

TCS Ninja Previous Papers

[www.prepinsta.com](http://www.prepinsta.com)



## Quantitative Aptitude

# TCS Ninja Previous Year Papers and study materials



Also, don't share this PDF with anyone as if they will score good marks too your percentile will get decreased

## QUESTIONS

**Q 1.**  $\frac{2}{3}$ rd of the balls in a bag are blue, the rest are pink. if  $\frac{5}{9}$ th of the blue balls and  $\frac{7}{8}$ th of the pink balls are defective, find the total number of balls in the bag given that the number of non defective balls is 146?

- a) 216
- b) 649
- c) 432
- d) 578

Solution- let total no of balls =  $x$

$$\text{blue} = \frac{2x}{3}$$

$$\text{pink} = \frac{x}{3}$$

$$\text{total no of defective balls} = \frac{10x}{27} + \frac{7x}{24}$$

$$= \frac{143x}{216}$$

$$\text{non defective balls} = x - \frac{143x}{216} = 146$$

$$x = 432$$

**Q 2.** Find no of ways in which 4 particular persons a,b,c,d and 6 more persons can stand in a queue so that A always stand before B. B always stand before C, And C always stand before D.

a)  $6!$

b)  $7!$

c)  $1006 \cdot 6!$

d)  $10046!$

Solution - a,b,c,d are grouped ie consider them as one and remaining as 6.

total  $6+1 = 7!$  Ways

**Q 3. 100 students appeared for two different examinations 60 passed the first, 50 the second and 30 both the examinations. Find the probability that a student selected at random failed in both the examination**

a)  $5/6$

b)  $1/5$

c)  $1/7$

d)  $5/7$

Solution-  $60+50-30=80$

$100-80=20$

$20/100=1/5$ .

so B is the answer.

**Q 4. There are 10 points on a straight line AB and 8 on another straight line AC none of them being point A. how many triangles can be formed with these points as vertices?**

Option

a. 680

b. 720

c. 816

d. 640

Solution-

To form a triangle we need 3 points

select 2 points from the 10 points of line AB & 1 from the 8 on AC

$$= (10C2) * (8C1)$$

select 2 points from the 8 points of line AC & 1 from the 10 on AB=

$$(8C2) * (10C1)$$

$$\text{total no. of triangles} = (10C2) * (8C1) + (8C2) * (10C1) = 640$$

d.640

**Q 5. From a bag containing 8 green and 5 red balls, three are drawn one after the other .the probability of all three balls beings green if the balls drawn are replace before the next ball pick and the balls drawn are not replaced , are respectively.**

a)  $\frac{512}{2197}, \frac{336}{2197}$

b)  $\frac{512}{2197}, \frac{336}{1716}$

c)  $\frac{336}{2197}, \frac{512}{2197}$

d)  $\frac{336}{1716}, \frac{512}{1716}$

Solution-THE PROBABILITIES OF GETTING WITH REPLACEMENT

$$IS = \frac{8}{13} * \frac{8}{13} * \frac{8}{13} = \frac{512}{2197}$$

THE PROBABILITIES OF GETTING WITHOUT REPLACEMENT

$$= \frac{8}{13} * \frac{7}{12} * \frac{6}{11} = \frac{336}{2197}$$

**Q 6. find the greatest number that will divide 148 246 and 623 leaving remainders 4 6 and 11 respectively.**

a) 20 b) 12 c) 6 d) 48

$$\text{Solution-Hcf ( (148-4), (246-6), (623-11))} = 12$$

**Q 7. a mother her little daughter and her just born infant boy together stood on a weighing machine which shows 74kgs.how much does the daughter weigh if the mother weighs 46kg more than the combined weight of daughter and the infant and the infant weighs 60% less than the daughter.**

- a)9
- b)11
- c)cannot be determined
- d)10

Solution-daughter weight is  $x$

infant weight is 60% less than daughter i.e.,  $0.4x$

mother weight is  $(x+0.4x+46)$

total weight =  $x + 0.4x + (x+0.4x+46) = 74$

solving the eq.  $x = 10$

option d is correct

**Q 8. find the number of ways a batsman can score a double century only in terms of 4's & 6's?**

- a)15
- b)16
- c)17
- d)18

Solution-4's and 6's

50 0

47 2

44 4

41 6

38 8

35 10

32 12

29 14

26 16

23 18

20 20

17 22

14 24

11 26

8 28

5 30

2 32

So total 17 ways but here it is 4's & 6's both so don't consider 1st one

Final ans : 16 ways

**Q 9. 98. Thomas takes 7 days to paint a house completely whereas Raj would require 9 days to paint the same house completely. How many days will take to paint the house if both them work together. (Give answers to the nearest integer)?**

A. 4

B. 2

C. 5

D. 3

Solution-work done by thomas in day= $\frac{1}{7}$

work done by other in a day= $\frac{1}{9}$

work done by both in a day =  $\frac{1}{7} + \frac{1}{9} = \frac{16}{63}$

days required by both =  $\frac{63}{16}$

Answer-A

**Q 10. how many positive integers less than 4300 of digits 0-4.**

**a) 560 b)565 c)575 d)625**

**Solution-Ans is 575**

**one digit no =4 (0 is not a positive integer)**

**two digit no =  $4 \times 5 = 20$**

**three digit no =  $4 \times 5 \times 5 = 100$**

**four digit no =  $3 \times 5 \times 5 \times 5 = 375$  (the possibility for 1,2,3 will come in the first position) four digit no =  $1 \times 3 \times 5 \times 5$  (the possibility of 4 is fixed in the first position and then 0,1,2 comes in second position) and the last digit is 4300 we include this number also**

**Ans is  $4 + 20 + 100 + 375 + 75 + 1 = 575$**

**Q 11. A person travels from Chennai to Pondicherry in cycle at 7.5 Kmph. Another person travels the same distance in train at a speed of 30 Kmph and reached 30 mins earlier. Find the distance.**

**A)5 Km**

**B)10 Km**

**C)15km**


**D)20km**

**Solution-Let, time taken by  = t**

**//ly, time taken by train  = t-30**

**We know that.....speed = distance /time**

**Speed of bicycle ,  $7.5 = \frac{d}{t} \dots (1)$**

Speed of ,  $30 = d / (t - 30/60) \dots (2)$

Sol 1&2, we get  $t = 0.666$

By sub and value in equal(1)

We  $d = 4.999 \sim 5\text{km}$

**Q 12.** A bag contains 8 white balls, and 3 blue balls. Another bag contains 7 white, and 4 blue balls. What is the probability of getting blue ball?

a)  $3/7$  b)  $7/22$  c)  $7/25$  d)  $7/15$

**Solution-**First we have to select a bag and then we will draw a ball.

Probability of selection of both bags is equal  $= 1/2$

Now probability of blue ball taken from first bag  $= (1/2) \times (3/11)$

and probability of blue ball taken from second bag  $= (1/2) \times (4/11)$

So probability of blue ball  $= (1/2) \times (3/11) + (1/2) \times (4/11) = 7/22$

**Q 13.** In a  $3 \times 3$  square grid comprising 9 tiles each tile can be painted in red or blue color. When the tile is rotated by 180 degree, there is no difference which can be spotted. How many such possibilities are there?

a) 16 b) 32 c) 64 d) 256

**Solution-**ans is 32 .

ans grid has to be rotated at 180 degrees.

hence,

$11 = 33$

$12 = 32$

$13 = 31$

$21 = 23$



$$22=22$$

$$31=13$$

$$32=12$$

$$33=11$$

cell 11-33 can be altered in 2 ways (as there are 2 colours)

cell 12-32 can be altered in 2 ways

cell 13-31 can be altered in 2 ways

cell 21-23 can be altered in 2 ways

and, cell 22 can be altered in 2 ways

, so

$$2 \times 2 \times 2 \times 2 \times 2 = 32.$$

**Q 14.** Jake can dig a well in 16 days. Paul can dig the same well in 24 days. Jake, Paul and Hari together dig the well in 8 days. Hari alone can dig the well in

option

**A)48**

**B)96**

**C)24**

**D)32**

$$\text{Solution-} \frac{1}{x} = \frac{1}{8} - \left( \frac{1}{16} + \frac{1}{24} \right)$$

$$\text{so } x=48$$

**ans = 48 days**

**Q 15. For any two numbers we define an operation \$ yielding another number, X \$ Y such that following condition holds:**

- **$X \$ X = 0$  for all X**
- **$X \$ (Y \$ Z) = X \$ Y + Z$**

**Find the Value of  $2012 \$ 0 + 2012 \$ 1912$**

**Options**

- a) **2112**
- b) **100**
- c) **5936**
- d) **Can not be determined**

**Solution-here \$ represent the - operator so  $X-X=0$  first condition**

$$x$(y$z)=x-(y-z)=x-y+z$$

**it can be written as  $x$y+z$**

$$2012-0+2012-1912=2112 \text{ so ans is } 2112$$

**Q 16. On a toss of two dice, A throws a total of 5. Then the probability that he will throw another 5 before he throws 7 is**

- a)40% b) 45% c)50% d)60%**

**Solution-ans: 40%**

**Explanation:**

**total probabilities for getting 5 =  $4/36$**

**total probabilities for getting 7 =  $6/36$**

**Total Probability =  $10/36$**

**We need only 5, hence prob of getting only 5 is  $(4/36)/(10/36)$**

**=40%**

**Q 17.**

**1,2,2,3,3,3,4,4,4,4,1,1,2,2,2,2,3,3,3,3,3,3,4,4,4,4,4,4,4,4,.....**

**Then what is the 2320 position of the number in the sequence?**

**a) 2 b) 1 c) 3 d) 4**

**Solution-answer is b)1**

**1,2,3,4(1-1time 2- 2times 3-3 4-4)=10 terms /completes cycle and starts from 1**

**1,2,3,4(1-2 2-4 3-6 4-8)= 20 terms /completes cycle and starts from 1**

**(1,2,3,4)each digit 3 time to its value =30 terms/completes cycle and starts from 1**

**10+20+30+40+50+.....=x**

**x is nearer value to 2320 solving  $n(n+1)/2$**

**10.(21.22)/2= 2310**

**analysing it 2310 completes cycle and starts from 1 again**

**now it 22 times**

**(1-22 times 2-44 times .....)**

**2320 position will occupied by 1**

**Q 18. In 2003, there are 28 days in February and there are 365 days in the year. In 2004, there are 29 days in February and there are 366 days in the year. If the date March 11, 2003 is a Tuesday, then which one of the following would be the date March 11, 2004 be?**

**A. Wednesday**

**B. Tuesday**

**C. Thursday**

**D. Monday**

**Solution-Every year day is increased by 1 odd day. Or in leap year it is increased by 2 odd days.**

**so 11 march 2003 is tuesday,**

**11 march 2004 is thursday**

**C. Thursday**

**Q 19. How many 6 digit even numbers can be formed from digits 1 2 3 4 5 6 7 so that the digit should not repeat and the second last digit is even?**

**a)6480 b)320 c)2160 d)720**

**solution-given 6th digit even number , so last digit 2 or 4 or 6-> 3 ways**

**" 5th digit should be even...so there will be 2 ways(rep. not allowed)**

**so,therefore we get  $5*4*3*2*2*3=720$  ways**

**Q 20. There are 5 letters and 5 addressed envelopes. If the letters are put at random in the envelops, the probability that all the letters may be placed in wrongly addressed envelopes is.**

**a)119 b)44 c)53 d)40**

**Solution-If there is one letter and one envelope then no way you can put it wrong(S1).**

**If there are 2 letters and 2 envelopes then you can put them wrong in 1 way(S2).**

**If there are 3 letters and 3 envelopes then you can put them wrong in 2 ways(S3).**

**If there are 4 then you can put them wrong in 9 ways(S4).**

**If there are 5 then you can put them wrong in 44 ways(S5).**

**If you observe you can find a pattern.**

**$S3=(S1+S2)*2$**

$$S4=(S2+S3)*3$$

$$S5=(S3+S4)*4$$

$$S6=(S4+S5)*5$$

$$\text{In general, } S_n=(S_{n-2} + S_{n-1})*(n-1)$$

$$\text{So, if there are 5 letters then } S5=(S3+S4)*4=(2+9)*4=44$$

**Q 21. How many liters of a 90% of concentrated acid needs to be mixed with a 75% solution of concentrated acid to get a 30 liter solution of 78% concentrated acid?**

- a) 8 b)9 c) 7 d)6**

**Solution-the concentration is given which is wrt 100, hence we can take x lt of 90% and (30-x)of 75%**

$$x*90 + (30-x)*75 = 30*78 \text{ hence the ans is 6 ltr...}$$

**Q 22. Average marks of a,b,c is 48. When d joins average becomes 47. E has 3 more marks than d. Average marks of b,c,d,e is 48. What is the marks of a?**

- a) 42 b) 43 c) 53 d)56**

$$\text{Solution- } a+b+c=144$$

$$a+b+c+d=188$$

$$d=44$$

$$e=47$$

$$b+c+d+e=192$$

$$b+c=101$$

$$b=43 \text{ ans.}$$

**Q 23. On a certain assembly line, the rejection rate for Hyundai i10s production was 4 percent, for Hyundai i20s production 8 percent and for the 2 cars combined 7 percent. What was the ratio of Hyundais i10 production?**

**option**

**a) 3/1**

**b) 2/1**

**c) 1/1**

**d)  $\frac{1}{2}$**

**Solution-let the no of i10 cars be x and i20 be y**

**now th rejcted i10 cars are  $\frac{4x}{100}$  and i20 cars are  $\frac{8y}{100}$**

**and it is given that  $\frac{4x}{100} + \frac{8y}{100} = \frac{7(x+y)}{100}$**

**so we get  $y = 3x$**

**so the ratio is 3:1**

**Q 24. For a car there are 5 tyres including one spare tyre(4+1). All tyres are equally used. If the total distance travelled by the car is 40000km then what is the average distance travelled by the each tyre?**

**Option**

**a) 10000**

**b) 40000**

**c) 32000**

**d) 8000**

**Solution-total distance travelled by the car=40000km**

**so total distance travelled by 4 wheels= $4 \times 40000 = 160000$**

**as all tyres(4+1) are equally used**

**so average distance travelled by the each tyre= $\frac{160000}{5} = 32000$**

option(c)

Q 25. If  $A=x^3 y^2$  and  $B=xy^3$ , then find the HCF of A,B.

a) $x^4y^5$  b) $xy^2$  c) $xy$  d) $x^3$

Solution-if  $A=x^3y^2$

$B=xy^3$

then  $hcf=xy^2$

bcz hcf is always equal to the highest common powers between the expressions,

i.e  $x^1$  is common in both and also  $y^2$  is common in both.

Q 26. In a clock the long hand is of 8cm and the short hand is of 7cm. if the clock runs for 4 days find out the total distance covered by both the hands

a)  $1824 \pi$  cm                      b) $1648\pi$  cm                      c) $1724\pi$  cm                      d) $2028\pi$  cm

Solution-Explanation: Short Hand ( Hour hand)

Hour hand makes a full rotation in 12 hours.

One full rotation in 12 hours  $\Rightarrow 2\pi r = 14\pi$  cm traversed every 12 hours.

For one day(24 hours ), we have  $28\pi$  cm, twice that of a 12 hour period.

For 3 days, we then have  $4 \times 28 \pi = 112\pi$  cm traversed.

Long Hand ( Minute hand)

One full rotation in 1 hour  $\Rightarrow 2\pi r = 16\pi$  cm traversed every hour.

For one day, we have  $24 \times 16 \pi = 384\pi$  cm.

For 4 days, we then have  $4 \times 384\pi = 1536\pi$  cm traversed.

Total Distance

For the total, we have  $112\pi + 1536\pi = 1648\pi$  cm.

**Q 27. A can finish a work in 18 days and B can do the same work in 15 days. B worked for 10 days and left the job. In how many days A alone can finish the remaining work?**

**a) 7 b) 6 c) 5 d) 10**

**Solution-**A can finish  $\frac{1}{18}$ th of the total work in a day and B can finish  $\frac{1}{15}$ th of the total work in a day. After working 10 days by B alone, the work remains is  $1 - 10 \times \frac{1}{15} = \frac{1}{3}$  of the total work.

**It can be finished by A in  $13 \div \frac{1}{18} = 1 \times 18 \times 1 = 6$  days.**

**Q 28. In how many possible ways can you write 1800 as a product of 3 positive integers a, b, c**

**a) 350 b) 360 c) 380 d) 450**

**Solution-** $1800 = 2^3 \times 3^2 \times 5^2$

**then  $5 \times 2^4 \times 2^4 \times 2 = 360$  ans**

**Q 29. In a horse racing competition there were 18 numbered 1 to 18. The organizers assigned a probability of winning the race to each horse based on horse's health and training. The probability that horse one would win is  $\frac{1}{7}$ , that 2 would win is  $\frac{1}{8}$ , and that 3 would win is  $\frac{1}{7}$ . Assuming that tie is impossible. Find the chance that one of these three will win the race?**

**a)  $\frac{22}{392}$  b)  $\frac{1}{392}$  c)  $\frac{23}{56}$  d)  $\frac{391}{392}$**

**Solution-**HORSE 1:  $\frac{1}{7}$  WINNING PROBABILITY

**HORSE 2:  $\frac{1}{8}$  WINNING PROBABILITY**

**HORSE 3:  $\frac{1}{7}$  WINNING PROBABILITY**

**ONE OF THESE WILL WIN THE RACE:**

**$\Rightarrow \frac{1}{7} + \frac{1}{8} + \frac{1}{7}$**

**$\Rightarrow \frac{8}{56} + \frac{7}{56} + \frac{8}{56}$  (TAKING LCM)**



=> 23/56

Q 30. Apple costs L rupees per kilogram for first 30kgs and Q rupees per kilogram for each additional kilogram. If the price of 33 kilograms is 11.67 and for 36kgs of Apples is 12.48 then the cost of first 10 kgs of Apples is

a) 3.50 b) 10.53 c) 1.17 d) 2.8

Solution- $30L + 3Q = 11.67$

$30L + 6Q = 12.48$

-----

$3Q = .81$   $Q = .27$

from that  $L = 0.362$  cost of 10 kg apple is  $10 \times .362 = 3.6$  a) 3.50

Q 31. How many vehicle registration plate numbers can be formed with digits 1,2,3,4,5 (no digits being repeated) if it is given that registration number can have 1 to 5 digits ?

a) 205 b) 100 c) 325 d) 105

Solution-you can have registration plates of 5,4,3,2 or 1 digits

So, it's  $5 \times 4 \times 3 \times 2 \times 1 + 5 \times 4 \times 3 \times 2 + 5 \times 4 \times 3 + 5 \times 4 + 5$

$= 120 + 120 + 60 + 20 + 5$

=> 325

Q 32. Jake and Paul each walk 10 km. The speed of Jack is 1.5 faster than Paul's speed. What is Jack's speed ?

a) 4 b) 6 c) 7 d) 8

Solution-Let Paul's speed be x kmph

Then Jack's speed is  $(x + 1.5)$  kmph

$(10/x) - (10/(x + 1.5)) = 1.5$

$$X=2.5$$

$$\text{Jacks speed}=2.5+1.5=4\text{kmph}$$

Q33. In this question  $A^B$  means A raised to the power B. If  $f(x)=a*x^4-b*x^2+x+5$ .  $f(-3)=2$ . Then  $f(3)=?$

a) 3 b) 7 c) 8 d) 6

Solution-Given that  $f(x)=a*x^4-b*x^2+x+5$

$$\text{and } f(-3)=2$$

$$\text{so } \Rightarrow a*(-3)^4-b*(-3)^2+(-3)+5=2$$

$$\Rightarrow 81a-9b+2=2$$

$$\Rightarrow 81a-9b=0 \text{ -----equation(1)}$$

$$\text{now } f(3)=a*(3)^4-b*(3)^2+3+5$$

$$=81a-9b+8$$

$$\text{and from equation (1) } 81a-9b=0$$

$$\text{so } f(3)=0+8=8$$

Q 34. Of a set of 30 numbers, average of first 10 numbers = average of last 20 numbers. Then the sum of the last 20 numbers is ?

(a) 2 X sum of first ten numbers

(b) 2 X sum of last ten numbers

(c) Sum of first ten numbers

(d) Cannot be determined with given data

Solution-since,  $\text{average}=(\text{sum of } n \text{ no.s})/(\text{total no})$

$$\text{therefore, } (\text{sum of first 10 no.s})/10 = (\text{sum of last 20 no})/20$$

$$\text{hence. } (\text{sum of last 20 no.s}) = 2*(\text{sum of first 10 no.s})$$

**Q 35. Mother, daughter and infant total weight is 74 kg. Mother's weight is 46 kg more than daughter and infant's weight. Infant's weight is 60% less than daughter's weight. Find daughter's weight.**

**a)10 b)9 c)8 d) 7**

**Solution-Total Age is  $M+D+I=74$**

**given that  $M-D-I=46$**

**solving above 2 eq's we get Mother age = 60**

**now remaining age=14 which is sum of daughter and Infant age.**

**Given that Infant age is 60% less than Daughter.**

**i.e If daughter age is 100 then infant age is 40.**

**So ages ratio Of D and I is 100 : 40 i.e ... 5 : 2**

**So  $(5+2)=7$  parts equal to 14.**

**then 5 parts equal to 10.**

**2 parts equal to 4.**

**daughter age is =10**

**and infant age is = 4**

**Answer a) 10**

**Q 36. In a certain city, 60% of the registered voters are congress supporters and the rest are BJP supporters. In an assembly election, if 75% of the registered congress supporters and 20% of the registered BJP supporters are expected to vote for candidate A, what percent of the registered voters are expected to vote for candidate A?**

**a) 53 b) 20 c) 60 d) 75**

**Solution-let the people in the city be x**

**60% are congress=60% of x**

40% are BJP=40% of x

out of 60%, 75% voted for congress=75%(60% of x)= $18x/40$

out of 40%, 20% voted for congress=20%(40% of x)= $8x/100$

total= $18x/40+8x/100=106x/200$

total percent= $106x/200*100=53\%$  of x

**Q 37.** In a particular year the month of january had exactly 4 thursdays and 4 sundays , on which day of the weekk, jan 1 occurs?

a) Monday b) Tuesday c) Thursday d) Wednesday

**Solution-**as there are 4 fulls weeks i.e 28 days..

so..every day occurs min 4 times.

den remaining 3 days (as jan has 31 days) will be monday tuesday wednesday.

so on 31st jan comes wednesday.

so 1st jan ll be MONDAY

**Q 38.** A number when divided successively by 4 and 5 leaves remainder 1 and 4 respectively. when it is successively divided by 5 and 4, then the respective remainders will be;

a). 1,2

b). 2,3

c). 3,2

d). 4,1

**Solution-**When dividing a positive integer  $n$  by another positive integer  $D$  (divider), we obtain a quotient  $Q$ , which is a non-negative integer and a remainder  $R$ , which is an integer such that  $0 \leq R < D$ . We can write  $n=DQ+R$ .

When dividing our number  $n$  by 4 we obtain a remainder of 1, so, if the quotient is some integer  $Q$ , we can write  $n=4Q+1$ .

Now, dividing  $Q$  by 5, we obtain another quotient say  $q$  and remainder 4, thus we can write  $Q=5q+4$ .

It follows that  $n=4(5q+4)+1=20q+17$ .

Since  $n=20q+17=5(4q+3)+2$ , it means that when dividing  $n$  by 5 first, we get a quotient  $4q+3$  and remainder 2.

Then dividing  $4q+3$  by 4 we obviously obtain a remainder of 3.

**Q 39.** Average salary of 17 teachers is 45000. 3 teachers left and the average salary dropped by 2500. What is the sum of salaries of 3 teachers who left?

a) 173000 b) 176000 c) 170000 d) 85000

**Solution-** Total Initial Salary :  $17 \times 45000 = 765000$

Average Salary After removal of 3 Teachers =  $45000 - 2500 = 42500$

Total Final Salary :  $14 \times 42500 = 595000$

Sum of Salaries of 3 teachers who left :  $765000 - 595000 = 170000$

**Q 40.** There are 20 persons sitting in a circle. In that, there are 18 men and 2 sisters. How many arrangements are possible, in which the two sisters are always separated by a man?

- a.  $18! \times 2$
- b.  $17!$
- c.  $17! \times 2$
- d. 12

**Solution-**  $18! \times 2$  Consider 1 man along with two sisters as one group.. so they can be arranged in  $17!$  ways as circular.. The one man in between the two sisters can

be out of any 18 men.. so,  $17! \cdot 18$ .. and the two sisters can be arranged in 2 ways..so  $18! \cdot 2$

Q 41. a number plate can be formed with two alphabets followed by two digits with no repetition. then how many possible combinations can we get?

a) 58500 b) 67600 c) 57850 d) 58761

Solution- no.of alphabets=26 (a-z), no.of digits=10(0-9).

ways of arranging two alphabets with out repetition= $26 \cdot 25$ ;

ways of forming two digits without repetition= $10 \cdot 9$

no.of combinations of forming the number on number plate=  $26 \cdot 25 \cdot 10 \cdot 9 = 58500$

Q 42. The letters in the word "PLACES" are permuted in all possible ways and arranged in the alphabetical order.Find the word at 48 position.

a)AESPCL

b)ALCEPS

c)ALSCEP

d)AESPLC

Solution- ans = (d)

for words AC\*\*\*\* possible ways for arranging \* will be  $4! = 24$

now next seq in alphabatical order will be AE\*\*\*\* so....

same way for AE\*\*\*\* possible ways for arranging \* will be  $4! = 24$

..

..

