as Sarah
   5. Marta sits on the same bench as Vicky
3. Make six squares of the same size using twelve match-sticks. (Hint : You will need an adhesive to arrange the required figure)
4. A farmer has two rectangular fields. The larger field has twice the length and 4 times the width of the smaller field. If the smaller field has area K, then the are of the larger field is greater than the area of the smaller field by what amount?

(a) 6K (b) 8K (c) 12K (d) 7K

1. Nine equal circles are enclosed in a square whose area is 36sq units. Find the area of each circle.
2. There are 9 cards. Arrange them in a 3\*3 matrix. Cards are of 4 colors. They are red, yellow, blue, green. Conditions for arrangement: one red card must be in first row or second row. 2 green cards should be in 3rd column. Yellow cards must be in the 3 corners only. Two blue cards must be in the 2nd row. At least one green card in each row.
3. Is z less than w? z and w are real numbers.

(I) z2 = 25

(II) w = 9

To answer the question,

a) Either I or II is sufficient

b) Both I and II are sufficient but neither of them is alone sufficient

c) I & II are sufficient

d) Both are not sufficient

1. A speaks truth 70% of the time; B speaks truth 80% of the time. What is the probability that both are contradicting each other?
2. In a family 7 children don't eat spinach, 6 don't eat carrot, 5 don't eat beans, 4 don't eat spinach & carrots, 3 don't eat carrot & beans, 2 don't eat beans & spinach. One doesn't eat all 3. Find the no. of children.
3. Anna, Bena, Catherina and Diana are at their monthly business meeting. Their occupations are author, biologist, chemist and doctor, but not necessarily in that order. Diana just told the neighbour, who is a biologist that Catherina was on her way with doughnuts. Anna is sitting across from the doctor and next to the chemist. The doctor was thinking that Bena was a good name for parent's to choose, but didn't say anything. What is each person's occupation?