Thus, 48th element will be last element in AE\*\*\*\* that means AE followed by reverse alphabatical order! which is AESPLC

**Q 43. A alone can do 1/4th of the work in 2 days. B alone can do 2/3th of the work in 4 days. If all the three work together, they can complete it in 3 days so what part of the work will be completed by C in 2 days?**

**A. 1/12**

**B. 1/8**

**C. 1/16**

**D. 1/20**

**Solution- A can do the total work in 8 days, and B can do it in 6 days.**

**Let the total work be 24 units. Now capacities are**

$$\mathbf{A = 24/8 = 3,}$$

$$\mathbf{B = 24/6 = 4,}$$

$$\mathbf{A + B + C = 24/3 = 8}$$

**So Capacity of C = 1 unit.**

**In two days C will do 2 units which is 2/24th part of the total work. So 1/12th part.**

**Q 44. A sum is sufficient to pay either George age for 15 days or marks wage to 10dayshow long together?**

**a)5 b) 6 c) 8 d) 9**

**Solution- George one day work is (1/15)**

**Marks one day work is (1/10)**

$$\mathbf{G+M=(1/15)+(1/10)=(1/6)}$$

**6 is the answer**

**Q 45. In how many ways a team of 11 must be selected a team 5 men and 11 women such that the team must comprise of not more than 3 men.**

- a) 1565      b) 2256      c) 2456      d) 1243**

**Solution- Maximum 3 men can be played which means there can be 0, 1, 2, 3 men in the team.**

$$(5C0 \times 11C11) + (5C1 \times 11C10) + (5C2 \times 11C9) + (5C3 \times 11C8) = 2256$$

**Q 47. how many prime numbers less than 100 and greater than 3 are of the form:  $4x+1$  ,  $5y-1$**

- a) 11 b)12 c)7 d)None of the above**

**Solution- all the prime numbers between 3 and 100 are:5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,61,67,71,73, 79, 83, 89 and 97**

**numbers must end with 4 or 9 to follow  $5y-1$  condition.**

**so the numbers are:29,89**

**so there are two numbers.**

**Q 48. Three dice are rolled. What is the probability of getting a sum of 13?**

- a)  $19/216$  b)  $21/216$  c)  $17/216$  d)  $23/216$**

**Solution- Just count the number of ways to get 13. We just need to count possibilities for two dice because the third dice value is fixed. For two dice, the sum can be anywhere from 7 to 12 and that would be  $6 + 5 + 4 + 3 + 2 + 1 = 21$ . So, the probability is  $21/216$**

**Q 49. On a 26-question test, five points were deducted for each wrong answer and eight points were added for each correct answer. If all the questions were answered, how many were correct if the score was zero?**



- a). 10
- b). 11
- c). 12
- d). 13

**Solution-** if x no. of question is wrong and y no. of question is correct then

$$-5x + 8y = 0 \text{ and } x + y = 26$$

**by solving we get**

$$x = 16 \text{ \& } y = 10$$

**Q 50.**Two alloys A and B are composed of two basic elements. The ratios of the compositions of the two basic elements in the two alloys are 5:3 and 1:2, respectively. A new alloy X is formed by mixing the two alloys A and B in the ratio 4:3. What is the ratio of the composition of the two basic elements in alloy X?

- a) 1:1 b) 2:3 c) 5:2 d) 4:32

**Solution-** Let the actual amount of A be 4x and actual amount of B be 3x since A and B are in the ratio 4/3

$$\text{amount of first basic element in the new alloy T } (5/8) \cdot 4x + (1/3) \cdot 3x = (7x)/2$$

$$\text{amount of second basic element in the new alloy T } (3/8) \cdot 4x + (2/3) \cdot 3x = (7x)/2$$

**so ratio of first basic element to second basic element:**  $[(7x)/2] / [(7x)/2] = 1/1 = 1:1$   
**( Answer A)**

**Q 51.** Babla alone can do a piece of work in 10 days ashu alone can do it in 15 days. The total wages for the work in Rs.5000 .how much should babla be paid of they work together for entire duration of the work

a)4000 b)3000 c)5000 d)2000

Solution- babla 10 day----- now  $30/10=3$  unit per day

L.C.M = 30(total work they have to perform)

ashu 15 day-----  $30/15=2$  unit per day

so their ratios of work is 3:2

so babla will get  $3/5*5000=3000$

Q 52. Average of 3 numbers ABC is given as 48. Average of A,B,C,D is 46. Its given that E is having 3 more than D, then Average of B,C,D,E is 45. What is the score of A?

a) 46 b) 48 c) 49 d) 47

Solution- average  $A+B+C= 48$ ;  $A+B+C=3*48=144$ ;

average  $A+B+C + D= 46$ ;  $A+B+C+D =4*46=184$ ;

$D=40$ ; GIVEN  $E=D+3=40+3=43$ ;

$B+C+D+E=45*4= B+C+40+43=45*4$

$B+C=180-40-43$

$B+C=97$

$A+B+C=144$

$A+97=144$

$A=47$

Q 53. Raj travels a part of journey by taxi paying 15 per km and rest by train paying 21per km. If he travels a total of 450 Km and pay Rs.8130 then the distance travelled by raj in train?

a) 230 b) 260 c) 190 d) 180

Solution- let the distance traveled by train =x

therefore distance travelled by taxi =  $(450-x)$

now,  $15*(450-x) + 21*x=8130$

or,  $x=230$

**Q54. A sum is sufficient to pay either George age for 15 days or marks wage to 10 days how long together?**

**a) 9 b) 5 c) 6 d) 8**

**Solution- George one day work is  $(1/15)$**

**Marks one day work is  $(1/10)$**

**$G+M=(1/15)+(1/10)=(1/6)$**

**6 is the answer**

**Q 55. Radius of the bigger circle is 1. Which area will be greater?**

**a) 5 b) 4 c) cannot be determined d) none of these**

**Solution- If the radius of the bigger circle is 1, then diameter = 2 units. Which in turn equals to diagonal of square.**

**Let the side of the square be  $x$ . Then  $x^2 + x^2 = 2^2 \Rightarrow 2x^2 = 4 \Rightarrow x = \sqrt{2}$**

**Now diameter of the inner circle = side of the square. So radius of the inner circle =  $\frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$**

**Areas marked by 1, 2, 3, 4 =  $\frac{(\text{Area of the circle} - \text{area of the square})}{4} = \frac{\pi(1)^2 - (\sqrt{2})^2}{4} = \frac{\pi - 2}{4} = 0.285$**

Areas marked by 5, 6, 7, 8 = (Area of the square - area of the inner circle)/4 =  $(\sqrt{2})^2 - \pi(1\sqrt{2})^2 / 4 = 2 - \pi / 2 = 0.1075$

So Area marked by 4 is bigger.

**Q 56.** University of Vikram has enrolled nine Phd candidates. Babu Chitra, Dheeraj , Eesha, Farooq, Gowri , Hameed, Iqbal, Jacob.

-Farooq and Iqbal were enrolled on the same day as each other, and no one else was enrolled that day.

-Chitra and Gowri were enrolled on the same day as each other, and no one else was enrolled that day.

-On each of the other days of hiring , exactly one candidate was enrolled.

-Eesha was enrolled before Babu.

-Hameed was enrolled before Dheeraj

-Dheeraj was enrolled after Iqbal but before Eesha

- Gowri was enrolled after both Jacob and Babu

-Babu was enrolled before Jacob

Who were the last two candidates to be enrolled?

a) Gowri and Chitra b) Babu and Chitra c) Babu and Gowri d) Eesha and Jacob

**Solution-**

**Given that**

1. Easha < Babu

2. Hameed < Dheeraj

3. Iqbal < Dheeraj < Easha

4. Jacob/Babu < Gowri

5. Babu < Jacob

from 1 and 5, Easha was before Babu and Jacob so she cannot be in the last two.  
Option B ruled out

from 4 and 5, babu is before Jacob and Gowri so he cannot be in the last two.  
Options a, c ruled out.

So option d is correct.

**Q 56. A boy buys 18 sharpeners (brown or white) for Rs. 100. For every white sharpener, he pays one rupee more than the brown sharpener. What is the cost of white sharpener & how much did he buy?**

a) 5,13 b)5,10 c)6,10 d) None of these

**Solution-** If he bought x white sharpeners @ Rs (y+1) and (18-x) brown sharpeners @ Rs y per sharpener, then

$$x*(y+1)+(18-x)*y=100$$

$$x= 100-18y$$

Only integral value of x less than 18 will be 10.

then x=10, y=5

so he bought 10 white sharpeners @ Rs 6 per sharpeners and 8 brown sharpeners @ Rs 5 per sharpener.

c)6,10

**Q 57. If M is 30% of Q, Q is 20% of P, N is 50% of P, Then M/N = ?**

a) 4/3 b) 3/25 c) 6/5 d) 3/250

**Solution-**  $m=3/10q, q=1/5p, n=1/2p$

here we can find d value of p and put into d second to get value of q

so m/n will be 3/25

**Q 58. In a staircase, there are 10 steps. A child is attempting to climb the staircase. Each time, she can either make 1 step or 2 steps. In how many different ways can she climb the stair case?**

a). 10 b). 21 c). 36 d). None of these.

**Solution- she can go by**

**1 steps-1 way**

**that is choosing 1 two-step in 9 moves:**

**$9C1 : 9 \text{ ways//}$**

**2 two-steps:**

**choosing 2 two-steps in 8 moves:**

**$8C2 = 28 \text{ ways//}$**

**3 two-steps**

**$7C3 = 35 \text{ ways//}$**

**4 two-steps//**

**$6C4 = 15 \text{ ways//}$**

**5 two-steps//**

**which covers all the 10 stairs.. that means only one way**

**$2 \ 2 \ 2 \ 2 \ 2 = 1 \text{ way//}$**

**Adding all the ways:**

**$1 + 9 + 28 + 35 + 15 + 1 = 89 \text{ ways//}$**

**Q 59. Eesha bought two varieties of rice costing 50Rs per kg and 60 Rs per kg and mixed them in some ratio. Then she sold that mixture at 70 Rs per kg making a profit of 20 % What was the ratio of the mixture?**

**a) 1:10 b) 3:8 c) 1:5 d) 2:7**

**solution- let x be the price of the rice after mixing, then**

$$120 \cdot x / 100 = 70$$

**$x = 175/3$  by elimination method**

**the required ratio is  $(60 - 175/3) : (175/3 - 50) = 1:5$**

**Q 60. Find the 32nd word in the list where the word MONOS is permuted in all possible ways and arranged in alphabetical order.**

**a) OSMON b) OSNOM c) OSMNO d) ONMSO**

**Solution-**

**Arranging in alphabetical order MNOOS**

**M \_ \_ \_ CAN BE ARRANGED IN  $4!/2! = 12$  WAYS**

**N \_ \_ \_ CAN BE ARRANGED IN  $4!/2! = 12$  WAYS ( $12 + 12 = 24$ )**

**O \_ \_ \_ CAN BE ARRANGED IN  $4!/2! = 12$  WAYS ( $12 + 12 + 12 = 36$ ) OUT OF BOUND**

**OM \_ \_ CAN BE ARRANGED IN  $3! = 6$  WAYS ( $12 + 12 + 6 = 30$ )**

**30TH WORD IS OMSON**

**31ST WORD IS ONMOS**

**32ND WORD IS ONMSO**

**Q 61. One card is lost out of 52 cards. Two cards are drawn randomly. They are spade. What is the probability that the lost card is also spade?**

**a)  $1/52$  b)  $1/13$  c)  $1/4$  d)  $11/50$**

**Solution-  $(13 - 2) / (52 - 2) = 11 / 50$**

**Q 62. What is the value of**

$$44444445 \cdot 88888885 \cdot 44444442 \cdot 44444438 / 44444448^2$$

**a)88888883 b)88888884 c)88888888 d)44444443**

**Solution- take  $x=44444444$**

**that equ.can be written as-  $(x+1)(2x-3)(x-2)+(x-6) / x^2$**

**solving equation we get  $2x-5$**

**substitute  $x=44444444$  in above equation we get- 88888883**

**Q 63.Complete the series 4,20,35,49,62,74,?**

**a)76 b)79 c) 78 d) 85**

**Solution-  $4+16=20$**

$$20+15=35$$

$$35+14=49$$

$$49+13=62$$

$$62+12=74$$

$$74+11=85$$

**Q 64. Walking at  $3/4$  of his normal speed, Mike is 16 minutes late in reaching his office. The usual time taken by him to cover the distance between his home and his office is**

**a). 42 minutes**

**b). 48 minutes**

**c). 60 minutes**



d). 62 minutes

Solution- Let  $s$  = his normal speed

$t$  = his normal time

Then

$$D = \left(\frac{3}{4}\right)s * (t+16)$$

Since the distance is the same we can equate this to his regular day which is  $D = s*t$

$$s*t = \left(\frac{3}{4}\right)s * (t+16)$$

$$t=48$$

Q 65. The sum of 5 numbers in AP is 30 and the sum of their squares is 190.  
Which of the following is the third term?

a)5 b) 6 c) 8 d) 9

Solution- consider the 5 numbers in AP as  $a-2d, a-d, a, a+d, a+2d$ ;

given,  $a-2d+a-d+a+a+d+a+2d=30$ ;

$$5a=30 \implies a=6$$

here  $a$  is the 3rd term so..third term is 6.

Q 66. A, B and C can do a piece of work in 20, 30 and 60 days respectively. In how many days can A do the work if he is assisted by B and C on every third day?

a). 12 days

b). 15 days

c). 16 days

d). 18 days

**solution- A's 2 day's work =  $2 * (1/20) = 1/10$**

**(A + B + C)'s 1 day's work =  $((1/20)+(1/30)+(1/60)) = 1/10$**

**Work done in 3 days =  $(1/10)+(1/10) = 1/5$**

**Now,  $(1/5)$  work is done in 3 days.**

**Whole work will be done in  $(3 \times 5) = 15$  days.**

**Q 67. The least number which when divided by 48, 60, 72, 108 and 140 leaves 38, 50, 62, 98 and 130 as remainders respectively, is:**

**a) 4562**

**b) 15110**

**c) 2135**

**d) 7589**

**Solution- Here  $(48 - 38) = (60 - 50) = (72 - 62) = (108 - 98) = (140 - 130) = 10$  in every case**

**Least number will be LCM of  $(48, 60, 72, 108, 140) - 10$**

**LCM = 15120**

**So, required number =  $15120 - 10 = 15110$**

**Q 68. A sum of money is borrowed and paid back in two annual instalments of Rs.882 each allowing 5% C.I. The sum borrowed was:**

**a) Rs.1680   b) Rs.1142   c) Rs.640   d) Rs.1640**

**Solution-**

$$\text{amount} = p \cdot (1 + r/100)^n$$

$$\text{borrowed amount} = 882 / (1 + 5/100) + 882 / (1 + 5/100)^2$$

$$= (882 \cdot 20) / 21 + (882 \cdot 20 \cdot 20) / (21 \cdot 21)$$

$$= 1640$$

**Q 69.** how many parallelograms are formed by a set of 4 parallel lines intersecting an other set of 7 parallel lines.

a) 125 b) 126 c) 127 d) 128

**Solution-** Let there be 4 horizontal set of parallel lines and 7 vertical set of parallel line. (U can also consider vice-versa)

Now for a parallelogram, u need 2 horizontally parallel and 2 vertically parallel lines ie. we need to choose 2 lines from each set.

So the solution will be  ${}^7C_2 \cdot {}^4C_2 = 126$

**Q 70.** A completes 80% of a work in 20 days. Then B also joins and A and B together finish the remaining work in 3 days. How long does it need for B if he alone completes the work?

a)  $37 \frac{1}{2}$  b) 32 c)  $32 \frac{1}{2}$  d) 37

**Solution-** let total work is 100 unit .

A can do 80 unit in 20 days ....so he can do 4 unit in 1 days .

now A has finished 80 units so remaining work is 20 unit

so , 20 unit work takes 3 days time to complete in which A will do 12 unit

(since A do 4 unit/days )

thus ,B do 8 unit in 3 days

and total work is 100 unit so B will take  $(3/8)*100 = 37.5$  days to complete total work

**Q 71. a person starts writing all 4 digits numbers.how many times had he written the digit 2?**

**a) 4200 b) 4700 c) 3700 d) 3200**

**Solution-1)when 2 is at unit place= $9*10*10*1$**

**2)when 2 is at tenth place= $9*10*1*10$**

**3)when 2 is at hundred place= $9*1*10*10$**

**4)when 2 is at thousand place= $1*10*10*10$**

**so total no. of 2s= $900+900+900+1000=3700$**

**Q 72. There is a tank,and two pipes A and B.A can fill the tank in 25 minutes and B can empty the tank in 20 minutes.If both pipes are opened at same time.how much time required the tank can fill?**

**a) 15 min b) 18 min c) 13 min d) Never be filled**

**Solution-We have pipe A filling the tank completely in 25 minutes.**

**ie, it can fill 100% tank in 25 minutes.**

**Hence, in 1 min, the tank is filled =  $100/25 = 4\%$**

**We have pipe B which can empty the tank in 20 minutes.**

**Hence, in 1 min, tank is empties =  $100/20 = 5\%$ .**

**Since we have the rate of emptying the tank more than the rate of filling the tank,**

**We can say that the tank will never get filled.**

**Q 73. An Old man and a Young man are working together in an office and staying together in a near by apartment. The Old Man takes 30 minutes and the Young 20 minutes to walk from apartment to office. If one day the old man started at 10:00AM and the young man at 10:05AM from the apartment to office, when will they meet?**

**a) 10:15 b) 10:30 c) 10:45 d) 10:00**

**Solution-Ratio of old man speed to young man speed = 2:3**

**The distance covered by old man in 5 min = 10**

**The 10 unit is covered with relative speed= $10/(3-2)=10$  min**

**so, they will meet at 10:15 am.**

**Q 74. the shopkeeper charged 12 rupees for a bunch of chocolate. but i bargained to shopkeeper and got two extra ones, and that made them cost one rupee for dozen less then first asking price .**

**how many chocolates i recieved in 12 rupees ??**

**a)10**

**b)16**

**c)14**

**d)18**

**Solution-let no. of chocolates= $x=x/12$ dozen**

**price of  $x/12$  dozen is rs 12**

**so price of 1 dozen is  $144/x$**

**2nd condition**

**$144/(x+2) +1=144/x$**

go through option x=16

**Q 75.** there are 16 teams divided in 4 groups. Every team from each group will play with each other once. The top 2 teams will go to the next round and so on the top two teams will play the final match. Minimum hw many matches will be played in that tournament?

a) 43 b) 40 c) 14 d) 50

**Solution-**for first round  $4 \times 4C2 = 24$

second round  $2 \times 4C2 = 12$

$1 \times 4C2 = 6$

**FINAL**=1

**TOTAL**=43

**Q 76.** A sealed envelope contains a card with a single digit written on it. Three of the following statements are true and one is false.

I. The digit is 1.

II. The digit is not 2.

III. The digit is not 9.

IV. The digit is 8.

Which one of the following must necessarily be correct?

a) II is false

b) III is true

c) IV is false

d) The digit is even.

e) I is true

**Solution-**III is true

since when 3 is wrong then there are 2 possibilities that 1 or 8

which is not possible

**Q 77. Tickets are numbered from 1,2....1100 and one card is drawn randomly what is the probability of having 2 as a digit?**

**a) 29/110 b) 32/110 c) 30/110 d) 22/110**

**Solution-**for every 100 probability of having 2 as digit is 19 and 2 is used 20 times for every 100. according to qstn, there r 10 100's having 19 digits as 2 n 200 to 299 has 100 digits having 2. hence,

$$((10 \times 19) + 100) / 1100 = 29/110$$

**Q 78. How many 2's are there between the terms 112 to 375?**

**a) 313 b) 159 c) 156 d) 315**

**Solution-**156

from 112 to 199....(19)

from 200 to 299....(100+20)

from 300 to 375....(18)

so  $100 + 19 + 18 + 20 - 1 = 156$

-1 bcz 112 shouldn't be taken

**Q 79. Ram and Shakil run a race of 2000 meters. First, Ram gives Shakil a start of 200 meters and beats him by one minute. If , Ram gives Shakil a start of 6 minutes Ram is beaten by 1000 meters. Find the time in minutes in which Ram and Shakil can run the races separately.**

**a) 12,18 b) 10,12 c) 11,18 d) 8,10**

**Solution-**Let x and y are the speeds of Ram and Shakil.. Then by problem we got following equation

$$2000/x=(1800/y)-1$$

$$1000/X=(2000/y)-6$$

solve equation 1 and 2, we get  $x=250$  and  $y=200$

Therefore, Time taken by Ram and Shakilk to complete a race of 2000m is 8 min and 10 Min

d) 8,10

**Q80.** The average temperature of June, July and August was 31 degrees. The average temperature of July, August and September was 30 degrees. If the temperature of June was 30 degrees, find the temperature of September (in degrees).

a) 25

b) 26

c) 27

d) 28

**Solution-c.27**

$$\text{June} + \text{July} + \text{August} = 3 \times 31 = 93 \dots\dots (1)$$

$$\text{July} + \text{August} + \text{Sept} = 3 \times 30 = 90 \dots\dots (2) \text{ June} = 30$$

Hence, putting  $\text{june} = 30$  in equ 1

$$\text{July} + \text{August} = 63$$

putting in 2nd equ.

$$63 + \text{Sept} = 90$$

$$\text{hence, Sept} = 27$$

**Q 81.** Three generous friends, each with some money, redistribute the money as follows: Sandra gives enough money to David and Mary to double the amount of money each has. David then gives enough to Sandra and Mary to double their amounts. Finally, Mary gives enough to Sandra and David to double their



amounts. If Mary had 11 rupees at the beginning and 17 rupees at the end, what is the total amount that all three friends have?

a) 105 b) 60 c) 88 d) 71

**Solution-**let sandra, david and mary each has s, d and 11(given) respectively.

**After first distribution**

David has  $d+d=2d$ , marry has  $11+11=22$  and sandra has  $s-d-11$ .

**After second distribution,**

sandra has  $2*(s-d-11)$  , mary has  $2*22=44$  and david has  $2d-(s-d-11)-22=3d-s-11$ .

**After third distribution,**

sandra has  $2*2(s-d-11)$ , david has  $2*(3d-s-11)$  and mary has  $44-2(s-d-11)-(3d-s-11)=77-s-d$

It is given that finally Mary has 17 rs. So,

$$77-s-d=17$$

$$\Rightarrow s+d=60$$

$$\Rightarrow s+d+11(\text{Mary's money})=60+11=71.$$

**Q 82.** George walks 36 kms partly at a speed of 4 kms per hour and partly at 3 km per hour If he had walked at a speed of 3km per hour when he had walked at 4 and 4 km per when he had walked at 3 he would have walked only 34 kms. The time (in hours) spent by George in walking was).

a) 8 b) 12 c) 5 d) 10

**Solution-**the question can be solved with the help of two equations...

$$4x+3y=36\text{----equ(1)}$$

$$3x+4y=34\text{----equ(2)}$$

by solving these two equations

$$x=6 \text{ and } y=4$$

so total time is 10hours.

**Q 83. The sum of the four consecutive two digit odd number when divided by 10 becomes a perfect square, which of the following can be one of these four numbers?**

**a) 21 b) 25 c) 41 d) 67**

**Solution-Let the four 2-digit odd numbers be**

**$n-3$   $n-1$   $n+1$   $n+3$**

**Sum of the 4 numbers  $\Rightarrow 4n$**

**acc to qn, when the sum is divided by 10**

**we get a perfect square...**

**perfect squares include  $\Rightarrow 1, 4, 9, 16, 25, 36, 49, \dots$**

**Possible values of  $4n/10 \Rightarrow 4, 16, 36 \dots$**

**If  $4n/10=4$**

**$n=10$**

**Hence, the corresponding nos are 7, 9, 11, 13 (all of which are NOT 2-digit nos)**

**If  $4n/10=16$**

**$n=40$**

**Hence the corresponding nos are 37, 39, 41, 43**

**If  $4n/10=36$**

**$n=90$**

**Hence the corresponding nos are 87, 89, 91, 93**

**The answer to the ques therefore is Option C**

**Q 84. Consider the sequence of numbers 0, 2, 2, 4, ... Where for  $n > 2$  the  $n$ th term of the sequence is the unit digit of the sum of the previous two terms.**

**Let  $s_n$  denote the sum of the first  $n$  terms of this sequence. what is the smallest value of  $n$  for which  $s_n > 2771$ ?**

a) 692 b) 693 c) 694 d) 700

**Solution-**0 2 2 4 6 0 6 6 2 8 0 8 8 6 4 0 4 4 8 2 .0 2 2...this series will be repeated after every 20 terms

sum of 20 terms of series=80

2771/80 quotient=34 remainder=51 sum of 13 terms =52

number of terms is 693 since  $34 \times 20 = 680$

$680 + 13 = 693$

sum of 693 terms will be  $> 2771$

**Q 85.** a number plate can be formed with two alphabets followed by two digits with no repetition. then how many possible combinations can we get?

a) 52500 b) 58500 c) 56500 d) 56800

**Solution-**no.of alphabets=26 (a-z), no.of digits=10(0-9).

ways of arranging two alphabets with out repetition= $26 \times 25$ ;

ways of forming two digits without repetition= $10 \times 9$

no.of combinations of forming the number on number plate=  $26 \times 25 \times 10 \times 9 = 58500$

**Q 86.** I bought a certain number of marbles at rate of 59 marbles for rupees 2 times M, where M is an integer. I divided these marbles into two parts of equal numbers, one part of which I sold at the rate of 29 marbles for Rs. M, and the other at a rate 30 marbles for Rs. M. I spent and received an integral number of rupees but bought the least possible number of marbles. How many did I buy?

a) 870 b) 102660 c) 1770 d) 1740

**Solution-**Let he bought x marbles.

59 marbles costs = Rs. 2M

Therefore, x marbles costs = Rs.  $(2M \times x) / 59$

Since the marble is divided into 2 equal parts so the number x should be an even number.

For first  $x/2$  marbles,

29 marbles s.p. is = Rs. M

Therefore,  $x/2$  marbles s.p. = Rs.  $(M * x) / 58$

For other  $x/2$  marbles,

30 marbles s.p. is = Rs. M

Therefore,  $x/2$  marbles s.p. = Rs.  $(M * x) / 60$

Now we can't equate like  $[(M * x) / 58] + [(M * x) / 60] = (2M * x) / 59$

because  $(M * x)$  will get cancel each side and of course  $1/58 + 1/60$  is not equal to  $2/59$

So here we don't need M and we can cancel it. After that we have,

$$CP = 2x/59$$

For first  $x/2$  marbles,

$$SP = x/58$$

And for other  $x/2$  marbles,

$$SP = x/60$$

Now this CP and SP must be an integer (as per question). So we have to find a number x which will be divisible simultaneously by 59, 58 and 60. So we have to find the LCM of 59, 58, 60 which will turn out minimum value as 102660 and it is even as well. So the value of x will be 102660 minimum

**Q 87.** Cara, a blue whale participated in a weight loss program at the biggest office. At the end of every month, the decrease in weight from original weight was measured and noted as 1, 2, 6, 21, 86, 445, 2676. While Cara made a steadfast effort, the weighing machine showed an erroneous weight once. What was that.

a) 2676

b) 2

c) 445

d) 86

**Solution-** $1*1+1=2$

$$2*2+2=6$$

$$6*3+3=21$$

$$21*4+4=88 \text{ and not } 86$$

**Q 88. How many different integers can be expressed as the sum of three distinct numbers from the set {3,8,13,18,23,28,33,38,43,48}**

**a) 421 b) 20 c) 10 d) 22**

**Solution-minimum sum of 3 no.=24**

**maximum sum =129**

**now the series 24,29,34,.....,129**

**no of terms = $\{(129-24)/5\}+1=22$**

**Q 89. Aman walking at the speed of 4 km/h crosses a square field diagonally in 3 minutes. The area of the field (in m<sup>2</sup>) is:**

**a) 20000 b) 21000 c) 25000 d) 26000**

**Solution-convert speed into m/s i.e**

$$4*5/18 = 2/9$$

**this is distance covered in 1 sec.**

**so distance covered in 3 min i.e 180 sec =  $2/9*180$**

**= 200m**

**this is the length of diagonal**

**and area of square =  $1/2$  (diagonal)\*(diagonal)**

$$1/2*200*200$$

**20,000 m<sup>2</sup>**

**Q 90. A owes B Rs 50. He agrees to pay B over a number of consecutive day starting on a Monday, paying single note of Rs 10 or Rs 20 on each day. In how many different ways can A repay B. (Two ways are said to be different if at least one day, a note of a different denomination is given)**

**a) 8**

**b) 7**

**c) 6**

**d) 5**

**Solution-  $10,20,20=3!/2!==3$  ways**

**$10,10,10,20=4!/3!==4$  ways**

**$10,10,10,10,10=5!/5!==1$  way**

**so.total= $3+4+1==8$  ways.**

**Q 91. The HCF of 2472, 1284 and a third number 'N' is 12. If their LCM is  $2^3 \times 3^2 \times 5 \times 103 \times 107$ ,**

**then the number 'N' is:**

**a)  $2^2 \times 3^2 \times 7$**

**b)  $2^2 \times 3^3 \times 103$**

**c)  $2^2 \times 3 \times 5$**

**d) None of these**

**Solution-  $2472=8*3*103$**

**$1284=4*3*107$**

**so  $n = 4*3*x$**

**dividing by hcf**

**$2472/12=2*103$**

**$1284/12=107$**

$$\text{lcm}/12=2*3*5*103*107$$

$$x=\text{lcm}/\text{first}*\text{second}$$

$$x=2*3*5*103*107/2*103*107=3*5=15$$

$$\text{number is} = 15*12=180$$

ans. d)

Q 92. A certain function  $f$  satisfies the equation  $f(x)+2*f(6-x) = x$  for all real numbers  $x$ . The value of  $f(1)$  is

a) 2

b) can't determine

c) 1

d) 3

$$\text{Solution- } f(1)+2*f(6-1)=1 \dots\dots\dots (1)$$

$$f(5)+2*f(6-5)=5 \dots\dots\dots (2)$$

substituting we have (2) in (1) we have :-

$$-3f(1)=-9,$$

$$\text{hence answer } f(1)=3$$

Q 93. what is the value of  $77!*(77!-2*54!)^3/(77!+54!)^3+54!*(2*77!-54!)^3/(77!+54!)^3$

a)  $2*77!+2*54!$  b)  $77!-54!$  c)  $77!+54!$  d)  $2*77!-2*54!$

$$\text{Solution- } 77!-54!$$

take  $77!=a$ ,  $54!=b$  then we get in simple  $(a-2b)^3/a+b$  solve it u get  $a-b$  as answer

Q 94. Find sum of the series  $1-2+3-4+\dots-98+99$

a) -49 b) 0 c) 50 d) -50

$$\text{Solution- } (1+3+\dots+99)-(2+4+\dots+98) \text{ ie } 50 \text{ terms} + 49 \text{ terms resp.}$$

using formula  $s = \frac{n}{2}[a+l]$

we get,  $\frac{50}{2}[1+99] - \frac{49}{2}[2+98]$

den  $2500 - 2450 = 50$ .

**Q 95.** In a city there are few engineering, MBA and CA candidates. Sum of four times the engineering, three times the MBA and 5 times CA candidates is 3650. Also three times CA is equal to two times MBA and three times engineering is equal to two times CA. In total how many MBA candidates are there in the city?

a) 200 b) 300 c) 450 d) 400

**Solution-**  $e$  = no. of engineering students,  $m$  = no. of MBA students and  $c$  = no. of CA students

$4e + 3m + 5c = 3650$ , therefore  $e = \frac{(3650 - 3m - 5c)}{4}$  -----(1)

$3c = 2m$ , therefore  $c = \frac{2m}{3}$

$3e = 2c$  replacing  $e$  with (1) we get,

$\frac{3(3650 - 3m - 5c)}{4} = 2c$ .....replacing  $c$  with  $\frac{2m}{3}$  and solving this equation we get  $m = 450$

So the number of MBA students is 450

**Q 96.** Find the sum of angles 1,2,3,4,5 in a star.

a) 180 b) 300 c) 360 d) 400

**Solution-** let an angle of 5 star is  $a, b, c, d, e$

then  $(180 - a) + (180 - b) + (180 - c) + (180 - d) + (180 - e) = 720$

now  $a + b + c + d + e = 900 - 720 \Rightarrow 180$

**Q 97.** Consider a triangle drawn on the X-Y plane with its three vertices at (41, 0), (0, 41) and (0, 0), each vertex being represented by its (X, Y) coordinates. The



number of points with integer coordinates inside the triangle (excluding all the points on the boundary) is

(1) 780

(2) 800

(3) 820

(4) 741

**Solution-draw the triangle and view it carefully**

The number of points with integer coordinates inside the triangle are

(1,39)

(1,38),(2,38)

(1,37),(2,37),(3,37)

.....

.....

(1,2),(2,2),(3,2),.....(38,2)

(1,1),(2,1),(3,1),(4,1)...(38,1),(39,1)

so total no of points are= $1+2+3+...+38+39$

$=39*(39+1)/2=39*20=780$

**ANS(1)**

**Q 98. the marked price of coat was 40%less than the suggested retail price. Eesha purchased the coat for half of the marked price at the 15th anniversary sale. What percent less than the suggested retail price did eesha pay?**

**a)60% b)20% c)70% d)30%**

**Solution-suppose retail price = 100**

**so the market price will be = 60**

**as given coat purchased = half f d market price = 30**

so its clear isha paid 70% less than retail price.

**Q 99.** There is a school where 60% are girls and 35% of the girls are poor.

Students are selected at random, what is the probability of selecting a poor girl out of total strength.

a) 21 b) 27 c) 28 d) 29

**Solution-** '21 will be the probability of poor girl out of total strength....

let 100 be the total strength

60% out of 100 = 60 number of girls

now 35% of girls are poor ..i.e.  $(35/60) \times 100$  are poor girl = 21

so 21% of total strength are poor... i.e. the probability is .21

**Q 100.** If  $m+n$  is divided by 12 leaves a remainder 8, If  $m-n$  is divided by 12 leaves a remainder 6, then If  $mn$  is divided by 6 what is the remainder?

a) 4 b) 3 c) 2 d) 1

**Solution-** let  $m=19$  and  $n=1$ ;

$m+n=20$ , gives the remainder=8

$m-n=18$ , remainder=6

so  $mn=19 \times 1=19$  after division by 6 it would give the remainder 1...:)

**Q 101.** there is conical tent in which 10 persons can stand. Each person needs 6m square to stand and 60m cube air to breathe. what is the height of tent?

a) 60 b) 30 c) 20 d) 45

**Solution-Amount of area reqd. by 1 person to stand = 6 sq.metre**

**Amount of area reqd. by 10 person to stand = 6x10 sq.metre i.e 60 sq.metre**

**So,**

**Base Area,  $\pi r^2 = 60$**

$$\Rightarrow r^2 = 60/\pi \text{ -----(1)}$$

**Now,**

**Volume of air reqd. to breathe 1 person= 60 cu.metre**

**Volume of air reqd. by 10 person to breathe = 60x10=600 cu.metre**

**So,**

$$\text{Volume, } \frac{1}{3} \pi r^2 h = 600 \text{ -----(2)}$$

**Putting the value of eqn 1 in eqn 2, we get**

$$\frac{1}{3} \pi \cdot 60/\pi \cdot h = 600$$

$$\Rightarrow \frac{1}{3} \cdot 60 \cdot h = 600$$

$$\Rightarrow 20 \cdot h = 600$$

$$\Rightarrow h = 600/20 = 30$$

**Therefore height = 30 metres**

**Q 102. In a triangle ABC, the lengths of the sides AB and AC equal 17.5 cm and 9 cm respectively. Let D be a point on the line segment BC such that AD is perpendicular to BC. If AD = 3 cm, then what is the**

**radius (in cm) of the circle circumscribing the triangle ABC?**

**a) 17.05 b) 27.85 c) 22.45 d) 26.25**

**Solution-circum radius = R**

$$\text{Area of the triangle ABC} = \Delta = \frac{1}{2} (BC)(AD) = \frac{1}{2} (a)(3) = \frac{3a}{2}$$

$$\text{The formula here is : } R = \frac{abc}{4\Delta} = \frac{abc}{4(\frac{3a}{2})} = \frac{bc}{6} = \frac{(17.5)(9)}{6} = 26.25$$

**Q 103. A rectangle is divided into four rectangles with area 70,36,20 and X. The value of X is:**

**a) 350/90 b) 350/7 c) 350/11 d) 350/13**

**Solution-** $70/x = 36/20$

$$\Rightarrow x \cdot 36 = 20 \cdot 70$$

$$\Rightarrow x = 20 \cdot 70 / 36 = 350/9$$

**Q 104. the ratio of radii of cylinder to that of cone is 1:2. heights are qual. find ratio between volume.**

**a) 3:4 b) 1:2 c) 1:4 d) 4:1**

**Solution-**Let ratio of radius of cylinder to cone= $\dots r_1/r_2=1/2$

**Volume of cylinder**= $\pi \cdot r_1^2 \cdot h$

**Volume of cone**= $\pi \cdot r_2^2 \cdot h/3$

**Ratio of volumes**= $3 \cdot (r_1/r_2)^2 = 3:4$

**Q 105. A hollow pipe has circumference 14 cm. A bug is on its wall at a distance of 48 cm from top. A drop of honey is on the wall at 24 cm from top but diametrically opposite to bug. Find the shortest distance bug has to travel to reach honey.**

**a) 25 cm      b) 39 cm      c) 21 cm      d) 24 cm**

**Solution-**Total Vertical Distance bug has to through = 24 cm  
Circumference of pipe= 14 cm  
Since bug has to move to diametrically opposite side, it has to cover half of the circumference =  $14/2 = 7$  cm  
SO by Pythagoras, diagonal distance would be =  $\sqrt{7^2 + 24^2} = \sqrt{625} = 25$  cm

**Q 106. if a ladder is 100m long, and distance b/w bottom of ladder and wall is 60. top side of bottom and wall is joint.**

what is the maximum size of cube that place b/t them.

a) 34.28 b) 24.28 c) 21.42 d) 28.56

Solution- using trigonometry we have

$$(80/60)=\tan(y)....1$$

$$(x/60-x)=\tan(y)....2$$

solve it... u will have 35 so a) 34.28

Q 107. what is the next three numbers for the given series? 11 23 47 83 131

a)145 b) 178 c) 176 d) 191

Solution- there are multiples of 12:

$$11+12=23$$

$$23+(12*2)=47$$

and so on .....answer is 191 as  $131+(12*5)=191$

Q 108. A series of book was published at 7 year intervals. When the 7th book was issued the sum of publication year is 13524. When was the 1st book published ?

a) 1911 b) 1910 c) 2002 d) 1932

Solution- sum of A.P. series  $=\frac{n}{2}(2*a+(n-1)*d)$

here sum=13524, n=7, d=7 substituting these values in above eq. n solving we get  
 $a=1911$

which was the 1st book published year.

Q 109. There are 14 digits of credit card number to be filled. Each of the below three boxes contains continuous digits of 18 as sum. Given: 4th digit is 7 and 7th digit is x. Then what is the value of x?

a) 1 b) 7 c) 4 d) 2

**Solution-**  $a+b+c=18$  and  $b+c+d=18$

given  $d=7$ , so  $b+c=11$

then we get  $b=5$  and  $c=6$

$c+d+e=18$ , so  $e=18-(c+d)=5$

since  $d+e+f=18$

we get  $f=7$  ie  $x=7$

**Q 110.** Crusoe hatched from a mysterious egg discovered by Angus, was growing at a fast pace that Angus had to move it from home to the lake. Given the weights of Crusoe in its first weeks of birth as 5, 15, 30, 135, 405, 1215, 3645. Find the odd weight out.

a) 3645

b) 135

c) 30

d) 15

**Solution-** 30.

5

$5*3=15$

$15*3=45$ (here it is given as 30)

$45*3=135$

$135*3=405$

$405*3=1215$

$1215*3=3645$

**Q 111.** Arun makes a popular brand of ice-cream in a rectangular shaped bar 6 cm long, 5 cm wide and 2 cm thick. To cut costs, the company had decided to reduce

the volume of the bar by 19%. The thickness will remain the same, but the length and width will be decreased by the same percentage. The new width will be.

a) 4.5cm b) 5.5cm c) 6.5 cm d) 7.5cm

**Solution-** volume  $v=l*b*t$

new volume is 81% of old v.

therefore new vol = 81%(v)= $l'*b'*t$

$$\Rightarrow 81\% (l*b*t) = l'*b'*t$$

$$\Rightarrow 81\% (l*b) = l' * b'$$

since the change in new l and b is the same. hence consider change to be x.

$$\Rightarrow 81\% (l*b) = xl*xb$$

$$81\%=x^2$$

$$x=9\%.$$

9% change in 5cm width is 0.45

therefore new width is  $5-0.45=4.55\text{cm}$

**Q 112.** A can complete a piece of work in 8 hours, B can complete in 10 hours and C in 12 hours. If A,B, C start the work together but A leaves after 2 hours. Find the time taken by B and C to complete the remaining work.

a) 2 (1/11) hours

b) 4 (1/11) hours

c) 2 (6/11) hours

d) 2 hours

**Solution-** A,B,C 1 hour work is= $1/8+1/10+1/12= 37/120$

A,B,C work together for 2 hours, so,A,B,C 2 hours work is:  $(37/120)*2=37/60$

remaining work= $1-37/60=23/60$  (23/60 work is done by B and C together)

B,C 1 hour work is=  $1/10+1/12=11/60$

23/60 hours work done by B,C=  $(11/60) * (60/23) = 11/23$

so... ans is:  $2(1/11)$

Q 113. What is the greatest possible positive integer n if  $8^n$  divides  $(44)^{44}$  without leaving a remainder?

a)14 b)28 c)29 d)15

Solution-  $44^{44} = 2^{88} * 11^{44}$

$= 8^{29} * 2 * 11^{44}$

so ans is 29

Q 114. A tree of height 36m is on one edge of a road of width 12m. It falls such that the top of the tree touches the other edge of the road. Find the height at which the tree breaks.

a) 16 b) 24 c) 12 d) 18

Solution- let the height at which it broke be Xmt

let the length of other piece be Ymt which touches ground

$X+Y=36$ ;

$Y^2 - X^2 = 144$

then on solving  $x=16$ mt

Q 115. How many 6 digit even numbers can be formed from digits 1 2 3 4 5 6 7 so that the digit should not repeat and the second last digit is even?

a)6480 b)320 c)2160 d)720

Solution- given 6th digit even number , so last digit 2 or 4 or 6-> 3 ways



" 5th digit should be even...so there will be 2 ways(rep. not allowed)

so,therefore we get  $5*4*3*2*2*3=720$  ways

Q 116. At the end of 1994 rohit was half an old as his grand mother.The sum of years in which they were born is 3844. How old rohit was at the end of 1999.

a) 48 b) 55 c) 49 d) 53

Solution- let at the end of 1994 grand mother's age is  $x$

and rohit's age  $x/2$

then we can say....birth year of GM is  $=(1994-x)$

and rohit is  $=(1994 - x/2)$

sum of years is 3844

i.e  $(1994 -x) + (1994 - x/2) = 3884$

$\Rightarrow x = 96$

i.e GM age is 96

so rohit age will be  $96/2 = 48$  years

in 1994 age is 48

1995 49

1996 50

1997 51

1998 52

1999 53

so ans should be 53 years.....

Q 117. Find the number of divisors of 1728.?

a) 28 b) 21 c) 24 d) 18

**Solution-  $1728 = 2^6 \times 3^3$**

**Hence the Number of factors =  $(6+1) \times (3+1) = 7 \times 4 = 28$ .**

**We know that if a number represented in standard form  $(a^m \times b^n)$ , then the number of factors is given by  $(m+1)(n+1)$ .**

**Answer is 28**

**Q 118. 17 x 8 m rectangular ground is surrounded by 1.5 m width path. Depth of the path is 12 cm. Gravel is filled and find the quantity of gravel required.**

- a) 5.5
- b) 7.5
- c) 6.05
- d) 10.08

**Solution- area of the rectangular ground =  $(17 \times 8) \text{ m}^2 = 136 \text{ m}^2$**

**taking into account the path:**

**total area =  $[(17 + (2 \times 1.5)) \times (8 + (2 \times 1.5))]$  =  $220 \text{ m}^2$**

**area of the path =  $220 - 136 = 84 \text{ m}^2$**

**gravel required =  $[84 \times (12/100)] = 10.08 \text{ m}$**

**Q 119. Ashok, Eesha, Farookh, and Gowri ran a race. Ashok said, “I did not finish 1st or 4th “.**

**Eesha said, “I did not finish 4th “. Farookh said, “I finished 1st “. Gowri said, “I finished 4th “. There were no ties in the competition, and exactly three of the children told the truth. Who finished 4th? explain**

- a) Farookh
- b) Eesha
- c) Gowri
- d) Ashok

**Solution- Gowri finished with 4th place:**

**According to the qsn :**

**exactly three of the children told the truth.**

**then 4 conditions may arise i.e.**

**TTTF, TTFT, TFTT, FTTT**

**For 1st condition :**

**Let Gowri lies that means she never be in 4th Place and other 3 tell the truth then nobody is in 4th place**

**so from the above we conclude that Gowri finished at the 4th**

**Q 120. A circle has 29 points arranged in a clockwise manner numbered from 0 to 28, as shown in the figure below. A bug moves clockwise around the circle according to the following rule. If it is at a point  $i$  on the circle, it moves clockwise in 1 second by  $(1 + r)$  places, where  $r$  is the remainder (possibly 0) when  $i$  is divided by 11. Thus if it is at position 5, it moves clockwise in one second by  $(1 + 5)$  places to point 11. Similarly if it is at position 28 it moves  $(1 + 6)$  or 7 places to point 6 in one second. If it starts at point 23, at what point will it be after 2012 seconds?**

**a) 1 b) 7 c) 15 d) 20**

**Solution- after 1st second :  $(1 + 23 \% 11 = 1) = 2$  places [25]**

**after 2nd second :  $(1 + 25 \% 11 = 3) = 4$  places [0]**

**after 3rd second :  $(1 + 0 \% 11 = 0) = 1$  place [1]**

**after 4th second :  $(1 + 1 \% 11 = 1) = 2$  places [3]**

**after 5th second :  $(1 + 3 \% 11 = 3) = 4$  places [7]**

**after 6th second :  $(1 + 7 \% 11 = 7) = 8$  places [15]**

**after 7th second :  $(1 + 15 \% 11 = 4) = 5$  places [20]**

after 8th second :  $(1+20\%11 = 9) = 10$  places [1]

now,for the same pattern from 4th sec to 8th sec will repeat itself (5 sec intervals)..

total time = 2012 secs

first 3 secs out of pattern...so time left  $2012 - 3 = 2009$  secs

now no. of repetitions in the leftover time =  $2009/5 = 401$ ....remainder = 4

for the next 4 iterations following the similar pattern

the position will be 20..

**Q 121. A team won 80% of the games it played. It played 5 more games of which it won 3 and lost 2. Its loss percentage changed to 25%. How many games did it play overall?**

a) 20

b) 14

c) 16

d) 25

**Solution- ans= 20**

if game played= $x$

then lost game= $x/5$

now they played 5 more games in which they lost 2

so,  $(x+5)*25/100=x/5 + 2$

$x=15$

so total game he played= $15+5 = 20$

**Q 122. find the sum of the series given below  $1(1!)+2(2!)+3(3!)+\dots+2012(2012!)$**

**a)  $2013!+1$  b)  $2013!-1$  c)  $2012!+1$  d)  $2013!-1$**

**Solution-** let  $x = 1(1!)+2(2!)+3(3!)+\dots+2012(2012!)$  &  $y = 1!+2!+3!+\dots+2012!$

$$x+y = 2(1!)+3(2!)+\dots+2013(2012!) = 2!+3!+\dots+2012!+2013!$$

$$x+y+1 = 1!+2!+3!+\dots+2012!+2013! = y+2013!$$

$$x = 2013! - 1$$

**Q 123. there is a circle which circumscribes three unit circle which are tangential to each other.what is the circumference of bigger circle.?**

**a)  $\pi(4+2\sqrt{3})/\sqrt{3}$  b)  $\pi(6+2\sqrt{3})/\sqrt{3}$  c)  $\pi(3+2\sqrt{3})/\sqrt{3}$  d)  $\pi(6+2\sqrt{3})/\sqrt{3}$**

**Solution-** Just draw according to question,

now, join the center of the smaller circles.

radius of bigger circle= 1+ radius of circle circumscribing the equilateral triangle.

$$\text{Hence radius of bigger circle} = \frac{2}{\sqrt{3}} + 1$$

$$\text{Hence circumference} = 2 * \pi * R$$

$$\text{ie. } \pi(4+2\sqrt{3})/\sqrt{3}$$

**Q 124. a man starts work on monday and works for 8 days and works for every ninth day as his holiday. His 12th day will be on which day**

**a) Monday b) Wednesday c) Thursday d) Tuesday**

**Solution-** his work cycle includes 9 days(Mon-Mon=8days and 1 day Tue is holiday)

so to get 12 holiday there should be 12 cycle= $12*9=108$  days

get remainder by dividing it by 7( $108/7$  i.e 3)

hence from monday 3rd day is wensday

**Q 125.** the value of a scooter depreciates in such a way that at the end of each year, is  $\frac{3}{4}$  of its value at the beginning of same year. If the initial value of the scooter is rs40,000. What is the value at the end of 3yrs?

- a)23125      b)19000      c)13435      d)16875

**Solution-** As, it is given that , the cost becomes  $\frac{3}{4}$  at the end of year.

so, after 3 years ,the price of Scooter= $40000 \times \frac{3}{4} \times \frac{3}{4} \times \frac{3}{4} =$  Rs.16875

**Q 126.** At 12:00 hours jake starts to walk from his house at 6kms an hour. At 13:30 hours, paul follows him from jake's house on his bicycle at 8 kmph. When will jake be 3 kms behind paul?

- a) 19:00 b) 18:30 c) 20:00 d) 19:30

**Solution-** upto 13:30 jake covered  $6 \times 1.5 = 9\text{km}$

then paul need to be ahead of 3 km.so he go 12km.

their relative speed is 2km per hour.(same direction).

so 12km divided by 2 is 6hrs.

hence from 13:30hrs ,6hrs is added.so answer is 19:30 hours.

**ANS:**19:30 hrs

**Q 127.** There are five boxes in a cargo hold. The weight of the first box is 200 kg and the weight of the second box is 20% higher than the weight of the third box, whose weight is 25% higher than the first box's weight. The fourth box at 350 kg is 30% lighter than the fifth box. Find the difference in the average weight of the four heaviest boxes and the four lightest boxes.

- a) 80 kg  
b) 75 kg  
c) 37.5 kg  
d) 116.8 kg

**Solution- weight of 1st box=200 kg**

**so weight of 3rd box=250 kg**

**weight of 2nd box = 300 kg and 4th box= 350**

**thus 5th box=500 kg**

**avg weight of four heaviest boxes=  $1400/4=350$**

**and lightest box= $1100/4=275$**

**diff=75 kg**

**Q 128. A rectangle of height 100 squares and width 200 squares. Squares is drawn on a graph paper. It is colored square by square from top left corner and moving across in a spiral turning right. Whenever a side of this rectangle or a colored square is reached. Which square is colored last (give its row and column numbers). The bottom right square is on row 100, column 200?**

**a) 51,150**

**b) 51, 50**

**c) 50, 150**

**d) 50, 50**

**Solution- For (4, 8) rectangle, ends at (3, 2)**

**Likewise,**

**For (2, 4) rectangle, ends at (2, 1)**

**For (3, 6) rectangle, ends at (2, 5)**

**For (4, 8) rectangle, ends at (3, 2)**

**For (5, 10) rectangle, ends at (3, 8)**

**For (6, 12) rectangle, ends at (4, 3)**

**For (7, 14) rectangle, ends at (4, 11)**

**For (8, 16) rectangle, ends at (5, 4)**

**For (9, 18) rectangle, ends at (5, 14)**

For (10, 20) rectangle, ends at (6, 5)

Analyzing the above 10 points:

We can get some idea that,

For Even number of rows, End points column increases 1 by previous column.

For Odd number of rows, End points column difference of the present column and the previous even number column.

For End point row, the value repeats two times from row 2.

In our problem, (100, 200) i.e.

Even number row,

So End point column value must be 50 for 200 columns and End point row value must be 51 for 100 rows.

For even number of rows and columns,

Condition:  $\text{Column} = 2 * \text{Row}$

Endpoint (R, C) =  $\{((\text{Row}/2) + 1), \text{Column}/4\}$

so last square to be coloured is (51, 50)

**Q 129.** A bag contains six sticks of the following lengths 1 cm, 3 cm, 7 cm, 11 cm and 13 cm. three sticks are drawn at random from the bag. What is the probability that we can form a triangle with those sticks?

- a)  $11/20$
- b) 1
- c)  $1/4$
- d)  $2/5$

**Solution-** A bag contains six sticks of the following lengths 1 cm, 3 cm, 7 cm, 5cm, 11 cm and 13 cm. three sticks are drawn at random from the bag. What is the probability that we can form a triangle with those sticks

total possibilities =  $6C3 = 20$



now for making a triangle,, the sum of any 2 sides must be greater than 3rd side  
so

3 5 7

3 11 13

5 7 11

7 11 13

5 11 13

$5/20=1/4$

Q 130. 3 mangoes and 4 apples costs Rs 85. 5 apples and 6 peaches costs Rs.  
122. 6 mangoes and 2 peaches cost Rs.114. what is the combined price of 1  
apple, 1 peach and 1 mango?

a) 37 Rs

b) 39 Rs

c) 35 Rs

d) 36 Rs

Solution-  $3m+4a=85$ ...(i)

$5a+6p=122$ ....(ii)

$6m+2p=114$ ....(iii)

Adding (i) (ii) (iii) we get

$9a+9m+8p= 321$

$9a+9m+9p= 321+p$

$a+m+p=(321+p)/9$ -----(iv) It must have to be a integer number.

To make (iv) as an integer p must have to be either 3 or (3+9) or (3+18)or.....

Let check it out..

if  $p=3$  then

$$5a+18=122$$

$$5a=104$$

$a \neq$  an integer so  $p=3$  is false

If  $a=12$ , then

by(ii)

$$5a=122-72$$

$$a=10$$

by(i)

$$3m+85=40$$

$$a=15$$

$$a+m+p=15+10+12=37.$$

Q 131. how many number  $x$  ( $x$  being an integer) with  $10 \leq x \leq 99$  are 18 more than sum of their digits?

a)12

b)9

c)18

d)10

Solution- Let the no. be  $10y+z$ .

then,

$$10y+z = y+z+18$$

$$\Rightarrow Y=2$$

So the no. are 20, 21, 22, 23, 24, 25, 26, 27, 28, 29. Total nos. 10

**Q 132. F, G, H, K, L, M and N are 8 people. They need to group into 2 with the condition.**

- \* F and J must be same group**
- \* G and N must be in different groups**
- \* H and L must be in same group**
- \* M and G are not in the same group**

**Correct ordering of groups**

- a) FJ,KL,MN,GH**
- b) FH,JL,MN,GK**
- c) FJ,HL,MN,GK**
- d) FJ,HI,MN,GH**

**Solution- ans is c because c satisfies all the conditions specified**

**Q 133. In how many ways can the digit of the number 2233558888 be arranged so that the odd digits are placed in the even positions?**

- a) 900 b) 450 c) 225 d) 360**

**Solution- odd place combination =  $\frac{5!}{2! \cdot 2!} = 30$**

**even place combination =  $\frac{6!}{2! \cdot 4!} = 15$**

**to total =  $30 \cdot 15 = 450$**

**Q 134. Find the probability that a leap year chosen at random will contain 53 sundays.**

- a)  $\frac{2}{7}$**
- b)  $\frac{3}{7}$**
- c)  $\frac{1}{49}$**
- d)  $\frac{1}{7}$**

**Solution-** In leap year, we have 366 days.

$$366/7=52\text{Weeks}+2\text{days}$$

we have already 52 sundays,mondays,etc.

then we have 2 days may be

{sunday,monday} , {monday,tuesday} , {tuesday,wednesday}  
,....{saturday,sunday}

we have 2 possible chances out of 7.

hence ans:2/7.

**Q 135.** A shop sells chocolates It is used to sell chocolates for Rs.2 each but there were no sales at that price. When it reduced the price all the chocolates sold out enabling the shopkeeper to realize Rs 164.90 from the chocolates alone If the new price was not less than half the original price quoted How many chocolates were sold?

a) 39 b) 97 c) 37 d) 71

**Solution-** just go on trial and error method until u get u a integer.  $164.90/1.7=97$

**Q 136.** The Mean of three numbers is 10 more than than the least number and 15 less than the highest. Their median is 5. Find the sum of the three numbers.

a) 5 b) 20 c) 30 d) 25

**Solution-** given:  $x+y+z/3=m$

$$y=5;$$

$$m=x+10;x=m-10;$$

$$z=m+15$$

sub in above give eq u will get  $m= 10$ ;

$$\text{sub in } x, y, z = 0, 5, 25 = \text{total} = 30$$

**Q 136. what is the remainder of  $(16937^{30})/31$**

**a) 1 b) 2 c) 3 d) 6**

**Solution-**  $16937=16926+11$ , now 16926 is completely divisible.. So Wat remains is  $(11^{30})/31$

**Which is  $(11^6)^5/31$**

**$11^6$  gives 4 as remainder..so  $4^5/31$  is remaining...which gives 1 as remainder.**

**Q 137.  $8+88+888+.....+8888.....8888$ . There are 21 “8” digits in the last term of the series.**

**Find the last three digits of the sum.**

**a) 458 b) 648 c) 658 d) 568**

**Solution-**  $21*8=168$  carry 16

**$20*8=160+16=176$  carry 17**

**$19*8=152+17=169$**

**the value is 968**

**Q 138. If  $x^y$  denotes x raised to the power y, find last two digits of  $(1941^{3843})+(1961^{4181})$ .**

**a) 02 b) 82 c) 42 d) 22**

**Solution-** we should use power cycle method

**take last 2 digit of 1941 take last 2 digits of 1961**

**$41^1=41$   $r=1$   $61^1=61$   $r=1$**

**$41^2=81$ (take last 2 digits of ans) $r=2$   $61^2=21$   $r=2$**

**$41^3=21$   $r=3$   $61^3=81$   $r=3$**

**$41^4=61$   $r=4$   $61^4=41$   $r=4$**

**$41^5=01$   $r=0$   $61^5=01$   $r=0$**

$$41^6 \equiv 41 \pmod{61}$$

hence power cycle is repeating and it is 5 hence for 1961 it is 5

r-remainder for 1961 powercycle-5

$$\text{for } 1941 \text{ powercycle-5 } 4181 \bmod 5 = \text{rem}1 = 61$$

$$3843 \bmod 5 = \text{rem } 3 = 21$$

$$\text{therefore } 21 + 61 = 82$$

Q 139. in a G6 summit being held in London a French, a German, an Italian, a British, a Spanish and a Polish diplomat represent their respective countries and participate in a round table conference to strengthen the co operation between these countries. There are exactly 6 chairs evenly spaced around a circular table. The chairs are numbered 1 through 6, with successively numbered chairs next to each other and chair number 1 next to chair no 6. Each chair is occupied by one of the diplomats. The following conditions apply.

- Polish sits immediately next to British
- German sits immediately next to Italian
- French doesn't sit immediately next to Italian
- If Spanish sits immediately next to Polish, Spanish doesn't sit next to Italian

Which of the following seating arrangement of the 6 diplomats in chair 1-6 would not violate the given conditions?

- A) French, Polish, British, Italian, Spanish, German
- B) French, German, Italian, Polish, British, Spanish
- C) French, German, Italian, Spanish, Polish, British
- D) French, Spanish, Polish, British, German, Italian

a) C   b) D   c) A   d) B

**Solution-** from the above inference its clear that german sits beside italian but spanish must sit beside polish and polish sits next to british. So D matches n hence option b)D

**Q 140.** Figure shows an equilateral triangle of side of length 5 which is divided into several unit triangles. A valid path is a path from the triangle in the top row to the middle triangle in the bottom row such that the adjacent triangles in our path share a common edge and the path never travels up (from a lower row to a higher row) or revisits a triangle. An example is given below. How many such valid paths are there?

a) 120 b) 16 c) 23 d) 24

**Solution-** given side length=5 .....so  $(n-1)!=(5-1)!=4!$

ans is 24

**Q 141.** A sum of rs 3000 is distributed amongst A, B, and C. A gets  $\frac{2}{3}$  of what B and C got together and c gets  $\frac{1}{3}$  of what A and B got together, C's share is?

a) 1200 b) 2250 c) 750 d) 1050

**Solution-**  $A+B+C=3000$  from data it is clear that  $A=\frac{2}{3}(B+C)$  and  $C=\frac{1}{3}(A+B)$

$\implies 3C=A+B$  so replace  $A+B$  can be replaced by  $3c$ .....

$\implies 4c=3000$  and now  $c=3000/4\implies 750$ ... So c gets 750

**Q 142.** Joke is faster than Paul, Joke and Paul each walk 24 KM. The sum of their speed is 7 Km per hour. And the sum of times taken by them is 14 hours. Then, Jake speed is

a) 7 kmph b) 3 kmph c) 5 kmph d) 4 kmph

**Solution-**  $\text{peed}=\frac{\text{Timedistance}}{\text{Speed}}=\frac{\text{Timedistance}}{\text{Speed}}$

let the speed of joke x then speed of paul will be  $7-x$

$$24x+247-x=1424x+247-x=14$$

Try to plugin the values from the options. If Jake speed is 4 the paul is 3.

**Q 143.** A child is looking for his father. He went 90 meters in the east before turning to his right. He went 20 meters before turning to is right again to look for his father at his uncle's place 30 meters from this point. His father was not there. From there, he went 100 meters to his north before meeting his father in a street. How far did the son meet his father from starting point ?

- a) 80 metre
- b) 90 metre
- c) 100 metre
- d) 110 metre

**Solution-** Clearly, the child moves from A to B 90 metres eastwards upto B, then turns right and moves 20 metre upto C, then turns right and moves upto 30 metre upto D. Finally he turns right and moves upto 100 metre upto E.

So  $AB = 90$  metre,  $BF = CD = 30$  metre,

So,  $AF = AB - BF = 60$  metre

Also  $DE = 100$  metre,  $DF = BC = 20$  metre

So,  $EF = DE - DF = 80$  metre

as we can see in image that triangle AFE is a right angled triangle and we are having two sides, need to calculate third one, so we can apply Pythagoras theorem here

$$A = AE = \sqrt{AF^2 + EF^2}$$

$$= \sqrt{(60)^2 + (80)^2}$$

$$= \sqrt{3600 + 6400}$$

$$= \sqrt{10000} = 100$$



So from starting point his father was 100 metre away.

Q 144. assume that  $f(1)=0$  and  $f(m+n)=f(m)+f(n)+4(9mn-1)$ .for all natural no(integer $>0$ )m and n.what is the value of  $f(17)$ ?

a) 5436 b) 4831 c) 5508 d) 4832

Solution- 4832...

calculate upto  $f(5)$  by putting values in the given expression i.e.  $f(1)=0$ ,  $f(2)=32$ ,  $f(3)=100$ ,  $f(4)=204$ ,  $f(5)=344$ . then cal  $f(7)=f(5+2)$  or  $f(3+4)=732$  and  $f(10)=f(5+5)=1584$ , and now  $f(17)=f(10+7)=f(10)+f(7)+4(9*15*7-1)$ .....

$$f(17)=1584+732+2516=4832$$

Q 145. The numbers 272738 and 232342, when divided by n, a 2 digit number, leave a remainder of 13 and 17 respectively. Find the sum of the digits of n?

- a) 7
- b) 8
- c) 5
- d) 4

Solution- as remainder is 13 & 17 so dividend must be greater than 17

$$272738 = n*a+13 \Rightarrow 272725=n*a \text{ ---(1)}$$

$$232342 = n*b+17 \Rightarrow 232325=n*b \text{ ---(2)}$$

last two digit of (1)&(2) is 25 so n must be 25, no other two digit no. greater than 25 satisfies this

$$272725=25*10909$$

$$232325=25*9293$$

$$n=25, \text{ sum of digits of } n = 2+5 = 7$$

Q 146. 60 48 38 28 24 20 18 choose odd one.

a) 28 b) 38 c) 60 d) 18

Solution- 28 is odd one because  
coming in reverse order  $18+2=20$

$$20+4=24$$

$$24+6=30$$

$$30+8=38$$

$$38+10=48$$

$$48+12=60$$

Q 147. The perimeter of an equilateral triangle and regular hexagon are equal. Find out the ratio of their areas?

a) 3:2

b) 2:3

c) 1:6

d) 6:1

Solution- Given that perimeter of equ. triang and hexagon are equal. consider length of triang

as 'x' and length of hex as 'y'. so the relation is  $x=2y$ . Hexagon is made of six equ triangles and formula for area of equ triang is  $\frac{\sqrt{3}}{4}x^2$  and using this we get ratio of areas as 2:3

Q 148. what is the remainder of  $(32^{31^{301}})$  when it is divided by 9?

a) 3 b) 5 c) 2 d) 1

Solution-  $32^{31^{301}}$

when 31 divided by 9 gives remainder 5

$5^5$   $5^2$   $5^3$  all gives the same unit digit 5

so  $31^{32}$  gives unit digit 5

same rule applicable to  $31^{301}$

when 31 divided by 9 gives remainder 4

$4^2 4^3 4^4 = 4 6 4 6$  unit place repeats for every 2 times i.e for even power its unit place is 6 and for odd its 4

as 301 is odd its unit place is 4

so  $31^{32^{301}} = 31^4 = 5^4 = 5$  is the ans

**Q 149.** A take 12 hrs to make publication B take 10 hrs to make publication. find the time taken by them to make two publications working independently?

a) 12 hours b) 11 hours

b) 22 hours d) 11 hours 40 minutes

**Q 150.** Which of the following numbers must be added to 5678 to give a remainder 35 when divided by 460?

a) 980 b) 797 c) 955 d) 618

**Solution-** ans is 797

If you need of remainder 35, while dividing a number by 460. The Unit place of that number must be 5. So  $5678 + 797 = 6475$

$6475/460$  gives reminder 35

**Q 151.** If a number is divided by 357 the remainder is 5, what will be the remainder if the number is divided by 17?

a) 9 b) 3 c) 5 d) 7

**solution- ANS:5** ...to get the original number add the 357 with remainder 5, you will get 362.then divide it by 17 you will get 5 as remainder.

**Q 152.** A girl entered a store and bought x flowers for y dollars (x and y are integers). When she was about to leave, the clerk said, "If you buy 10 more

flowers I will give you all for \$2, and you will save 80 cents a dozen". The values of x and y are:

- a) (15,1)
- b) (10,1)
- c) (5,1)
- d) Cannot be determined from the given information.

Solution- initially price/dozen =  $12y/x$ ; after purchasing 10 more--new dozen price =  $2 \cdot 12/x + 10$ ...now..  $12y/x - 24/x + 10$  must be equal to 80/100 dollars...keep substituting the options.. (5,1) fits in

Q 153. In how many possible ways can write 3240 as a product of 3 positive integers a, b and c

- a) 450 b) 420 c) 350 d) 320

Solution-  $3240 = 2 \cdot 2 \cdot 2 \cdot 5 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

so,

no. of ways =  $8! / (3! \cdot 4!) = 420$ .....

Q 154. a and b starts from their house at 10am. they travel from their house on MG road at 20kmph and 40kmph. they meet at T junction at 12:00 pm B reaches the T junction earlier and turns right. Both of them continue travelling till 2:00pm what is distance between a & b at 2:00pm?

- a) 160km b) 120km c) 140km d) 150km

Solution- a reaches the junction at 12 after travelling 40 km

but b reaches junction at 11 after travelling 40 km.

at 2 am. a will travel 40 km from junction

at 2 am. b will travel for 3 hrs that is 120 km from junction so it travel 10 km.

distance between them is  $120 + 40 = 160$  km

**Q 155. On door A - It leads to freedom**

**On door B - It leads to Ghost house**

**On door C - door B leads to Ghost house**

**The statement written on one of the doors is wrong.**

**Identify which door leads to freedom.**

- a) A**
- b) B**
- c) C**
- d) None**

**Solution- lets consider door A is wrong then A leads to ghost**

**on door B written is it leads to ghost**

**and on door c it is written door B leads to ghost house,henc C leads to freedom**

**in the same way assume B is wrong,means lead to freedm but on door c written door B leads to ghost house,it is contradiction**

**last case if we assume C is wrong,the written on door B is also becoming wrong**

**so our ansr is C lead to freedm which comes from 1st case where we assume A is wrong**

**Q 156. The savings of employee equals income minus expenditure.If the income of A,B,C are in the ratio 1:2:3 and their expense ratio 3:2:1 thenwhat is the order of the employees in increasing order of their size of their savings?**

- a)  $A > C > B$  b)  $B > A > C$  c)  $B > C > A$  d)  $C > B > A$**

**Solution- $C > B > A$**

**salary of C is highest among all n expenses are least**

**salary of A is lowest among all n expenses are high**

**Q 157. A manufacturer of chocolates makes 6 different flavors of chocolates. The chocolates are sold in boxes of 10. How many different boxes of chocolates can be made?**

**(NOTE: A box is considered different from another only if, regardless of the order, the box contains a different number of chocolates of at least one type)**

**a) 3003**

**b)  $10^6$**

**c) 3000**

**d)  $6^{10}$**

**Solution- f n similar articles are to be distributed to r persons,  $x_1+x_2+x_3+\dots+x_r=n$  each person is eligible to take any number of articles then the total ways are  $n+r-1C_{r-1}$**

**In this case  $x_1+x_2+x_3+\dots+x_6=10$**

**in such a case the formula for non negative integral solutions is  $n+r-1C_{r-1}$**

**Here  $n=10$  and  $r=6$ . So total ways are  $10+6-1C_{6-1} = 3003$**

**Q 158. 4 men throw a die each simultaneously. Find the probability that at least 2 people get the same number.**

**a)  $5/18$  b)  $13/18$  c)  $1/36$  d)  $\frac{1}{2}$**

**Solution-  $13/18$  as  $1-(\text{probability of not getting same no.})=1-((6*5*4*3)/(6*6*6*6))$**

**Q 159. How many positive integers less than 500 can be formed using the numbers 1,2,3,and 5 for digits, each digit being used only once.**

**a) 52 b) 68 c) 66 d) 34**

**Solution- 3 digits no formed=  $3*3*2$  (5 cant come at place,no should be less than 500)**

**=18**

**2 digit no formed= $4*3$**

=12

1 digit no formed=4

total positive integers=18+12+4

=34

**Q 160. In a rectangular region of 300X400 foot, there are 3 ants per square inch. how many ants(approximate value) are there in the square region???**

**[Gave the hint: 1foot=12inches]**

**a) 500million**

**b) 50million'**

**c) 500000**

**d) 5million**

**Solution- 00\*400 (foot)**

**300\*400\*12 (inches)**

**300\*400\*12\*3**

**4320000**

**approximately 50 million ants**

**Q 161. The letters in the word ROADIE are permuted in all possible ways and arranged in alphabetic order. Find the word in the 44th rank.**

**a) AERIOD b) AERDOI c) AERODI d) AEODRI**

**Solution- A----- => 5!=120**

**AD---- => 4!=24**

**AED--- => 3!=6**

**AEI--- => 3!=6**

$$\text{AEO} \rightarrow 3! = 6$$

$$24 + 6 + 6 + 6 = 42$$

$$\text{AERDIO} \Rightarrow 43\text{th}$$

$$\text{AERDOI} \Rightarrow 44\text{th}$$

Q 162. There is a pool of radius  $X$  and there is a path way around the pool with a width of 4 feet. Find the radius of the pool if the path area / pool area =  $11/25$ .

a) 12

b) 5

c) 25

d) 29

$$\text{Solution- } (\pi(X+4)^2 - \pi X^2) / \pi X^2 = 11/25$$

$$(X+4)^2 / X^2 - 1 = 11/25$$

$$(X+4)^2 / X^2 = 36/25$$

$$(X+4)/X = 6/5$$

$$X = 20$$

Q 163. a certain organization has three committees. only two persons are members of all committees, but every pair of committees have three members in common. what is the least possible no of member of members on any one committee?

a) 4 b) 5 c) 6 d) none of these.

Solution- the least possible no of member of members on any one committee = 4  
.. option a)



In all 3 committees, say X,Y,Z, 2 persons say A and B are common.

C is common between X and Y.

D is common between Y and Z.

E is common between X and Z.

so X committee has ABCE. Y committee has ABCD. Z committee has ABDE.

Q 164. In how many ways can 2310 be expressed as product of three factors??

1) 41

2) 56

3) 23

4) 46

Solution-  $(3^{(n-1)}+1)/2$

$$2310=2*3*5*7*11$$

$$n=5$$

do this

ans===41

Q 165. In an office, at various times during the day, the boss gives secretary a letter to type , each time putting the letter on top of the secretary's inbox. when there is time, the secretary takes the top letter off the pile and type it. if there are 5 letters in all and boss delivers them in the order 12345, which of the following could not be the order in which secretary types them?

a) 24351

b) 45231

c) 32415

d) 12345

**Solution- B) 45231 cant be the order of typing.....**

**Suppose boss put first time 4 letters in order 1,2,3,4**

**Then definitely she will strt typing the top one tht is 4th..after completing 4th letter...boss again put the 5th letter on the top....sho she again choose the top most tht is 5th one and type it...after tht queue will have order 1,2,3**

**So she should shoosed the top most one tht is 3rd card...but in option it is given 2 which is wrong...check like this in all the options.**

**Q 166. 6 task and 6 persons. P1 and P2 does not do task T1. T2 is assigned to P3 or P4;. Each person should be assigned with at least 1 task. In how many ways the task can be assigned.**

a) 192

b) 360

c) 144

d) 180

**Solution- 192**

**As T1 can be done in 4 ways(p3,p4,p5,p6)**

**T2 in tw0 ways (p3,p4)**

**and the remaining in 4! ways**

$$4*2*4!=192$$

**Q 167. How many lattice points are there between (2,0) and (16,203)?**

a) 8 b) 10 c) 14 d) 15

**Solution-** draw a line from origin(0,0) to (14,203)

this line is parallel to the line joining(2,0) and (16,203).

A lattice point is defined as the positive values for x and y coordinates along the line in a graph.

after drawing this line you will come across 8 such points.

so the answer is 8

**Q 168.** It takes 52 days to complete an agreement deal by a certain number of men.After 17 days,300 men are added and 21 days are reduced.how many men were working initially?

a) 250 b) 150 c) 200 d) None of the above

**Soultion-** Let x no people works initially.

So the left work after 17 days can be done by x people is in 35, but the same work can be done by x+300 is in 35-21=14 days.

so,  $35 \cdot \left(\frac{x}{x+300}\right) = 14$

x=200.

initially 200 people worked

**Q 169.** four parallel lines are drawn parallel to one side of an equilateral triangle such that it cuts the other two sides at equal intervals.the area of the largest segment thus formed is 27msqr.find the area of the triangle?

a) 100 b) 75 c) 81 d) 54

**Solution-** Area of Trapezoid=  $\frac{(a+b) \cdot h}{2}$  (where a and b are length of parallel sides)

Now Since side is divided in 5 parts therefore,length of one interval= $\frac{a}{5}$

Now use Sin60 and to calculate the height of trapezoid( ie. a root 3/10). and cos60 to calculate the base of the triangle whose hypotenuse is  $\frac{a}{5}$ ..(i.e. will be  $\frac{a}{10}$ );

We get  $b = a - \left(\frac{a}{10} + \frac{a}{10}\right)$

$$b = 4a/5$$

now equate the area of trapezoid with 27..

Hence area of equilateral triangle is 75 sqm

Q 170. In the sample subtraction problem below, single digits are replaced by letters,

Find the values of  $3*A + \&*B + 4*C *D = ?$

A5C1

3U79

-----

397D

a) 80

b) 99

c) 89

d)96

Solution- I think the answer is 96, let me explain...

from the above question it is clear that there is a printing mistake, for now let us assume  $b=u$ ;

after solving the subtraction we get the value  $A=7, d=2, u=5, c=5$ ;

now if we suppose  $\&=a$  then the ans will be 96(Which is option d)

if  $\&=d$  then the ans will be 71

if  $\&=c$  then the ans will be 86

so, from all the assumptions only the first one matches with the options given,

so option d will be our answer, 96

**Q 171. two dice are thrown. find the probability of getting a multiple of 3 or 4 as the sum.**

**a)  $5/9$  b)  $4/9$  c)  $2/9$  d)  $1/9$**

**Solution-  $20/36=5/9$**

**(1,2),(1,3),(1,5),(2,1)(2,2)(2,4)(2,6)(3,1)(3,3)(3,5)(3,6)(4,2)(4,4)(4,5)(5,1)(5,3)(5,4)(6,2)(6,3)(6,6) as its some is multiple of 3 or 4**

**Q 172. 2 gears. one with 12 teeth and the other one with 14 teeth are engaged with each other. One tooth in smaller gear and one tooth in bigger gear are marked and initially those 2 marked teeth are in contact with each other. After how many rotations of the smaller gear with the marked teeth in the other gear will again come into contact for the first time?**

- a) 7**
- b) 12**
- c) Data Insufficient**
- d) 84**

**Solution- Assume the distance between the teeth is 1 cm. Then the circumference of first gear is 12 cm and the second is 14 cm.**

**Now LCM (12, 14) = 84.**

**So to cover 84 cm, the first gear has to rotate  $84/12 = 7$  rounds**

**(the second gear rotates  $84 / 14 = 6$  rounds as it is bigger)**

**Q 173. there are 4 couples who go for honeymoon together.at one of the places they all have to cross the river but only one boat is available.wives are jealous that they dont want their husbands to travel with another women and husbands are also possessive that they dont want their wives to travel with some other men.the no of minimum possible ways in which they will cross the river are.**

**a) 16 b) 17 c) 18 d) 19**

**Solution- we have 4 couple**

1)first two husbands goes to another side

2)then one husband comes back

3)then one couple will go

4)then second husband comes back

so in this 4 ways 1 couple reach to another side

so for 4 couples there are 16 ways

a)16 is ans

**Q 174.** Professor absentminded has a very peculiar problem, in that he cannot remember numbers larger than 15. However, he tells his wife, I can remember any number up to 100 by remembering the three numbers obtained as remainders when the number is divided by 3, 5 and 7 respectively. For example (2,2,3) is 17. Professor remembers that he had (1,1,6) rupees in the purse, and he paid (2,0,6) rupees to the servant. How much money is left in the purse?

option

a) 59

b) 61

c) 49

d) 56

**Solution-** He had 76 rupees, according to questions, he remember any no. larger than 15 as remainder when divided by 3,5 and 7 respectively.

Divide 76 by 3,5 and 7, we will get (1,1,6)as remainder.

He paid 20 rupees bcoz when 20 divided by 3,5 & 7 , we will get (2,0,6) as remainder.

Now money left=76-20

=56 (Ans)

**Q 175. A and B completed a work together in 5 days. Had A worked at twice the speed and B at half the speed, it would have taken them four days to complete the job. How much time would it take for A alone to do the work?**

**a) 5days b) 20days c) 10days d) 25days**

**Solution- a and b's 1 day work,  $a+b=1/5$**

**with twice the speed of a and half of b completes work in 4 days,**

**so,  $2a+b/2=1/4$ .**

**on solving both the eq. we get  $a=1/10$**

**so a will complete the whole work in 10 days.**

**Q 176.  $0 > a > b > c > d$ . Which is largest**

**a)  $(b+d)/(a+c)$**

**b)  $(a+d)/(b+c)$**

**c)  $(b+c)/(a+d)$**

**d)  $(c+d)/(a+d)$**

**Solution- given statement is  $0 > a > b > c > d$**

**that means all the values of a,b,c,d are less than ZERO**

**so let's consider  $a=-1$ ,  $b=-2$ ,  $c=-3$  and  $d=-4$  so that  $0 > a > b > c > d$  will satisfy**

**by solving the options we get the values as follows**

**a.  $(b+d)/(a+c) = 1.5$**

**b. 1**

**c. 1**

**d. 1.4**

**among all of these options a is highest so the answer is option a.**

**Q 177. An engineer undertakes a project to build a road of 15km in 300 days and employs 45 men for the purpose .After 100 days,he finds only 2.5km of the road has been completed.find the (approx)number of extra men must employs to finish the work in time.**

**option**

**a) 43**

**b) 45**

**c) 55**

**d) 68**

**Solution- 45 workers working already**

**Let x be the total men required to finish the task in next 200 days**

**2.5 km done hence remaining is 12.5 km**

**Also, work has to be completed in next 200 days (300 - 100 = 200)**

**We know that, proportion of men to distance is direct proportion**

**and, proportion of men to days is inverse proportion**

**Hence,  $X = (45 * 12.5 * 100) / (2.5 * 200)$**

**thus,  $X = 112.5$  that is approximately 113**

**Thus, more men needed to finish the task =  $113-45=68$**

**Q 178. there are 5 sweets - jamun, kulfi, peda. laddu and jilebi that i wis t eat on 5 consecutive days, monday throufh friday, one sweet a day, based on following self imposed constraints:**

**1) laddu is not eaten on monday**

**2) if jamun is eaten on monady , then laddu must be eaten on friday**

**3) if jamun is eaten on tuesday, kulfi should be eaten on monday**

**4) peda is eaten the day following the day eating jelabi**

**based on the above , peda can be eaten on any day expect??**



**Solution-monday bcoz the day before jalebi is required to be taken bt its sunday and no sweet is eaten on Sunday**

**Q 179. A circular swimming pool is surrounded by a concrete wall 4ft wide. If the area of the wall is 11/25 of the area of the pool then radius of the pool in feet is**

**a) 20**

**b) 8**

**c) 16**

**d) 30**

**Solution- i thnk ans is 20.Bcoz let r be the radius of pool.**

$$(11/25)(\pi r^2) = (\pi(r+4)^2) - (\pi r^2)$$

**By solving this we get ans as 20**

**Q 180. How many 5's will be there in the number 121122123... till 356?**

**a) 51 b) 54 c) 50 d) 49**

**Solution- 121122123... till 356**

**121,122,123,124... till 356**

**121 to 200 => 125,135,145, from 150 to 159 => 11 5's , 165,175,185,195**

**[from 150 to 159, each no. has 1 no. of 5 except 155, 155 has 2 no. of 5]**

**total=18**

**201 to 300 => 205,215,225,235,245, 250 to 259 => 11 5's , 265,275,285,295**

**=> total=20**

**301 to 356 => 305,315,325,335,345,350,351,352,353,354,355(2 5's),356**

**=> total=13**

**total 5's = 18+20+13 = 51**

**Q 181. Car A leaves city C at 5 pm and drives at a speed of 40 kmph. 2 hours later another car B leaves city C and drives in the same direction as car A. In how much time will car B be 9 km ahead of car A. Speed of car B is 60 kmph.**

option

a) 4.25 hrs

b) 4.17 hrs

c) 4.30 hrs

d) 4.45 hrs

**Solution-we take the relative speeds of the 2 cars.**

**relative speed= $(60-40)=20\text{km/h}$**

**the car a has travelled  $(40*2)\text{km}$  in 2 hrs.**

**thence car b has to travel  $80\text{km}+9\text{km}$  ahead to get ahead by 9 km.**

**so time=  $89/20=4\text{hr } 45 \text{ min.}$**

**Q 182. The rupee/coin changing machine at a bank has a flaw. It gives 10 ten rupee notes if you put a 100 rupee note and 10 one rupee coins if you insert a 10 rupee note but gives 10 hundred rupee notes when you put a one rupee coin!**

**Sivaji, after being ruined by his rivals in business is left with a one rupee coin and discovers the flaw in the machine by accident. By using the machine repeatedly, which of the following amounts is a valid amount that Sivaji can have when he gets tired and stops at some stage (assume that the machine has an infinite supply of notes and coins):**

a) 26975

b) 53947

c) 18980

d) 33966

**Solution-initially sivaji had only one coin so he earns only 1000/-**

**to earn more he must convert one 100 note to 10 notes and then one ten note to ten coins**

**now he has Rs.990 and 10 coins**

**after converting 10 coins he has 10990**

after converting another 10 coins he has 20980

after converting another 10 coins he has 30970

after converting another 10 coins he has 40960

after converting another 10 coins he has 50950

after converting another 10 rupee note to coins and using only 3

he has seven coins and 53940

so sum is  $53940+7=53947$

**Q 183.**  $\frac{2}{3}$ rd of the balls in a bag are blue, the rest are pink. if  $\frac{5}{9}$ th of the blue balls and  $\frac{7}{8}$ th of the pink balls are defective, find the total number of balls in the bag given that the number of non defective balls is 146.

a) 216 b) 649 c) 432 d) 578

**Solution-**let total no of balls =x

blue= $\frac{2x}{3}$

pink= $\frac{x}{3}$

total no of defective balls =  $\frac{10x}{27} + \frac{7x}{24}$

= $\frac{143x}{216}$

non defective balls= $x - \frac{143x}{216} = 146$  , $x=432$

**Q 184.** One day Eesha started 30 min late from home and reached her office 50 min late while driving 25% slower than her usual speed. How much time in min does eesha usually take to reach her office from home?

a) 80min b) 50min c) 60min d) 70min

**Solution-**let time taken by eesha daily = x

and usual speed = y

$(x+20) \times (.75 \times y) = x \times y$  extra time taken =  $50-30 = 20$ min

$.75x + 15 = x$

$.25x = 15$

**x = 60 min**

**Q 185. 7,17,19,43,91,131...find the odd term.**

**a) 17 b) 43 c) 91 d) 131**

**Solution-except 91 all other are prime no.**

**so 91 odd one**

**Q 186. find the no. of zeros in the product of  $1^1 \cdot 2^2 \cdot 3^3 \dots \cdot 49^{49}$ ?**

**a) 250 b) 225 c) 545 d) 135**

**Solution-the number of zero's can be found by finding number of 2's and 5's.**

**since in this number, number of occurrences 2's will always be greater than number of occurrences of 5's.**

**therefore we need to find number of 5's only.**

**number of occurrences of 5's**

**in  $5^5 = 5$**

**$10^{10} = 10$**

**$15^{15} = 15$**

**$20^{20} = 20$**

**$25^{25} = 25$**

**$30^{30} = 30$**

**$35^{35} = 35$**

**$40^{40} = 40$**

**$45^{45} = 45$**

**sum=225.**

**therefore 225 5's can be paired with 225 2's.**

total number of zeros = 225

Q 187. a merchant buys 20kg of wheat at 30rs/kg and 40k at 25rs/kg.he mixes and sells 1/3 rd of mixture at 26rs/kg.price at which merchant should sell remaining mixture so that a profit of 25% on whole outlay is?

a) Rs30 b) Rs40 c) Rs360 d) Rs 37

Solution-cp of total mixture= $(20 \times 30) + (25 \times 40) = 1600$ rs

as he needs 25% profit, so he needs to earn  $1600 + (1600 \times (25/100)) = 2000$ rs.

he has alre dy got rs by selling 1/3 part= $1/3$  of 60 kg.. $=20$  kg

$=20 \times 26 = 520$ rs..

now he needs  $2000 - 520 = 1480$ rs.

so he must sell remaining 40 kg at= $1480/40 = 37$ rs/kg

Q 188. the addition of  $641 + 852 + 973 = 2456$  is incorrect. What is the largest digit that can be changed to make the addition correct?

a) 5    b) 6    c) 4    d) 7

Solution-641

852

973

2466

Given Sum is 2456

So if we change 10's digit 7 to 6 then the sum will be correct .

so 7 is the largest digit .

Q 189. a, b, c are non negative integers such that  $28a + 30b + 31c = 365$ . Then  $a + b + c$  is?

a)13 b)> 13 c) =13 d) 12

**Solution-Here,  $a + b + c = 12$**

**Explanation :**

**$a = 1$ , because in a month of twelve only Feb has 28 days**

**$b = 4$ , there are four months namely April, June, Sep and Nov having 30 days**

**$c = 7$ , there are 7 months namely Jan, Mar, May, Jul, Aug, Oct and Dec having 31 days**

**So,  $a + b + c = 1 + 4 + 7 = 12$ .**

**Q 190. 26ab5 is a four-digit number divisible by 25. If the number formed from the two digits ab is a multiple of 13, then ab =?**

a) 52

b) 65

c) 10

d) 25

**Solution-Any number last two digits are 25 then that should be divisible by 25.**

**When  $ab=52$ , the number is 26525 and  $52/13=4$ ,**

**So  $ab=52$**

**Q 191. A owes B Rs 50. He agrees to pay B over a number of consecutive day starting on a Monday, paying single note of Rs 10 or Rs 20 on each day. In how many different ways can A repay B. (Two ways are said to be different if at least one day, a note of a different denomination is given)**

a) 8

b) 7

c) 6

d) 5

Solution- $10,20,20=3!/2!=3$  ways

$10,10,10,20=4!/3!=4$  ways

$10,10,10,10,10=5!/5!=1$  way

so.total= $3+4+1=8$  ways.

Q 192. After 6 years Raju's fathers age will twice of the Raju's age 2 years ago.His mothers age was twice that of Raju's age. Sum of the age of their parents.

a) 4 less than four times Raju's age

b) 2 more than four times Raju's age

c) 4 more than four times Raju's age

d) 2 less than four times Raju's age

Solution- $F+6=2(R+6)$

$$F=2R+6$$

$$M-2=2(R-2)$$

$$M=2R-2$$

Therefore the sum of Raju's Parent's age is

$$F+M=2R+6+2R-2$$

$$F+M=4R+4$$

4 more than four times Raju's age

Q 193. Length, Breadth and Height of a 3D figure is in the ratio 3:2:1. If the length is doubled and Breadth & Height are halved, then what is the % decrease in the volume of the solid?

a) Decreased by 15% b) Decreased by 18% c) Decreased by 30%

d) Decreased by 50%

**Solution-50% decrease**

If original length, breadth & height are  $3x$ ,  $2x$  and  $x$  respectively, then  
volume= $3x \times 2x \times x = 6x^3$  With length doubled, breadth & height halved, new  
dimensions are  $6x$ ,  $x$  and  $x/2$  respectively and volume= $6x \times x \times x/2 = 3x^3$

So % decrease in volume= $100 \times (6x^3 - 3x^3) / 6x^3 = 50$

**Q 194.** 12 divides,  $ab313ab$  (in decimal notation, where  $a, b$  are digits  $> 0$ , the  
smallest value of  $a+b$  is

- a) 7
- b) 6
- c) 2
- d) 4

**Solution-**If a number is divisible by 12 then it should be divisible by 4 & 3

for divisible by 4 last [2 digit] no's should be divisible by 4

so last no's are 12, 15, 18, ..., and soon..

now least is 12 it's sum is 3 which is not the option,,

no other least is 16 it's sum  $1+6=7$ ..

so 7 is option :)

**Q 195.** In a telecom assembly factory, there are 250 men and 150 women. The  
average productivity of all workers is 12 units per day. The average productivity of  
men is 15 units per day.. what is the average productivity of women per day?

- a) 6 b) 9 c) 7 d) 8

**Solution-** $250M + 150W = 400$

Thus,  $400 \times 12 = 4800$

Now,  $250 \times 15 = 3750$



Now,  $4800 - 3750 = 1050$  Thus, for 150W avg prod is :  $1050/150 = 7$

Q 196. If a lemon and an apple together cost Rs. 12.00, a tomato and a lemon cost Rs. 4.00 and an apple cost Rs.8.00 more than a tomato or a lemon then which of the following can be.

a) Rs 2 b) Rs 4 c) Rs 1 d) Rs 3

Solution-lemon+apple=12rs

tomato+lemon=4

then apple=8+t or 8+l

by solving we get

$$l + (8 + l) = 12$$

$$2l = 4$$

$$l = 2$$

$$\text{so } a = 8 + 2 = 10; \text{ so a)}$$

Q 197. George, Paul and Hari start a business by contributing Rs. 30000/-, Rs. 40000/- and Rs. 50000/- respectively. After  $\frac{1}{2}$  a year George withdraws half his contribution. At the end of the year the business showed a profit of Rs 90000 which was divided amongst the 3 men proportionate to the amount and duration of their investment in the enterprise. Paul got,

a) Rs 25000/-

b) Rs 18000/-

c) Rs 32000/-

d) Rs 24000/

Solution-G,P & h ratio will be

$$(30,000 \times 6 + 15000 \times 6) : (40000 \times 12) : (50000 \times 12)$$

$$= 27 : 48 : 60$$

$$\text{hence } 135x = 90000 \quad x = 2000/3$$

paul got  $x \times 48$  means  $2000/3 \times 48 = 32000$

**Q 198.** A drinks machine offers three solutions – Tea, Coffee or Random but the machine has been wired up wrongly so that each button does not give what it claims. If each drink costs Rs. 50, what is the minimum amount of money that must be spent to determine with certainty the correct labeling of the buttons?

- a) Rs. 100
- b) Can not be determined from the given information
- c) Rs 150
- d) Rs 50

**Solution-**You have to put just 50rs.

Put 50rs and push the button for Random. There are only 2 possibilities. It will give either Tea or Coffee.

If it gives Tea, then the button named Random is for Tea.

The button named Coffee is for Random selection. And the button named Tea is for Coffee.

If it gives Coffee, then the button named Random is for Coffee. The button named Tea is for Random selection. And the button named Coffee is for Tea.

Thus, you can make out which button is for what by putting just 50rs and pressing Random selection first.

**Q 199.** P,Q,R,S are distinct integers numbered from 1 to 12.What is the possible smallest value for  $(P/Q)+(R/S)=?$

- a)  $1/12+2/11$  b)  $1/11+9/10$  c)  $1/11+2/12$  d)  $1/10+1/11$

**Solution-**he given options for the above question are, a. $1/12+2/11$  b. $1/11+9/10$  c. $1/11+1/12$  d. $1/10+1/11$

In mathematics, two things are called distinct if they are not equal.

so p,q,r,s are not equal.

Ans:-  $1/12 + 2/11$

Q 200. If  $ab64ab$  is divisible by 12, then what is the least possible value of  $a+b$  ?

a) 4 b) 5 c) 6 d) 7

Solution-1. Condition for divisibility by 3--

The sum of digits of number must be divisible by 3.

i.e  $a+b+6+4+a+b = 0 \pmod 3$

$\Rightarrow 10 + 2(a+b) = 0 \pmod 3$

$\Rightarrow 1 + 2(a+b) = 0 \pmod 3$  ( $10 = 1 \pmod 3$ )

$\Rightarrow 2(a+b) = -1 \pmod 3$

$\Rightarrow 2(a+b) = 2 \pmod 3$

$\Rightarrow a+b = 1 \pmod 3$

So,  $a+b$  must be of the form  $3n + 1$  for some positive integer  $n$ .

Max value of  $(a+b)$  is 18 as  $a$  and  $b$  can take values upto 9 since they are digits.

The possible values are 1,4,7,10,13,16.

2. Condition for divisibility by 4--

For divisibility by 4, Last two digits must be divisible by 4.

i.e  $10a+b = 0 \pmod 4$

$\Rightarrow 2a + b = 0 \pmod 4$  (Since,  $8a = 0 \pmod 4$ )

So,  $2a + b$  can be 4,8,12,16,20,24,28.

Combining these, we get

$a + b = 3n + 1$

$$2a + b = 4k$$

The smallest values which satisfies these two equation is  $a = 4$  ,  $b = 0$ .

So, the minimum sum of  $a + b$  is 4.

**Q 201.** There are 100 in a class and they attend a test. 20 students are failed in both the subjects. 50 students pass in subject A. 60 students passed in subject B. How many students passed in subject A only.

a) 20 b) 30 c) 15 d) 25

**Solution-**LET  $x$  be the total no. of students who passed in both test.

Then, no. of students who passed in A only= total no. of students who passed in A - total no. of students who passed for both A & B  $= 50 - x$

similarly, no. of students who got pass only in B  $= 60 - x$

now, total no. students who got pass  $= 80$

$80 = (50 - x) + (60 - x) + x$  then we'll get on solving,  $x = 30$

students who passed in A only  $= 50 - x = 50 - 30 = 20$

**Q 202.** Aravind can do a job in 24 days. Mani can dig the same well in 36 days. Aravind, Mani, and Hari can do the work together in 8 days. How long does it take Hari to do the work alone?

a) 12 days b) 18 days c) 16 days d) 24 days

**Solution-**This can be solved with the help of efficiency. Efficiency of (aravind +mani+hari) =total efficiency

Here,

No. Of Days taken by Aravind  $= 24$  Efficiency of aravind  $= 1/24$

No.of days taken by mani  $= 36$  Efficiency of mani  $= 1/36$

No. Of days taken when all the three work together  $= 8$

Efficiency of all thr three together  $= 1/8$

Let the no. Of days taken by hari to complete the job be x.

Then efficiency of hari  $=1/x$  Now, from the above formula

$$1/24 + 1/36 + 1/x = 1/8$$

$$x=18$$

**Q 203.** Truck A and Truck B move grain into a box at the rate of 20 kilos/min and  $13 \frac{1}{3}$  kilos a min respectively while truck C removes grain from the box at the rate of 10 kilos/min. If the capacity of the box is 2.4 tons, and Truck A, Truck B and Truck C are working simultaneously Then the box will be filled in?

a)  $1 \frac{1}{2}$  hrs

b)  $\frac{3}{5}$  hrs

c)  $1 \frac{5}{7}$  hrs

d)  $2 \frac{1}{8}$  hrs

**Solution-**otal filled in i min  $=(20+40/3-10)=70/3$

to fill  $70/3$  time req-----= $1$  min

to fill 2400 time req-----= $(3/70)*(2400/60)$  hr

$$=15/7$$

**Q 204.** If  $5 + 3 + 2 = 151022$ ,  $9 + 2 + 4 = 183652$ ,  $8 + 6 + 3 = 482466$  and  $5 + 4 + 5 = 202541$ , then  $7 + 2 + 5 = ?$

a) 143547 b) 132234

c) 2577224 d) 112321

**Solution-** $5+3+2=(5*3)(5*2)(5*3+5*2-3(\text{ie second term}))=15,10,22$

$9+2+4=(9*2)(9*4)(9*2+9*4-2(\text{ie second term}))=18,36,52$

$8+6+3=(8*6)(8*3)(8*6+8*3-6(\text{ie second term}))=48,24,66$

so answer is 143547

**Q 205. Two full tanks one shaped like the cylinder and the other like a cone contain liquid fuel the cylindrical tank held 500 lts more than the conical tank. After 200 lts of fuel is pumped out from each tank the cylindrical tank now contains twice the amount of fuel in the conical tank. How many lts of fuel did the cylindrical tank have when it was full?**

**a) 1200 b) 1000 c) 700 d) 1100**

**Solution-**let area of cylinder= $A$

**& area of cone= $B$**

**acc. to ques,**

$$A = B + 500 \dots\dots(1)$$

$$A - 200 = 2(B - 200) \dots\dots(2)$$

**from (1) & (2)**

$$A = 1200$$

**volume of fuel when cylinder is full = 1200 lts**

**Q 206. Asha and Eesha – Eesha lies on Monday, Tuesday and Wednesday. Asha lies on Thursday, Friday and Saturday. Other days they will say the truth. Professor forgot and asked them what day it is. Both of them said yesterday I was lying and then professor got the day. What day is it?**

**a) Tuesday b) Thursday c) Friday d) Cannot be determined**

**Solution-**Thursday. Asha lies on Thursday and today she is lying that she was lying yesterday. Eesha is not lying today but she was lying yesterday.

**Q 207. Three sisters are identical triplets. The oldest by is Aasha, and she always tells anyone the truth. The next oldest is Usha, and Usha always will tell anyone a lie. Eesha is the youngest of the three. She sometimes lies and sometimes tells the truth.**

**Mukund an old friend of the family, visited them one day and was able to recognize who was who, so he asked each of them one question.**

Mukund asked the sister that was sitting on the left. "Which sister is in the middle of you three ?" and the answer he received was, "Oh,that's Aasha."

Mukund then asked the sister in the middle. "What is your name?" The response given was, "I'm Eesha."

Mukund turned to the sister on the right,then asked. "Who is that in the middle ?" The sister then replied, "She is Usha."

This confused Mukund.

Who was in the middle ?

a) Aasha b) Eesha c) Usha d) Cannot be determined

Solution-its USHA ! as the left one said the middle one is aasha.. if it was aasha she would have admitted! so the left one and the middle one could be eesha usha both. as eesha sometimes says truth and sometimes lie. and usha always lie. so the right one would be aasha who will say truth and she said the middle one is USHA,so option (c) Usha is a right answer !

Q 208. If 4 examiners can examine a certain number of answer books in 8 days by working 5 hours a day, for how many hours a day would 2 examiners have to work in order to examine twice the number of answer books in 20 days.

a) 6 hours

b) 7 hours

c)  $15/2$  hours

d) 8 hours

Solution-4 examiner working for 8 days(5 hours a day)

thus,

1 examiner= $8*5=40$  hrs/person

Now,

2 examiner working for 20 days(x hrs a day) to have twice the work.

thus, $2*x$  hrs spent each day

We need 160 hrs. Working 2 hrs the duration will be:

$$160/2 \cdot x = 20$$

$$\Rightarrow x = 4 \text{ hrs}$$

Twice work is done, thus, time =  $4 \cdot 2 = 8$  hrs.

**Q 209.** A circle has 11 points arranged in a clockwise manner from 0 to 10. A bug moves clockwise on the circle according to following rule. If it is at a point  $i$  on the circle, it moves clockwise in 1 sec by  $(1 + r)$  places, where  $r$  is the remainder (possibly 0) when  $i$  is divided by 2. If it starts at 4th position, at what position will it be after 2012 seconds?

a) 7 b) 9 c) 5 d) 1

**solution-(D) 1**

cycle =  $1 + 7n$  after this cycle always is 5th position.

now after 2008 sec point is 5th position.

now next 4 sec 1st position.

or

**Trick:-** starting position - 3 = present position. maximum cases.

**Q 210.** in a group of 5, Anooj said "one of us are lying", Pooja said "Exactly two are lying", Bitto said "Exactly three are lying", Billa said "Exactly four are lying", Chitra said, "Exactly five of us are lying". Which one said the Truth?

a) Billa b) Anooj c) Chitra d) Pooja

**Solution-**Billa because 4 of them are lying and one is saying the truth....

$$1/5 + 2/5 + 3/5 + 4/5 + 5/5$$

$$15/5 = 3 \text{ So Billa}$$



**Q 211. A travels at 40kmph. B travels at 60kmph. They are travelling towards each other. BY the time they meet ,B would have travelled 120 km more than A. Find the total distance.**

**a)600km b) 720km c) 400km d) 540km**

**Solution- dist. traveeld by A = 40x (let x be the time taken to meet)**

**dist travelld by B = 60x**

**difference in dist = 20x = 120; which gives x=6hours**

**so relative speed of A and B is 100km/hr.**

**distance travlld = 6\*100 = 600km.**

**Q 212. If all the numbers between 11 and 100 are written on a piece of paper. How many times will the number 4 be used?**

**a) 20 b) 19 c) 9 d) none of these**

**Solution- 19, every word can only be appeared 20 times from 1 to 100. nd it is starting from 11, so 19 times used..**

**Q 213. 10 people are there, they are shaking hands together, how many hand shakes possible, if they are in no pair of cyclic sequence.**

**a) 45**

**b) 9**

**c) 12**

**d) 10**

**Solution-  $10C_2 = \frac{n!}{(n-r)! \cdot r!}$**

**=  $\frac{10!}{8! \cdot 2!}$**

**=  $10 \cdot \frac{9}{2}$**

**=45**

**Q 214. What should be the value of a, in the polynomials  $x^2-11x+a$  and  $x^2-14x+2a$  so that these two polynomials have common factors.**

**a) 24 b) 1 c) -1 d)  $\frac{1}{2}$**

**Solution-  $a=24$ , then polynomials will become**

**$x^2-11x+24$  and  $x^2-14x+48$  which can be written as**

**$(x-8)(x-3)$  and  $(x-8)(x-6)$**

**$(x-8)$  is common factor.**

**Q 215. a man cannot remember the number larger than 15. However he remember any number upto 100 by remembering the three numbers obtained as remainders when the numbers is divided by 3, 7 and 11 respectively. he remembers that he had (2, 4, 8) rupees in his purse. and he paid (2, 5, 4) rupees to the servant. How much money is left in the purse?**

**a) 40 b) 48 c) 46 d) 52**

**Solution- the number that satisfies the all remainders of 2, 4, 8 by numbers 3, 7, 11 respectively is 74.**

**and the the number that satisfies the all remainders of 2, 5, 4 by numbers 3, 7, 11 is 26.**

**hence the remaining money is  $=74-26=48$**

**ans is 48**

**Q 216. Next number in the given series 1, 7, 8, 49, 50, 56, 57, 343**

**a) 344 b) 350 c) 2401 d) Cannot be determined**

**Solution- 344 because**

$$1*7=7$$

$$7+1=8$$

$$7*7=49$$

$$49+1=50$$

$$8*7=56$$

$$56+1=57$$

$$49*7=343$$

$$343+1=344$$

$$\text{ans} = 344$$

Q 217. A man sold 12 candies in 10\$ had loss of b% then again sold 12 candies at 12\$ had profit of b% find the value of b.

a) 9 b) 9.09 c) 10 d) 11

Solution- Let the CP be 'x' then:

$$(x-10)*100/x = b\% \text{ -----}>1 \quad (12-x) * 100 / x = b\% \text{ -----}>2$$

$$(x-10)*100 / x = (12-x)*100 / x$$

$$x-10 = 12-x$$

$$x = 11$$

So by Submitting value of x into one of above question (1 or 2) we get b%

which is 9.09 or 9 Approx

Q 218. Two breakers are kept on a table. the capacity of the first breaker is x liters and that of the second breaker is 2x. Two thirds of the 1st breaker and one fourth of the 2nd breaker is filled with wine. The remaining space in both breakers is filled with water. If the content in these breakers are mixed in a larger breaker of volume 3x, What is the proportion of wine in the breaker?

a) 11/12

b) 11/36

c) 7/6

d) 7/18

**Solution-**  $\frac{2}{3} + \frac{1}{2}(\frac{1}{4}\text{th of } 2x = \frac{1}{2} \text{ of } x) = \frac{7}{6}$ . when pored in breaker of vol  $3x$  then d proportion will be  $\frac{7}{6} * \frac{1}{3} = \frac{7}{18}$

**Q 219.** When all possible six-letter arrangements of the letters of the word "MASTER" are sorted in alphabetical order, what will be the 49th word?

**a) AREMST b) ARMEST c) AMERST d) ARMSET**

**Solution-** ARRANGING THE LETTERS IN MASTER ALPHABETICALLY WE GET....  
AEMRST

NOW A E \_ \_ \_ \_ can be filled in  $4!$  ways

A M \_ \_ \_ \_ can be filled in  $4!$  ways

so words upto  $4! + 4! = 48$  words are of ae series and am series

So 49th word can be A R E M S T

**Q 220.** find a number such that when it is added to 7249 will be perfectly divisible by 12,14,21,33 and 54

**a) 8136 b) 9123 c) 8727 d) 9383**

**Solution-** lcm of 12,14,21,33,54=8316

now checking through options,

on adding  $7249 + 8136/8316 = \text{not perfetily divisible}$

similarly on checking through options,  $(9383 + 7249)/8316 = 2$

answer=9383

**Q 221.** 60 men can complete a piece of work in 40 days. 60 men start the work but after every 5 days 5 people leave. in how many days will the work be completed?

**a) 60 b) 80 c) 120 d) None of these**

**Solution-**  $(60 * 40)$  men complete the work in 1 day

1man's 1 day work is  $1/60 * 40$

60 men's 5 day work is  $5 \times (1/40) = 1/8$

remaining work  $(1 - 1/8) = 7/8$

as 5 men leave

55 men's 1 day work  $= 55 \times (1/60 \times 40) = 11/60 \times 8$

now

$11/60 \times 8$  work done by them 1 day

$7/8$  work done by them  $[(60 \times 8)/11] \times (7/8) = 420/11 = 38.18$

so they complete in  $(38.18 + 5)$  days {5 day added bcoz alrdy 5dy work had been done}

43.18 day total work will be completed.

**Q 222.** A person walks at 4km/hr for a particular duration T1 and 3km/hr for another duration T2 and covers a total distance of 36km. If he walks at 4km/hr for the duration T2 and at 3Km/hr for the duration T1, then he covers only 34km. What will be the time taken by him to cover the one of the legs?

a) 4hrs

b) 7hrs

c) 10hrs

d) 6hrs

**Solution-**  $4T1 + 3T2 = 36 \dots (i)$

$3T1 + 4T2 = 34 \dots (ii)$

$4 \times (i) - 3 \times (ii)$ , we get

$T1 = 6\text{hrs}$  and  $T2 = 4\text{hrs}$

**Q 223.** If ABERSU are in sorted in alphabetical order, if 24 sortings are req for ABUSRE, 25 - AEBSRU, 49- ARBESU, den how many for AEUSRB.

a) 45 b) 48 c) 47 d) 46

**Solution- AEUSRB**

**ALPHA ORDER ABERSU**

**A B \_ \_ \_ \_ =4! =24**

**A E B \_ \_ \_ =3!=6**

**A E R \_ \_ \_ =3!=6**

**A E S \_ \_ \_ =3! =6**

**A E U B \_ \_ =2! =2**

**A E U R \_ \_ =2!=2**

**A E U S B \_ =1**

**A E U S R B=1**

**24+6+6+6+2+2+1+1=48**

**Q 224. a,b and c can do some work in 36 days a and b together do twice as much work as c. a and c together do thrice as much work as b. find time taken by c alone to do complete work**

a) 72

c) 120

c) 96

d) 108

**Solution- 1 day work for (A+B+C) =  $\frac{1}{36}$  .....(ii)**

**Now, (A+B) = 2C .....(i)**

**From (i) and (ii):  $3C = \frac{1}{36}$**

**C =  $\frac{1}{108}$**

**Thus, C takes 108 days to complete the whole work alone.**

**(Remaining data are not required in this case)**

**Q 225. A sum of rs 3000 is distributed amongst A, B, and C. A gets  $\frac{2}{3}$  of what B and C got together and c gets  $\frac{1}{3}$  of what A and B got together, C's share is?**

**a) 1200 b) 2250 c) 750 d) 1050**

**Solution-  $A+B+C=3000$  from data it is clear that  $A=\frac{2}{3}(B+C)$  and  $C=\frac{1}{3}(A+B)$**

**$\implies 3C=A+B$  so replace  $A+B$  can be replaced by  $3c$ .....**

**$\implies 4c=3000$  and now  $c=3000/4\implies 750$ ... So c gets 750**

**Q 226. raj writes a number. He sees that the first no of 2digits exceeds 4times the sum of its digits by 3. If the number is increased by 18, the result is the same as the number formed by reversing its digits. Find the number**

**a) 35 b) 57 c) 42 d) 49**

**Solution-  $35-4*8=3$**

**$35+18=53$**

**answer is 35**

**Q 227.  $P(x) = (x^{2012} + x^{2011} + x^{2010} + \dots + x + 1)^2 - x^{2012}$**

**$Q(x) = x^{2011} + x^{2010} + \dots + x + 1$**

**The remainder when  $P(x)$  is divided by  $Q(x)$  is**

**a) 1 b) 0 c)  $x+1$  d)  $x-1$**

**Solution- substitute 1 in x**

**then it will become**

**$((2013)^2-1)/2012$**

**$(2013+1)(2013-1)/2012$**

**2014 is quotient**

**So, remainder is '0'.**

**Q 228. If YWUSQ is 25 - 23 - 21 - 19 - 17 then MKIGF is what?**

**a) 13-11-9-7-6 b) 1-2-3-5-7 c) 9-8-7-6-5 d) 7-8-4-5-3**

**Solution- YWUSQ - 25-23-19-17**

**THEN Y=25,W=23,U=21.....**

**THEN MKIGF = 13-11-9-7-6**

**Q 229. when numbers are written in base b, we have  $12 \times 25 = 333$ . The value of b is**

**a) 6 b) 8 c) 7 d) none of these**

**Solution- when a no. is written in base b**

$$(1 \cdot b^1 + 2 \cdot b^0) \cdot (2 \cdot b^1 + 5 \cdot b^0) = (3 \cdot b^2 + 3 \cdot b^1 + 3 \cdot b^0)$$

$$(b+2) \cdot (2b+5) = (3b^2+3b+3)$$

**solve it further a quadratic eq. is formed**

$$b^2 - 6b - 7$$

**after solving it can be written as**

$$(b-7)(b+1)$$

**therefore  $b=7$**

$$b=7$$

**Q 230. How many polynomial functions f of degree  $\geq 1$  satisfy  $f(X^2) = (f(X))^2 = f(f(X))$ .**

**a) 1 b) 0 c) 2 d) more than 2**

**Solution- :Let  $f(x)=x^2$**

$$f(x^2)=x^4$$

$$[f(x)]^2=x^4$$

$$f(f(x))=x^4$$



Only 1 sol.

**Q 231.** A cow and a horse are bought for Rs.200000. The cow is sold at a profit of 20% and the horse is sold at a loss of 10%. The overall gain is Rs. 4000. The cost price of the cow is:

a) Rs 130000

b) Rs 80000

c) Rs 70000

d) Rs 120000

**Solution-** let cost of cow be x

let cost of horse be 200000-x

so,  $(120\%)x - (90\%)(200000 - x) = 204000$

solve the above equation will get  $x = 80000$

thus cost price of cow is 80000/-

**Q 232.** Raj drives slowly along the perimeter of a rectangular park at 24kmph and completes one full round in 4mins. The ratio of length to breadth is 3:2. What are its dimensions?

a) 450m\*300m

b) 150m\*100m

c) 480m\*320m

d) 100m\*100m

**Solution-** The ratio of length to breadth is 3:2

So,

Length is 3x and breadth is 2x

Now, The perimeter of the rectangular park is;  $2(\text{Length} + \text{Breadth})$

$2(3x + 2x)$

$2 \times 5x$

$$=10x$$

Raj drives slowly along the perimeter of a rectangular park that's mean he covered the total distance  $10x$ .

So, the total distance is  $= 10x$

Total time 4mins, so  $4/60$  hrs.

Speed 24kmph

We know that,

Distance = Time \* Speed

$$\text{Distance} = 4/60 * 24$$

$$\text{Distance} = 1.6$$

Now, we can write;

$$10x = 1.6$$

$$x = 1.6/10$$

$$x = 0.16$$

Length is  $(3*0.16) = .48\text{km}$  or 480 m

Breath  $(2*0.16) = .32\text{km}$  or 320 m

Ans. Its dimensions are  $480\text{m} * 320 \text{ m}$

Q 233. or which of the following n is the number  $2^{74} + 2^{2058} + 2^{2n}$  is a perfect square.

a) 2010 b) 2018 c) 2012 d) 2020

$$\text{Solution- } 2^{74} + 2^{2058} + 2^{2n} = (2^{37})^2 + (2^{1029})^2 + (2^n)^2$$

now, if we put  $2^{37} = a$  ;  $2^{1029} = b$ ; Then for the above expression to be perfect square  $2^{2n}$  must be equal to  $(2*a*b) = 2*(2^{37})*(2^{1029})$ ;

$$\implies 2^{2n} = 2^{(1067)}$$

$$\implies 2n = 1067 ,$$

but this case is not possible since R.H.S is an odd integer whereas L.H.S is an even integer.

So , the above mentioned case can't hold.

Now,if we put  $2^{37} = a$ ;  $2^n = b$  ; So, for the given expression to be perfect square  
 $2^{2058} = (2^a \cdot b) = 2^{(2^{37}) \cdot (2^n)} = 2^{(n+38)}$ ;

So,  $2058 = (n+38)$

$\Rightarrow n = 2020$

So,The answer is  $n = 2020$

Q 234. Father is 5 times faster than son. Father completes work in 40days before son.If both of them work together when will work get complete?

a) 8 days b)  $50/6$  days c) 10 days d) 20 days

Solution- et takes  $x$  days TO COMPLETE THE WORK than father will take  $x-40$

as we know time is inversely propotional to speed so

$\text{time} = 1/\text{speed}$

$\text{father time}/\text{son time}$

$x-40/x$

and given that speed ration btwn father and son is 5:1

so  $x-40/x=5/1$

$x-40=5x$

$4x=40$

$x=10$

so if father and son work together than

$1/10+1/50$

25/3 days is ans

**Q 235. a beaker contains 180 litres of alcohol. On day 1, 60 litres of alcohol is replaced with water. On 2nd and 3rd days 60 litres of the mixture in the beaker is replaced with water. What will be the quantity of alcohol in the beaker after 3rd day?**

**a) 40 liters b) 80 liters c) 53.33 liters d) 100 liters**

**Solution-**

**1st time  $180 - 60 = 120$**

**2nd time  $120 - 60 \times 120 / 180 = 80 \text{ lit}$**

**3rd time  $80 - 60 \times 80 / 180 = 160/3 \text{ lit}$**

**So c) 53.33 liters**

**Q 236. A man asks 5 people to make a guess about the amount of money in his pocket which is less than 50.**

**A guess that the amt is a multiple of 10..**

**B guess that the amt is a multiple of 12..**

**C guess that the amt is a multiple of 15..**

**D guess that the amt is a multiple of 18...**

**E guess that the amt is a multiple of 30**

**Which of the following guesses are correct?**

**a) AE**

**b) AB**

**c) BC**

d) DE

**Solution-** AE:30 is multiple of both 10 and 30 which is less than 50. ... possible answer.

AB: there is no multiple of 10 and 12 less than 50. .... not possible answer.

BC: Same logic as that of AB. .... not possible answer.

DE: Same logic as that of AB. .... not possible answer.

Hence answer is AE.

**Q 237.** Letters of alphabets no from 1 to 26 are consecutively with 1 assigned to A and 26 to Z. By 27th letter we mean A, 28th B. In general  $26m+n$ , m and n negative integers is same as the letters numbered n.

Let  $P = 6$ , strange country military general sends this secret message according to the following codification scheme. In codifying a sentence, the 1st time a letter occurs it is replaced by the pth letter from it. 2nd time if occurred it is replaced by  $P^2$  letter from it. 3rd time it occurred it is replaced by  $P^3$  letter from it. What is the code word for ABBATIAL

a) GHNNZOOR

b) GHKJZOHR

c) GHHGZOGR

d) GHLKZOIR

**Solution-**A should be coded as  $1+6 = G$  (it occurred for first time)

B should be coded as  $2+6 = H$  (it occurred for first time)

B Should be coded as  $2 + 36 = 38 - 26 = 12 = L$  (it occurred for second time)

Option d)

**Q 238.**  $30L + 3Q = 1167$  ,  $30L + 6Q = 1284$

Find L?

a) 30 b) 35 c) 40 d) 45

**Solution-  $30L+3Q=1167$  ----(i)**

**$30L+6Q=1284$  ----(ii)**

**Solving (i) & (ii),  $Q=39$ ,  $L=35$**

**Q 239. The price of a book in four different shops and the successive discounts offered for the books is given below. Select the option in which the price of the book is the least.**

**(a) 10%, 5%, and 5% discount on Rs.195**

**(c) 12.5% and 12.5% discounts on Rs.205**

**(b) 25%, discount on Rs.200**

**(d) 10%, and 15% discounts on a marked price of Rs.190**

**Solution- we know that there is a formula on discount of  $m\%$  and  $n\%$  respectively which is  $(m+n-mn/100)\%$ . According to this for first case, total discount is  $18.775\%$ , so after discount the price of the book is Rs.158.38. For second case total discount is  $23.4375\%$ , so the price of the book after discount is Rs.156.95. For third case after discount the price of the book is Rs.150. For last case total discount is  $23.5\%$  and the price of the book after discount is Rs.145.35.**

**So ans is option d in which the price is least.**

**Q 240. Divide 50 into two parts such that the sum of their reciprocals is  $1/12$ . the numbers are**

**a) (24,26) b) (28,22) c) (27,23) d) (20,30)**

**let one number be  $x$**

**the other number will be  $50-x$**

$$1/x + 1/(50-x) = 1/12$$

$$50-x+x = x(50-x)/12$$

$$600 = 50x - x^2$$

$$x^2 - 50x + 600 = 0$$

$$x^2 - 30x - 20x + 600 = 0$$

$$x(x-30) - 20(x-30) = 0$$

$$(x-30)(x-20) = 0$$

$x = 20$  or  $30$  the numbers are 20 and 30

**Q 241.** John told mark that if mark gives  $\frac{1}{3}$  rd of his money to him, he will have rs. 75. Mark told john that if john gives half of hi money to him, he will have rs. 75. How much money did they totally have?

a) 105 b) 125 c) 150 d) 75

**Solution-** let mark be  $y$  nd john be  $x$

$$x + \frac{y}{3} = 75$$

$$y + \frac{x}{2} = 75$$

by solving

$$x = 60$$

$$y = 45$$

$$\text{total} = 105$$

**Q 242.** A city in the U S has a basketball league with three basketball teams, the Arêtes, the Braves and the Deities. A sports writer notices that the tallest player of the Arêtes is Shortest than the shortest player of the Braves. The shortest of the Deities is shortest of the Arêtes, while the tallest of the braves is taller than the tallest of the Arêtes. Which of the following can be judged with certainty?

X) Paul, a brave is taller than David, an Arêtes.

Y) David, a Deities, is shorter than Edward, an Arêtes.

a) X only

b) Both X and Y

c) Neither X and Y

d) Y only

**Solution-** its clearly written that the tallest player of the Arates is Shortest than the shortest player of the Braves.

=> all players of braves are taller than all players of Arates.

=> X is true

=> ans = (a)

**Q 243.** Sum of the digits in the equation  $(16^{100}) \cdot (125^{135})$  is

a) 2 b) 5 c) 3 d) 8

**Solution-**  $16^{100} \cdot 125^{135} \Rightarrow (2^4)^{100} \cdot (5^3)^{135} \Rightarrow 2^{400} \cdot 5^{405} = 2^{400} \cdot 5^{400} \cdot 5^5$

$= (2 \cdot 5)^{400} \cdot 3125$

$= 10^{400} \cdot 3125$

sum of  $10^{400} = 1 + 0 + 0 + 0 + \dots = 1$

sum of 3125 = 11

therefore =  $1 \cdot 11 = 11$

therefore =  $1 + 1 = 2$

ans is 2

**Q 244.** what is the average of the first 200 terms of the series 1,-2,3,-4,5,-6,7....

a) -0.5 b) -50.5 c) 0.5 d) 50

**Solution-** average of the first 200 terms of the series 1,-2,3,-4,5,-6,7...

$= 1 + (-2) + 3 + (-4) + \dots + 199 + (-200) / 200$

$= (1-2) + (3-4) + (5-6) + \dots + (199-200) / 200$



$$=(-1)+(-1)+(-1)+\dots 100\text{times}/200$$

$$=-100/200$$

$$=-0.5$$

**Q 245. A sequence  $x_1, x_2, x_3, \dots$  is said to be in harmonic progression if the reciprocals  $1/x_1, 1/x_2, 1/x_3, \dots$  are in arithmetic progression. The 5th and 7th term for harmonic progression are 30 and 50 respectively what is difference between 6th and 4th term ?**

**a) 16 b) 14.5 c) 13.4 d) 12.5**

**Solution- hp series is**

$$a, a/1+d, a/1+2d, \dots$$

**so applying this**

$$\text{5th term is } 30 = a/1+4d$$

$$\text{and 7th term is } 50 = a/1+6d$$

**so from this two eq. we get**

$$a = 50/3$$

$$\text{and } d = -1/9$$

**putting this two for 4th and 6th term we get 4th term =25 ..6th term=37.5**

$$\text{difference} = 12.5$$

**Q 246. Each of A,B and C need a**

**certain unique time to do certain work. C needs 1 hour less than A**

**to complete the work. Working together they require 30 minutes to**

**complete 50% of the work. The work also gets completed if A and B**

**start working together and A leaves after 1 hour and B works further**

**3 hours. How much work does C do per hour?**

a) 16.66%

b) 66.66%

c) 50%

d) 33.33%

**Solution-** 50% suppose A do work in x hrs ,B in y, then c would do in x-1 hrs..then  $1/x + 1/x-1 + 1/y = 1$  in 1 hrs..also A&B 1 hrs work  $1/x + 1/y$  then work remaining  $xy - x - y/xy$  which is done by B in 3 hrs so  $(xy - x - y)/xy = 3/y$  it results  $y = 4x/x-1$  putting value we get  $x=3$  so  $y=6$  so A CAN DO WORK in 3 hrs B in 6 hrs & C IN 2 hrs that is 50%

**Q 247.** In an year N, the 320th day of the year is Thursday. In the year N+1 the 206th day of the year is also Thursday. What is the 168th day of In the year N-1?

a) Friday

b) Thursday

c) Tuesday

d) Saturday

**Solution-** riday..If the Nth year is a non-leap year, then 320th day of year N to 206th day of year N+1 is  $[(365$

$- 320) + 206] = 251$  days i.e. 35 weeks + 6 days. But this will not make the two days to be

Thursday.

Thus, the Nth year has to be a leap year. In this case 320th day of year N to 206th day of year

N+1 is  $[(366 - 320) + 206] = 252$  days i.e. 36 weeks. Hence both days will be same day of the

week i.e. Thursday as given by the data.

168th day of N-1 year to 320th day of N year is  $[(365 - 168) + 320] = 517$  days i.e. 73 weeks +

6 days. Thus, if the 320th day is Thursday, then the 168th day of year will be Friday, option

Q 248. What is the remainder when  $6^{17} + 17^6$  is divided by 7?

- a) 1
- b) 6
- c) 0
- d) 3

Solution-  $6^{17} + 17^6 = (7-1)^{17} + (21-4)^6 = (7-1)^{17} + (7 \cdot 3 - 4)^6 \dots [\text{eqn1}]$

if the [eqn1] is expanded then every term of the expansion except  $[(-1)^{17} + (-4)^6]$  will have 7 as one of its factors.

Just think a little bit about the binomial expansion of both  $[(7-1)^{17}]$  and  $[(7 \cdot 3 - 4)^6]$ , then you can readily point out that only the last term of both the expansions, i.e.,  $[(-1)^{17}]$  &  $[(-4)^6]$  respectively, will not have 7 as one of its factors.

So, we have to calculate the remainder when  $[(-1)^{17} + (-4)^6]$  is divided by 7.

Now, clearly  $(-1)^{17} = -1$

and,  $(-4)^6 = 4^6 = 2^{12} = (2^3)^4 = (7+1)^4$ .

Now, a same reasoning related to binomial expansion mentioned previously explains why, when  $(7+1)^4$  is divided by 7 will leave a remainder 1.

So,  $(7+1)^4$  will be of the form  $(7 \cdot A + 1)$ ; where A is some +ve integer, to know whose value isn't important in this case.

So, when

$[(-1)^{17} + (-4)^6]$  will be divided by 7

or,  $[-1 + (7+1)^4]$  will be divided by 7

or, when  $[-1 + 7 \cdot A + 1]$  will be divided by 7

or, when  $[7 \times A]$  will be divided by 7, clearly therefore the remainder will be zero, i.e, 0.

So, the answer is **OPTION 3)0**.

**Q 249.** George and Mark can paint 720 boxes in 20 days. Mark and Harry in 24 days and Harry and George in 15 days. George works for 4 days, Mark for 8 days and Harry for 8 days. The total number of boxes painted by them is

a) 252 b) 516 c) 348 d) 492

**Solution-** Capacity of  $G + M = 720 / 20 = 36$

$M + H = 720 / 24 = 30$

$H + G = 720 / 15 = 48$

Combined capacity =  $2 (G + H + M) = 114$

$G + H + M = 114 / 2 = 57$

Now capacity of  $G = (G+H+M) - (H + M) = 57 - 30 = 27$

$M = (G+H+M) - (H + G) = 57 - 48 = 9$

$H = (G+H+M) - (G + M) = 57 - 36 = 21$

Given that G worked for 4 days, and mark for 8 and harry for 8 days

So total work by them =  $4 \times 27 + 8 \times 9 + 8 \times 21 = 348$

**Q 250.** Megha drives along the perimeter of square field of side 10kms. She drives along the first side at 10kmph. along second side 20 kmph along 3rd side 30kmph and along the forth side at 40 kmph. Her average speed is ?

a) 19.2kmph b) 18kmph c) 30kmph d) 20kmph

**Solution-** Average speed : total distance/total time

Total distance =  $10 \times 4 = 40$  km

$$\text{total time} = 10/40 + 10/20 + 10/30 + 10/40$$

So, Average Speed = 19.2 Km/h

**Q 251.** For real number  $x$ ,  $\text{int}(x)$  denotes integer part of  $x$ .  $\text{int}(x)$  is the largest integer less than or equal to  $x$ .  $\text{int}(1,2)=1$ ,  $\text{int}(-2,4)= -3$ . Find the value of  $\text{int}(1/2)+\text{int}(1/2+100)+\text{int}(1/2+2/100)+\dots+\text{int}(1/2+99/100)$

a) 50 b) 49 c) 51 d) 48

**Solution-** if it is  $\text{int}(1/2 + 100)$  the answer is 150 lest if it is  $\text{int}(1/2 + 1/100)$  the answer is 50.

from  $\text{int}(1/2 + 49/100)= 0$  and from  $\text{int}(1/2 + 50/100)= 1$  and  $\text{int}(1/2 + 99/100) = 1$  so from 50 to 99 it is equal to 50

**Q 252.** 10 years ago 10 people age was 33. After 3 years a person of age 40 dies. After another 3 years another person of 40 years dies. After another 3 years another person of 27 years dies. Find the present average age?

a) 43 b) 44 c) 35 d) 40

**Solution-** 10 year ago 10 people = 33

10 year ago total age = 330

after 3 year 1 person with age 40 died = ie take his age as 37 before 3 years

lly for next 2 persons ; consider as 34 (40-6) and as 18(27-9) in 6 and 9 years ago( ie  $37+34+18=89$ ) 10 years ago age of 7 people =  $330-89=241$

nw consider present age  $7*10=70+241=311$

nw avg =  $311/7=44.43(\text{ans})$

**Q 253.** Raj invested in Indigo, HUL and SBI shares at Rs. 300,

Rs. 200 and Rs. 5 per share, 100 shares for Rs. 10000. The number of Indigo and HUL shares he bought are

a) 15, 25 b) 23, 17

c) 17, 23 d) 17, 60

**Solution-** ans will be 17,23 coz..

left sbi share will be  $100-(17+23)=60$

then indigo= $300*17=5100$

and HUL= $200*23=4600$

sbi= $5*60=300$

.....

total= $5100+4600+300=10000$

**Q 254.** Raju can do a piece of work in 10 days..vicky 12days,tinku 15 days..day all start the work together,but raju leaves afr 2 days,vicky leaves 3 days before the work is completed..how many days work is completed?

a) 7 b) 5 c) 9 d) 6

**Solution-** raju+vicky+tinku one day work =  $(1/10)+(1/12)+(1/15)= 1/4$

now for 2 days together work done=  $2*(1/4)= 1/2$

.....now work done by tinku in last 3 days alone= $(3/15)=(1/5)$

remaining work=  $1-(1/2 + 1/5)= 3/10$

....now vicky+tinku one day work= $(1/12)+(1/15)=9/60$

therefore  $3/10$  work will be done by both of them in=  $(60/9)*(3/10)= 2$  days

now answer= 2days(as got from above; it is days required to do rem. work)+ 3days(when vicky leaves)+2days(raju leaves)=7 days ans.

**Q 255.** Box of fruits can be loaded into a truck in 9 minutes by a worker. And 8 boxes will fill a truck completely. How many trucks can be loaded in  $1 \frac{1}{2}$  hours if there are 16 men together.

a) 1

b) 2

c) 3

d) 0

**Solution-** 1 worker can in 9 mins load 1 box

1 worker can in 90 mins load  $(1 \times 90/9) = 10$  boxes

16 worker can in 90 mins load  $(10 \times 16) = 160$  boxes

So no. of trucks needed  $= 160/8 = 20$  i think...

**Q 256.** the first 44 positive integers are written in order to form the largest number  $N = 12345678910111213..424344$ . what will be the remainder when N is divided by 45?

a) 4 b) 9 c) 14 d) 18

**Solution-** no will be div by 45 when it is divided by both 9 and 5

a no is div by 9 if sum of digits is div by 9

now sum of digits of given no is 270

so the no is div by 9

and since last digit is 4 when div by 5 it leaves rem 4

let us say numbers such as 9, 54...

we see they are div by 9 but leaves rem 4 when div by 5..

so when div by 45 they leave rem 9

so req ans = 9

**Q 257.** The sum of 3 consecutive numbers of the four numbers A, B, C, D are 4613, 4961, 5010, 5099 then what is the largest number among A, B, C, D ?

a) 1948 b) 1463 c) 1601 d) 1550

**Solution-** Let,  $S_1, S_2, S_3, S_4$  be the sums of A,B,C,D taking 3 of them at a time.

So, by the given data in the problem, it follows that :

$$S_1 + S_2 + S_3 + S_4 = 4613 + 4961 + 5010 + 5099$$

$$\Rightarrow S_1 + S_2 + S_3 + S_4 = 19683 \dots [\text{eqn 1}]$$

Now, Without the loss of generality we can assume

$$S_1 = A + B + C$$

$$S_2 = B + C + D$$

$$S_3 = C + D + A$$

$$S_4 = D + A + B$$

-----

adding the above terms we get,

$$S_1 + S_2 + S_3 + S_4 = 3(A + B + C + D)$$

$$\Rightarrow 19683 = 3(A + B + C + D); [\text{From [eqn 1]}]$$

$$\Rightarrow (A + B + C + D) = (19683/3)$$

$$\Rightarrow (A + B + C + D) = 6561$$

So, the greatest term among them = sum of all four - sum of lowest three terms

$$\text{So, the greatest term among them} = 6561 - 4613 = 1948.$$

$$\text{So, the greatest term among them} = 1948$$

So, the correct answer is : **OPTION a) 1948**

**Q 258.** Three cars A, B and C are participating in a race. A is twice as likely as B to win and B is thrice as likely as C to win. What is the probability that B will win, if only one of them can win the race?

$$\text{a) } \frac{1}{2} \text{ b) } \frac{2}{5} \text{ c) } \frac{3}{10} \text{ d) } \frac{1}{10}$$

$$\text{Solution- } p(A) = 2 * p(B)$$

$$P(B) = 3 * p(c)$$



$$P(A) + P(B) + P(C) = 1$$

$$2 * P(B) + P(B) + P(B)/3 = 1$$

$$10 * p(B) / 3 = 1$$

$$P(B) = 3/10$$

**Q 259. 3 white chips, 7 blue chips, 16 green chips, 2 chips drawn from the box in succession what is the probability that one is blue and other is white?**

**a) 7/50 b) 8/30 c) 7/25 d) 21/25\*13**

**Solution- no of ways that 2 chips selected from total of 26 is  ${}^{26}C_2 = 26 * 25 / 2 = 13 * 25$**

**no of ways that 1 white and 1 blue is selected is  ${}^3C_1 * {}^7C_1 = 21$**

**total probability =  $21 / 13 * 25$**

**Q 260. George is  $2/3$  rd as efficient as smith and smith is  $3/4$  th as efficient as John. George working alone is what fraction of All of them working together.**

**a)  $2/3$  b)  $2/9$  c)  $4/9$  d)  $1/3$**

**Solution-  $g:s = 2/3:1 = 2:3$**

**$s:j = 3/4:1 = 3:4$**

**$g:s:j = 2:3:4$**

**so ans is  $2/9$**

**Q 261. A man can load one box in 9 minutes. A truck can contain 8 boxes. If 16 men load for one and a half hour, how many trucks will be loaded?**

**a) 20 b) 10 c) 15 d) 40**

**Solution- 1 person in 9 min can load 1 box**

**1 person in 1 min can load  $1/9$  boxes**

**16 person in 1 min can load  $16/9$  boxes**

16 person in 90 min can load  $16 \times 90 / 9 = 160$  boxes

now

8 boxes in 1 truck

so

160 boxes comes under 20 trucks

so answer is 20 trucks loaded

Q 262. In the simple subtraction problem Below , sum single digits (not necessarily distinct) are replace by letters , find the value of  $7 \times A + 7 \times B + 6 \times C \times D$

A 7 C 2

- 4 B 6 8

\_\_\_\_\_

5 4 3 D

a) 77 b) 95 c) 84 d) 70

Solution- A7C2

-4B68

\_\_\_\_\_

543D

So after solving the equation we get  $A=9, B=2, C=0, D=4$  (because no are not distinct so it may be repeated).

so Ans of  $7A+7B+6CD=7 \times 9 + 7 \times 2 + 6 \times 0 \times 4 = 77$

Q 263. There are 5 distinct integers a,b,c,d,e in ascending order.

$(68-a)(68-b)(68-c)(68-d)(68-e)=725$ .

then what is the value of  $a+b+c+d$ ?

a) 34 b) 136 c) 306 d) 238

**Solution-  $725 = -5 \cdot -1 \cdot 1 \cdot 5 \cdot 29$**

**so we can write,**

$$68 - e = -5$$

$$\Rightarrow e = 73$$

$$68 - d = -1$$

$$\Rightarrow d = 69$$

$$68 - c = 1$$

$$\Rightarrow c = 67$$

$$68 - b = 5$$

$$\Rightarrow b = 63$$

$$68 - a = 29$$

$$\Rightarrow a = 39$$

$$\text{so } a+b+c+d = 39+63+67+69 = 238$$

**Q 264. A circle has 29 points arranged in a clockwise manner numbered from 0 to 28, as shown in the figure below. A bug moves clockwise around the circle according to the following rule. If it is at a point  $i$  on the circle, it moves clockwise in 1 second by  $(1 + r)$  places, where  $r$  is the remainder (possibly 0) when  $i$  is divided by 11. Thus if it is at position 5, it moves clockwise in one second by  $(1 + 5)$  places to point 11. Similarly if it is at position 28 it moves  $(1 + 6)$  or 7 places to point 6 in one second. If it starts at point 23, at what point will it be after 2012 seconds?**

**a) 1 b) 7 d) 15 d) 20**

**Solution- after 1st second :  $(1+23\%11 = 1) = 2$  places [25]**

**after 2nd second :  $(1+25\%11 = 3) = 4$  places [0]**

**after 3rd second :  $(1+0\%11 = 0) = 1$  place [1]**

after 4th second :  $(1+1\%11 = 1) = 2$  places [3]

after 5th second :  $(1+3\%11 = 3) = 4$  places [7]

after 6th second :  $(1+7\%11 = 7) = 8$  places [15]

after 7th second :  $(1+15\%11 = 4) = 5$  places [20]

after 8th second :  $(1+20\%11 = 9) = 10$  places [1]

now,for the same pattern from 4th sec to 8th sec will repeat itself (5 sec intervals)..

total time = 2012 secs

first 3 secs out of pattern...so time left  $2012 - 3 = 2009$  secs

now no. of repetitions in the leftover time =  $2009/5 = 401$ ....remainder = 4

for the next 4 iterations following the similar pattern

the position will be 20..

**Q 265.** Total income of Eesha in the years 2003,2004,2005 was \$36,400.Her income increased by 20% each year.What was her income in 2005?

a) 14500 b) 14000 c) 14200 d) 14100

**Solution-** let in 2003 income= $x$ .so in 2004 it will be  $(x+x*20\%)=6x/5$ .and in 2005 it will be  $(6x/5+6x/5*20\%)=36x/25$ .

$x+6x/5+36x/25=36400$  then  $x=10000$ .in 2004 income= $12000$  and in 2005 income= $14400$

**Q 266.** Length, Breadth and Height of a cuboid is in the ratio 1:3:27. Volume of the cuboid is 27 m<sup>3</sup>. If the length is doubled and Breadth & Height are halved, then what is the change in the volume of the cuboid?

a) Decreased by 15% b) Decreased by 18% c) Decreased by 30%

d) Decreased by 50%

**Solution-** given  $l:b:h=1:3:27$

so now volume will be  $lbh=1*3*27=81$

now given  $l$  is doubled so  $l=2l$

$b$  and  $h$  are halved so  $b=3b/2, h=27h/2$

now new volume  $2l*b/2*h/2$

so substitute values then u get  $lbh=2*(3/2)*(27/2)=40.5$

so the change is  $81-40.5=40.5$

so half of the original volume

**Q 267.** Two people, Ranbir and Katrina decide to meet at a beach between 1 pm to 2 pm, given that both will surely turn up once in the given time frame. If Ranbir arrives, he waits for 15 minutes and then leaves feeling betrayed and similarly Katrina waits for 15 minutes after she arrives. So what's the probability that they meet?

a) 0.35 b) 0.45 c) 0.25 d) 0.15

**Solution-** waiting time of both Katrina and Ranbir is 15 min. Means they can meet only meet each other in 15 Min. , if they 1 more min. than they can't meet each other .. so chances of meeting in only (Favourable event) = 15 min

Total no. of min. (Sample space) = 60 min

Probability of Meeting is = (Favourable event) / (Sample space)

$15/60=0.25$  ans.

**Q 268.** If  $(3a+6b)/(5a+12b)=12/23$  determine the value of  $3a^2+5b^2/ab$

a)  $19/2$  b)  $32/3$  c) 9 d)  $31/3$

**Solution-** consider  $(3a+6b)/(5a+12b)=12/23$  ----> eq 1

sol eq ---> 1 the v vil get  $a/b=2/3$

div 'ab' to the num and den for  $3a^2+5b^2/ab$

therefore,  $3*(a/b)+5*(ba)$

sub  $a/b=2/3$  in ab eqtn

v get  $19/2$

**Q 269.** A series of books was published at 10years intervals when the 10th book was issued the sum of publication years was 19,560when was the 1st book published

a)1910 b)1914 c)1911 d)1909

**Solution-**  $19560=10/2[a+a+(10-1)*10]$

$19560=5[2a+90]$

$19560-450=10a$

$a=19110/10$

$a=1911$

**Q 270.** given the digits 1,3,6,9 find the probability that a 3 digit number formed by using them with no digit repeated is divisible by 4

a)  $1/12$  b)  $1/4$  c)  $1/6$  d) none

**Solution-** divisibility rule for four is last 2 digit must be divisible by 4. so last 2 digit must be 16,36,96.

(1) -- -- 1 6, (2) -- -- 3 6 , (3) -- -- 9 6

now you can put in 1 st case 9,3 yoy have  $2*1$  choice, similar in 2nd and 3rd case ..so total number of choice is =6

and total no. odf case =  $4!=24$

$p(\text{divisible } 4)= 6/24=1/4$

**Q 271.** The diagonal of a square is twice the side of equilateral triangle the ratio of Area of the Triangle to the Area of Square is?

a)  $\sqrt{3}:8$  b)  $\sqrt{2}:5$  c)  $\sqrt{3}:6$  d)  $\sqrt{2}:4$

**Solution-** diagonal of a square is  $2a$

area of the square =  $\frac{1}{2} \times (\text{diagonal})^2$  i.e.  $2a^2$

side of the equi triangle is  $a$

area of equi triangle =  $\frac{3}{4}a^2$

$\frac{3}{4}a^2:2a^2$

$3:8$

**Q 272.** The number of different non congruent triangles with integer side and perimeter 15 is

a) 9 b) 7 c) 10 d) 6

**Solution-** B)7, Let ,1st side of triangle =a, 2nd side =b & 3rd side =c

A/C to law of triangle  $a+b>c$  so  $(a+b)$  must be 8 or 9 or 10 or 11 or 12 or 13 or 14 but not be 15,

**Q 273.** The number of committees of size 10 that could be formed from 10 men & 10 women such that committee has atleast 6 women is

a)60626 b) 210 c) 10210 d) none

**Solution-** Option: (a)

${}^{10}C_6 \times {}^{10}C_4 + {}^{10}C_7 \times {}^{10}C_3 + {}^{10}C_8 \times {}^{10}C_2 + {}^{10}C_9 \times {}^{10}C_1 + {}^{10}C_{10} \times {}^{10}C_0$

$= 44100 + 14400 + 2025 + 100 + 1$

$= 60626$

**Q 274.** How many positive multiples of 10 that are less than 1000 are the sum of 4 consecutive integers

a) 51 b) 50 c) 49 d) none

**Solution-** in the question what they given is we have to find the sum of the 4 consecutive numbers that sum should be multiple of like 10 ie..10,20.....and should be less than 1000.

so that we can conclude tat last 10 multiple before 1000 is 990

then w.k.t  $1+2+3+4=10$

$6+7+8+9=30\text{---}>2$

$11+12+13+14=50$

$16+17+18+19=70$

like wise it will be repeat,

based upon the given we need to find upto 990 how many time it occurs is

so that use this formula to find last number in AP

$sn=a+(n-1)d$

we knw  $sn=990\Rightarrow$ last number

$a=10\Rightarrow$ initial number

$d=20\Rightarrow$ diff b/w two consecutive numbers

$990=10+(n-1)20$

$990=10+20n-20$

$990=20n-10$

$20n=1000$

$n=50$

**Q 275.** Inabhi's class of 44 students,28 students speak malayalam,26 students speak tamil,9 students speak none of the two languages.How many students speak both tamil& Malayalam

a) 54 b) 38 c) 19 d) 10

**Solution-**  $(44-9)=28+26-n(A\&B)$

$35=54-n(A\&B)$



$$n(A \cap B) = 19$$

Q 276. The sum of two numbers is 2016 and their product is 32 the sum of their reciprocals is

a) 63 b) 9 c)  $32 + 2014$  d)  $32 - 2014$

Solution- let two no are  $x, y$

$$x + y = 2016 \dots\dots(1)$$

$$xy = 32 \dots\dots(2)$$

therefore

$$1/x + 1/y = x + y / xy = 2016 / 32 = 63$$

Q 277. The sum of two numbers is 45. The sum of their quotient and is reciprocal is 2.05, the product of the numbers is?

a) 450 b) 205 c) 400 d) 500

$$\text{Solution- } a + b = 45$$

$$a/b + b/a = 2.05$$

$$\Rightarrow (a^2 + b^2) / ab = 2.05$$

$$\Rightarrow ((a+b)^2 - 2ab) / ab = 2.05$$

$$\Rightarrow (a+b)^2 = 2.05ab + 2ab = 4.05ab$$

$$\Rightarrow ab = 45^2 / 4.05 = 500$$

Q 278. Find the number of divisors of 1728.?

a) 28 b) 20 c) 30 d) 18

$$\text{Solution- } 1728 = 2^6 * 3^3$$

$$\text{Hence the Number of factors} = (6+1) \times (3+1) = 7 \times 4 = 28.$$

We know that if a number represented in standard form ( $a^m \cdot b^n$ ), then the number of factors is given by  $(m+1)(n+1)$ .

Answer is 28

Q 279. In 4 years, Rajs father will be double Rajs age then. Two years ago, while his mother was twice his age that time. If Raj is going to be 32 years old 8 years from now, then what is the sum of his parents age now?

a) 96 b) 100 c) 102 d) 98

Solution- R.F=RAJS FATHER AGE

R=RAJS AGE

R.M=RAJS MOTHER AGE

$$(R.F+4)=2*(R+4)$$

$$(R.M-2)=2*(R-2)$$

$$R+8=32$$

therefore,  $R=24$

therefore,  $R.M=46$

therefore,  $R.F=52$

$$R.F + R.M = 98$$

Q 280. when a no. divided by 406 it gives 115 as a remainder. when it divided by 29 what is the remainder.???

a) 27 b) 7 c) 28 d) 19

Solution- let x is divided by 406 & gives quotient y & remainder 115 then

$$x = 406 * y + 115$$

$$\text{now, } x / 29 = (406 * y + 115)/29 = 406 * y/29 + 115/29$$

$$\Rightarrow \text{rem} = 115/29 = 28$$

**Q 281. Raj divided 50 into two parts such that the sum of their reciprocal is  $1/12$ , we get the parts as**

- a) 28, 22**
- b) 24, 36**
- c) 36, 14**
- d) 20, 30**

**Solution-  $(1/20)+(1/30)=5/60=1/12$  so ans is (d) 20,30**

**Q 282.  $p/q - q/p = 21/10$**

**then**

$$4p/q + 4q/p = ?$$

- a)  $58/10$  b)  $113/10$  c)  $58/5$  d)  $121/110$**

**Solution-  $58/5$**

**let us take  $p/q=x$  and  $q/p=1/x$**

$$x - 1/x = 21/10$$

**then by solving we get a quadratic equation like  $10x^2 - 21x - 10 = 0$**

$$10x^2 - 25x + 4x - 10 = 0$$

**then by taking factors we get two values for  $x$ ,  $x = -2/5$  and  $x = 5/2$**

**by substituting  $x = 5/2$**

$$4(5/2) + 4(2/5) = 58/5$$

**Q 283. what is the 2015th no. of problemsolvingproblemsolving.....**

- a) g b) p c) n d) o**

**Solution- "problemsolving" it is a 14 letters word**

**total no = 2015th**

"g" is repeat= $2015/14=143$  remainder=13

13th words is "N"

Q 284. In the sixth, seventh, eighth, and ninth basketball games of the season, a player scored 23, 14, 11, and 20 points, respectively. Her points-per-game average was higher after nine games than it was after the first five games. If her average after ten games was greater than 18, what is the least number of points she could have scored in the tenth game?

a) 29 b) 30 c) 28 d) 27

Solution- The sum of the scores for games 6 through 9 is 68. The average in these four games is  $\frac{68}{4} = 17$

The total points in all ten games is greater than  $10 \cdot 18 = 180$ . Thus, it must be at least 181.

There are at least  $181 - 68 = 113$  points in the other six games: games 1-5 and game 10. Games 1-5 must have an average of less than 17. Thus we cannot put more than  $5 \cdot 16 + 17 = 97$  points in those five games.

Thus, the tenth game must have at least  $113 - 97 = 16$  points

Q 285.  $\frac{2}{3}$ rd of the balls in a bag are blue, the rest are pink. If  $\frac{5}{9}$ th of the blue balls and  $\frac{7}{8}$ th of the pink balls are defective, find the total number of balls in the bag given that the number of non defective balls is 146.

a) 216 b) 649 c) 432 d) 578

Solution- let the total balls be x

$\frac{2}{3}x = \text{blue}$  &  $\frac{1}{3}x = \text{pink}$

non defective balls=146

total no. of balls=defective+non defective

hence defective=total-non defective(146)

$(\frac{2}{3}x) \cdot \frac{5}{9} + (\frac{1}{3}x) \cdot \frac{7}{8} = t - 146$

$0.66203x = t - 146$

$$146 = 0.3303x$$

$$x = 432$$

### FACE MATERIAL SOLUTIONS

1. Ray writes a two digit number. He sees that the number exceeds 4 times the sum of its digits

by 3. If the number is increased by 18, the result is the same as the number formed by reversing

the digits. Find the number.

a) 35

b) 42

c) 49

d) 57

Solution: Let the two digit number be  $xy$ .

$$4(x + y) + 3 = 10x + y \dots\dots(1)$$

$$10x + y + 18 = 10y + x \dots\dots(2)$$

$$\text{Solving 1st equation we get } 2x - y = 1 \dots\dots(3)$$

$$\text{Solving 2nd equation we get } y - x = 2 \dots\dots(4)$$

Solving 3 and 4, we get  $x = 3$  and  $y = 5$

2.  $a, b, c$  are non negative integers such that  $28a + 30b + 31c = 365$ .  $a + b + c = ?$

a) Greater than 14

b) less than or equal to 11

c) 13

d) 12

In a calendar,

Number of months having 28 days = 1

Number of months having 30 days = 4

Number of months having 31 days = 7

$$28 \times 1 + 30 \times 4 + 31 \times 7 = 365$$

Here,  $a = 1$ ,  $b = 4$ ,  $c = 7$ .

$$a+b+c = 12$$

3. George can do a piece of work in 8 hours. Paul can do the same work in 10 hours, Hari can do

the same work in 12 hours. George, paul and hari start the same work at 9 am, while george

stops at 11 am, the remaining two complete the work. What time will the work complete?

a) 11.30 am

b) 12 noon

c) 12.30 pm

d) 1 pm

Let the total work = 120 units.

As George completes this entire work in 8 hours, his capacity is 15 units /hour

Similarly, the capacity of paul is 12 units / hour

the capacity of Hari is 10 units / hour

All 3 started at 9 am and worked upto 11 am. So total work done upto 11 am =  $2 \times (15 + 12 +$

$$10) = 74$$

$$\text{Remaining work} = 120 - 74 = 46$$

Now this work is to be done by paul and hari.  $46 / (12 + 10) = 2$  hours (approx)

So work gets completed at 1 pm

4. If  $x^y$  denotes  $x$  raised to the power  $y$ , Find last two digits of  $(1141^{3843}) + (1961^{4181})$

a) 02

b) 82

c) 42

d) 22

Remember 1 raised to any power will give 1 as unit digit.

To find the digit in the 10th place, we have to multiply, 10th digit in the base x unit digit in the

power.

So the Last two digits of the given expression =  $21 + 61 = 82$

5. J can dig a well in 16 days. P can dig a well in 24 days. J, P, H dig in 8 days. H alone can dig

the well in How many days?

a) 32

b) 48

c) 96

d) 24

Assume the total work = 48 units.

Capacity of J =  $48 / 16 = 3$  units / day

Capacity of P =  $48 / 24 = 2$  units / day

Capacity of J, P, H =  $48 / 8 = 6$  units / day

From the above capacity of H =  $6 - 2 - 3 = 1$

So H takes  $48 / 1$  days = 48 days to dig the well

6. If a lemon and apple together costs Rs.12, tomato and a lemon cost Rs.4 and an apple costs

Rs.8 more than a lemon. What is the cost of lemon?

$L + A = 12$  ...(1)

$$T + L = 4 \dots(2)$$

$$L + 8 = A$$

Taking 1 and 3, we get  $A = 10$  and  $L = 2$

7. 3 mangoes and 4 apples costs Rs.85. 5 apples and 6 peaches costs 122. 6 mangoes and 2

peaches costs Rs.144. What is the combined price of 1 apple, 1 peach, and 1 mango.

a) 37

b) 39

c) 35

d) 36

$$3m + 4a = 85 \dots(1)$$

$$5a + 6p = 122 \dots(2)$$

$$6m + 2p = 144 \dots(3)$$

$$(1) \times 2 \Rightarrow 6m + 8a = 170$$

$$4 \times (3) \Rightarrow 6m + 2p = 144$$

$$\text{Solving we get } 8a - 2p = 56 \dots(4)$$

$$(2) \Rightarrow 5a + 6p = 122$$

$$3 \times (4) = 24a - 6p = 168$$

$$\text{Solving we get } a = 10, p = 12, m = 15$$

$$\text{So } a + p + m = 37$$

8. An organisation has 3 committees, only 2 persons are members of all 3 committee but every

pair of committee has 3 members in common. what is the least possible number of members on

any one committee?

a) 4



b) 5

c) 6

d) 1

Total 4 members minimum required to serve only on one committee.

9. There are 5 sweets - Jammun, kaju, Peda, Ladu, Jilebi which can be consumed in 5

consecutive days. Monday to Friday. A person eats one sweet a day, based on the following

constraints.

(i) Ladu not eaten on monday

(ii) If Jamun is eaten on Monday, Ladu should be eaten on friday.

(iii) Peda is eaten the day following the day of eating Jilebi

(iv) If Ladu eaten on tuesday, kaju should be eaten on monday

based on above, peda can be eaten on any day except

a) tuesday

b) monday

c) wednesday

d) friday

From the (iii) clue, peda must be eaten after jilebi. so Peda should not be eaten on monday.

10. If YWVSQ is 25 - 23 - 21 - 19 - 17, Then MKIGF

a) 13 - 11 - 8 - 7 - 6

b) 1 - 2-3-5-7

c) 9 - 8 - 7 - 6 - 5

d) 7 - 8 - 5 - 3

MKIGF = 13 - 11 - 9 - 7 - 6

**Note: this is a dummy question. Dont answer these questions**

**11. Addition of  $641 + 852 + 973 = 2456$  is incorrect. What is the largest digit that can be**

**changed to make the addition correct?**

**a) 5**

**b) 6**

**c) 4**

**d) 7**

**641**

**852**

**963**

**-----**

**2466**

**Largest among tens place is 7, so 7 should be replaced by 6 to get 2456**

**12. Value of a scooter depreciates in such a way that its value at the end of each year is  $\frac{3}{4}$ th of**

**its value at the beginning of the same year. If the initial value of scooter is 40,000, what is the**

**value of the scooter at the end of 3 years?**

**a) 23125**

**b) 19000**

**c) 13435**

**d) 16875**

**Value of the scooter at the end of the year =  $40000 \times (\frac{3}{4})^3 = 16875$**

**13. At the end of 1994, R was half as old as his grandmother. The sum of the years in which**

**they were born is 3844. How old R was at the end of 1999**

a) 48

b) 55

c) 49

d) 53

In 1994, Assume the ages of GM and R =  $2k$ ,  $k$

then their birth years are  $1994 - 2k$ ,  $1994 - k$ .

But given that sum of these years is 3844.

So  $1994 - 2k + 1994 - k = 3844$

$K = 48$

In 1999, the age of R is  $48 + 5 = 53$

14. When numbers are written in base  $b$ , we have  $12 \times 25 = 333$ , the value of  $b$  is?

a) 8

b) 6

c) None

d) 7

Let the base =  $b$

So,  $(b+2)(2b+5) = (b+2)(2b+5) = 3b^2 + 3b + 3$

$2b^2 + 9b + 10 = 3b^2 + 3b + 3$

$b^2 - 6b - 7 = 0$

Solving we get  $b = 7$  or  $-1$

So  $b = 7$

15. How many polynomials of degree  $\geq 1$  satisfy  $f(x^2) = [f(x)]^2 = f(f(x))$

a) more than 2

b) 2

c) 0

d) 1

Let  $f(x) = x^2$

$$f(x^2) = (x^2)^2 = x^4$$

$$(f(x))^2 = (x^2)^2 = x^4$$

$$f(f(x)) = f(x^2) = (x^2)^2 = x^4$$

Only 1

16. Figure shows an equilateral triangle of side of length 5 which is divided into several unit

triangles. A valid path is a path from the triangle in the top row to the middle triangle in the

bottom row such that the adjacent triangles in our path share a common edge and the path never

travels up (from a lower row to a higher row) or revisits a triangle. An example is given below.

How many such valid paths are there?

a) 120

b) 16

c) 23

d) 24

Sol:

$$\text{Number of valid paths} = (n-1)! = (5-1)! = 24$$

17. In the question,  $A^B$  means, A raised to power B. If  $x \cdot y^2 \cdot z < 0$ , then which one of the

following statements must be true?

(i)  $xz < 0$  (ii)  $z < 0$  (iii)  $xyz < 0$

a) (i) and (iii)

b) (iii) only

c) None

d) (i) only

As  $y^2$  is always positive,  $x \cdot y^2 \cdot z < 0$  is possible only when  $xz < 0$ . Option d is correct.

18. The marked price of a coat was 40% less than the suggested retail price. Eesha purchased the

coat for half the marked price at the fiftieth anniversary sale. What percentage less than the

suggested retail price did Eesha pay?

a) 60

b) 20

c) 70

d) 30

Let the retail price is Rs.100. then market price is  $(100-40) \% \text{ of } 100 = 60$ . Eesha purchased the

coat for half of this price. ie., 30 only. which is 70 less than the retail price. So Option C is

correct.

1. A cow and horse are bought for Rs.2,00,000. The cow is sold at a profit of 20% and the horse

is sold at a loss of 10%. The overall gain is Rs.4000, the Cost price of cow?

a) 130000

b) 80000

c) 70000

d) 120000

Ans: Overall profit =  $4000 \div 200000 \times 100 = 2\%$

By applying alligation rule, we get

So cost price of the cow =  $\frac{2}{5} \times 200000 = 80,000$

2. A circle has 29 points arranged in a clock wise manner from 0 to 28. A bug moves clockwise

manner from 0 to 28. A bug moves clockwise on the circle according to following rule. If it is

at a point  $i$  on the circle, it moves clockwise in 1 sec by  $(1 + r)$  places, where  $r$  is the remainder

(possibly 0) when  $i$  is divided by 11. If it starts in 23rd position, at what position will it be after

2012 sec.

Ans: After 1st second, it moves  $1 + (23/11)r = 1 + 1 = 2$ , So 25th position

After 2nd second, it moves  $1 + 25/11 = 1 + 3 = 4$ , So 29th position = 0

After 3rd second, it moves  $1 + 0/11 = 1 + 0 = 1$ , So 1st position

After 4th second, it moves  $1 + 1 = 2$  3rd position

after 5th,  $1 + 3/11 = 4$  So 7th

After 6th,  $1 + 7/11 = 8$  so 15th

After 7th,  $1 + 15/11 = 5$  so 20th

After 8th,  $1 + 20/11 = 10$ th, So 30th = 1st

So it is on 1st after every  $3 + 5n$  seconds. So it is on 1st position after 2008 seconds ( $3 + 5 \times$

401) So on 20th after 2012 position.

3. In a city 100% votes are registered, in which 60% vote for congress and 40% vote for

BJP. There is a person A, who gets 75% of congress votes and 8% of BJP votes. How many

votes got by A?

Assume total votes are 100. So A got

75% of 60 = 45

**20% of 40 = 8**

**A total of 53%**

**4. Mean of 3 numbers is 10 more than the least of the numbers and 15 less than greatest of the**

**3. If the median of 3 numbers is 5, Find the sum of the 3 numbers?**

**Ans: Median is when the given numbers are arranged in ascending order, the middle one. Let the**

**numbers are x, 5, y where x is the least and y is greatest.**

**Given that  $x+5+y=3x+10$**

**and  $x+5+y=3y-15$**

**Solving we get  $x = 0$  and  $y = 25$ .**

**So sum of the numbers =  $0 + 5 + 25 = 30$**

**5. A and B start from house at 10am. They travel from their house on the MG road at 20kmph and**

**40 kmph. there is a Junction T on their path. A turns left at T junction at 12:00 noon, B reaches**

**T earlier, and turns right. Both of them continue to travel till 2pm. What is the distance between**

**A and B at 2 pm.**

**Distance between House and T junction =  $20 \times 2 = 40$ .**

**ie., B reached T at 11 am.**

**B continued to right after 11 am and travelled upto 2. So distance covered by him =  $3 \times 40 = 120$**

**A reached T at 12 noon and travelled upto 2 So distance travelled by him =  $2 \times 20 = 40$**

**So total distance between them =  $120 + 40 = 160$  km**

**6. In a particular year, the month of January had exactly 4 thursdays, and 4 sundays. On which**

day of the week did january 1st occur in the year.

a) monday

b) tuesday

c) wednesday

d) thursday

Ans: If a month has 31 days, and it starts with sunday, Then Sundays, Mondays, tuesdays are 5

for that month. If this month starts with monday, then mondays, tuesdays, and wednesdays are 5

and remaining days are 4 each. so this month start with Monday.

7. A, E, F, and G ran a race.

A said "I did not finish 1st /4th

E said "I did not finish 4th"

F said "I finished 1st"

G said "I finished 4th"

If there were no ties and exactly 3 children told the truth, when who finishes 4th?

a) A

b) E

c) F

d) G

Ans: Option D

8. A child was looking for his father. He went 90 m in the east before turning to his right. he

went 20 m before turning to his right again to look for his father at his uncle's place 30 m from this

point. His father was not there. From there he went 100m north before meeting his father in a



street. How far did the son meet his father from the starting point.

- a) 90
- b) 30
- c) 80
- d) 100

From the diagram,  $AB = 90 - 30 = 60$  and  $BD = 100 - 20 = 80$

$$AD = \sqrt{AB^2 + BD^2} = \sqrt{60^2 + 80^2} = 100$$

9. In an office, at various times during the day the boss gives the secretary a letter to type, each

time putting the letter on top of the pile in the secretary's inbox. Secretary takes the top letter and

types it. Boss delivers in the order 1, 2, 3, 4, 5 which cannot be the order in which secretary

types?

- a) 2, 4, 3, 5, 1
- b) 4, 5, 2, 3, 1
- c) 3, 2, 4, 1, 5
- d) 1, 2, 3, 4, 5

Ans: Option B

10. At 12.00 hours, J starts to walk from his house at 6 kmph. At 13.30, P follows him from J's

house on his bicycle at 8 kmph. When will J be 3 km behind P?

By the time P starts J is  $1.5 \text{ hr} \times 6 = 9 \text{ km}$  away from his house.

J is 3 km behind when P is 3 km ahead of him. ie., P has to cover 12 km. So he takes  $12 / (8 - 6)$

= 6 hrs after 13.30. So the required time is 19.30Hrs

11. J is faster than P. J and P each walk 24 km. Sum of the speeds of J and P is 7 kmph. Sum of

time taken by them is 14 hours. Then J speed is equal to

a) 7 kmph

b) 3 kmph

c) 5 kmph

d) 4 kmph

Given  $J > P$

$J + P = 7$ , only options are (6, 1), (5, 2), (4, 3)

From the given options, If  $J = 4$  the  $P = 3$ . Times taken by them =  $24/4 + 24/3 = 14$

12. In a G6 summit held at london. A french, a german, an italian, a british, a spanish, a polish

diplomat represent their respective countries.

(i) Polish sits immediately next to british

(ii) German sits immediately next to italian, British or both

(iii) French does not sit immediately next to italian

(iv) If spanish sits immediately next to polish, spanish does not sit immediately next to Italian

Which of the following does not violate the stated conditions?

a) FPBISG

b) FGIPBS

c) FGISPB

d) FSPBGI

e) FBGSIP

Ans: Option B

13. Raj drives slowly along the perimeter of a rectangular park at 24 kmph and completes one

full round in 4 min. If the ratio of length to breadth of the park is 3 : 2, what are the dimensions?

a) 450 m x 300 m

b) 150 m x 100 m

c) 480 m x 320 m

d) 100 m x 100 m

$$24 \text{ kmph} = 24 \times 1000 / 60 = 400 \text{ m / min}$$

In 4 minutes he covered  $4 \times 400 = 1600 \text{ m}$

This is equal to the perimeter  $2(l + b) = 1600$

But  $l : b = 3:2$

Let  $l = 3k$ ,  $b = 2k$

Substituting, we get  $2(3k + 2k) = 1600 \Rightarrow k = 180$

So dimensions are 480 x 320

14. M is 30% of Q, Q is 20% of P and N is 50% of P. What is M / N

ans: Take  $P = 100$ , then  $N = 50$ ,  $Q = 20$ ,  $M = 6$ . So  $M/N = 3/25$

15. At what time between 6 and 7 are the hands of the clock coincide?

Ans. Total = 3600

For hour =  $360/12 = 300/\text{hr}$

For Minute = full rotation =  $3600/\text{hr}$

Let the time is 't', for 6 =  $6 \times 30 = 1800$

then

$$30t + 1800 = 360t$$

$$330t = 1800$$

$$t = 1800/330$$

$$t = 6/11 \text{ hr } 6/11 \times 60 = 360/11 = 32 \frac{8}{11}$$

**Ans. is 6:32**

**16. Series 1, 4, 2, 8, 6, 24, 22, 88 ?**

**Sol : The given series is in the format:  $\times 4, -2, \times 4, -2, \times 4, -2, \times 4, \dots$**

$$1 \times 4 = 4$$

$$4 - 2 = 2$$

$$2 \times 4 = 8$$

$$6 \times 4 = 24$$

$$24 - 2 = 22$$

$$22 \times 4 = 88$$

$$88 - 2 = 86$$

**Ans: 86**

**17. 4 Women & 6 men have to be seated in a row given that no two women can sit together.**

**How many different arrangements are there.**

**Sol : Let us first sit all the 6 men in 6 positions in  $6!$  ways. Now there are 7 gaps between them**

**in which 4 women can sit in  ${}^7P_4$  ways.**

**So total ways are  $6! \times {}^7P_4$**

**18.  $xy + yx = 46$  Find x & y values ?**

$$\text{Sol: } 145 + 451 = 46$$

$$\text{Hence } x = 1, y = 45$$

**19. In 10 years, A will be twice as old as B was 10 years ago. If A is now 9 years older than B**

**the present age of B is**

$$\text{Soln: } A + 10 = 2(B - 10) \dots\dots\dots(1)$$

$$A = B + 9 \dots\dots\dots(2)$$

from equations. 1 & 2

we get  $B = 39$  A will be  $39+9=48$  years old.

20. A student can select one of 6 different math book, one of 3 different chemistry book & one of

4 different science book. In how many different ways students can select book of math, chemistry

& science.

Sol:  $6C1 \times 3C1 \times 4C1 = 6 \times 3 \times 4 = 72$  ways

21. Sum of two number is 50 & sum of three reciprocal is  $\frac{1}{12}$  so find these two numbers

Sol :  $x+y = 50$  .....(1)  $x=50-y$  ....(2)

$\frac{1}{x} + \frac{1}{y} = \frac{1}{12} \Rightarrow y + xxy = 12 \Rightarrow 12(y+x) = xy$  ...(3)

put (2) in (3)

$\Rightarrow 12(y+50-y) = (50-y)y$

$\Rightarrow 12y+600-12y = 50y-y^2$

$\Rightarrow y^2-50y+600=0$

$\Rightarrow y^2-30y-20y+600=0$

$\Rightarrow y(y-30)-20(y-30)=0$

$\Rightarrow (y-20)(y-30)=0$

$y=20$  or  $y=30$

if  $y=20$  then  $x = 30$

or  $y=30$  then  $x = 20$

two numbers are 30 & 20

1. Dinalal divides his property among his four sons after donating Rs.20,000 and 10% of his

remaining property. The amounts received by the last three sons are in arithmetic progression

and the amount received by the fourth son is equal to the total amount donated.  
The first son

receives as his share RS.20,000 more than the share of the second son. The last son received

RS.1 lakh less than the eldest son. 10. Find the share of the third son.

- a) Rs.80,000
- b) Rs.1,00,000
- c) Rs.1,20,000
- d) Rs.1,50,000

Ans: Assume the amounts received by the 2nd, 3rd, and 4th sons are  $a+d$ ,  $a$ ,  $a-d$  (as they are in

AP)

Now Eldest son received Rs.20,000 more than the 2nd son. So He gets  $a+d+20,000$

Last son received 1 lakh less than the eldest son. So  $(a+d+20,000) - (a-d) = 1,00,000 \Rightarrow 2d =$

$80,000 \Rightarrow d = 40,000$

So Amounts received by the 4 sons are  $a + 60,000$ ,  $a+40,000$ ,  $a$ ,  $a - 40,000$

It was given that the youngest son's share is equal to  $20,000 + 12(\text{His property})$

Assume His property =  $K$  rupees.

Then  $20,000 + 12(K) = a - 40,000 \dots\dots\dots(1)$

and the Remaining property = Sum of the properties received by all the four son's together.

Remaining property =  $910(K-20,000)$

$\Rightarrow 910(K-20,000) = (a + 60,000) + (a+40,000) + a + (a - 40,000) \dots\dots(2)$

Solving We get  $K = 40,000$  and  $a = 1,20,000$

So third son got Rs.1,20,000

In a quadratic equation, (whose coefficients are not necessarily real) the constant term is not 0.

The cube of the sum of the squares of its roots is equal to the square of the sum of the cubes of

its roots. Which of the following is true?

a) Both roots are real

b) Neither of the roots is real

c) At least one root is non-real

d) At least one root is real

Ans: Assume the given quadratic equation is  $ax^2+bx+c=0$  whose roots are  $p, q$ .

Now given that  $(\alpha^2+\beta^2)^3=(\alpha^3+\beta^3)^2$

By expanding we get,  $\alpha^6+3\alpha^4\beta^2+3\alpha^2\beta^4+\beta^6=\alpha^6+\beta^6+2\alpha^3\beta^3$

$3\alpha^2\beta^2(\alpha^2+\beta^2)=2\alpha^3\beta^3$

$3(\alpha^2+\beta^2)=2\alpha\beta$

$3(\alpha^2+\beta^2)+6\alpha\beta-6\alpha\beta=2\alpha\beta$

$3(\alpha+\beta)^2=8\alpha\beta \dots(1)$

We know that sum of the roots =  $\alpha + \beta = -b/a$

product of the roots =  $\alpha\beta = c/a$

Substituting in the equation (1) we get  $3(-b/a)^2=8.c/a \Rightarrow 3.b^2=8.a.c$

The nature of the roots can be determined by finding the magnitude of the determinant =  $b^2-4ac$

But we know that  $ac = 3b^2/8$

So  $b^2-4ac = b^2-4.3b^2/8 = -b^2/2 < 0$

So the roots are imaginary.

3. A man sold 12 candies in 10\$ had loss of  $b\%$  then again sold 12 candies at 12\$ had profit of

$b\%$  find the value of  $b$ .

**Ans: Here 12 candies is immaterial.**

$$\text{Loss \%} = \frac{\text{CP} - \text{SP}}{\text{CP}} \times 100$$

**So Here SP = 10 and loss% = b%**

$$\text{CP} - 10\text{CP} \times 100 = b \Rightarrow \text{CP} - 10\text{CP} = b100$$

**In the second case he got a profit of b%**

$$\text{So Profit \%} = \frac{\text{SP} - \text{CP}}{\text{CP}} \times 100$$

**So Here SP = 12 and profit% = b%**

$$12 - \text{CP} \times 100 = b \Rightarrow 12 - \text{CP} = b100$$

**Solving 1 and 2 we get b = 1/11 or 9.09%**

**4. find the total number of combinations of 5 letters a,b,a,b,b taking some or all at a time?**

**Ans: 1 letter can be chosen in 2 ways. a or b**

**2 letters can be chosen in 3 way. aa, ab, bb**

**3 letters can be chosen in 3 ways. bbb, aab, bba**

**4 letters can be chosen in 2 ways. aabb, bbba**

**5 letters can be chosen in 1 way.**

**So total ways are 11**

**5. what is the sum of all the 4 digit numbers that can be formed using all of the digits 2,3,5 and**

**7?**

**Ans: use formula (n-1)! x (111..n times) x (Sum of the digits)**

**here n is number of different letters**

**So answer is 3! x 1111 x 17**

**6.  $30^{72} \cdot 87$  divided by 11 gives remainder**

**Ans: Fermat little theorem says,  $a^{p-1} \equiv 1 \pmod{p}$  remainder is 1.**

**ie.,  $30^{10}$  or  $810$  when divided by 11 remainder is 1.**



The unit digit of 7287 is 8 (using cyclicity of unit digits) [Click here](#)

$$\text{So } 7287 = 10K + 8$$

$$30(10K+8)11=(3010)K.30811=1k.30811$$

$$8811=22411=(25)4.2411=1611=5$$

7. 1234567891011121314151617181920.....424344 what is remainder when divided by 45?

$$\text{Ans: Let } N = 1234567891011121314151617181920.....424344$$

$$\text{Remainder when } N \text{ is divided by } 5 \text{ is } 4. \text{ So } N = 5K + 4 \dots\dots(1)$$

Remainder when N is divided by 9 is Sum of the digits of N divided by 9. We know that

$1+2+3+\dots+44 = 990$  Which gives digit sum as 9. So remainder when N is divided by 9 is 0.

$$\text{So } N = 9L \dots\dots(2)$$

$$\text{Equation (1) and (2) we } 9L = 5K + 4$$

For  $K = 1$  this equation gets satisfied. So least possible number satisfies the condition is 9

So The general format of  $N = w(\text{LCM of } (9, 5)) + \text{Least number satisfies the condition.}$

$$\text{So } N = w.45 + 9$$

When N is divided by 45, we get 9 as remainder.

1. The wages of 24 men and 16 women amounts to Rs.11600 per day. Half the number of

men and 37 women earn the same amount per day. What is the daily wage of a man?

Let the wage of a man is m and woman be w.

$$24m+16w=11600$$

$$12m+37w = 11600$$

Solving we get  $m = 350$

2. The sum of three digits a number is 17. The sum of square of the digits is 109. If we subtract

495 from the number, the number is reversed. Find the number.

Let the number be  $abc$ .

Then  $a + b + c = 17$  .....(1)

$a^2 + b^2 + c^2 = 109$  .....(2)

$100a + 10b + c - 495 = 100c + 10b + a$  .....(3)

From 3, we get  $a - c = 5$

So the possibilities for  $(a, c, b)$  are  $(6, 1, 10)$ ,  $(7, 2, 8)$ ,  $(8, 3, 6)$ ,  $(9, 4, 4)$

From the above,  $(8, 3, 6)$  satisfies the condition.

3. A calculator has a key for squaring and another key for inverting. So if  $x$  is the displayed

number, then pressing the square key will replace  $x$  by  $x^2$  and pressing the invert key will

replace  $x$  by  $1/x$ . If initially the number displayed is 6 and one alternatively presses the invert

and square key 16 times each, then the final number displayed (assuming no roundoff or

overflow errors) will be

Even number of inverse key has no effect on the number.

By pressing the square key, the value got increased like 2, 4, 8, .... Which are in the format

of  $2^n$ . So after the 16 pressings the power becomes  $2^{16}$

So the final number will be  $6^{2^{16}} = 665536$

4. How many two digit numbers are there which when subtracted from the number formed by

reversing its digits as well as when added to the number formed by reversing its digits, result in

a perfect square.

Let the number  $xy = 10x + y$

Given that,  $10x+y - (10y - x) = 9(x-y)$  is a perfect square

So  $x-y$  can be 1, 4, 9. ----- (1)

So given that  $10x+y + (10y - x) = 11(x+y)$  is a perfect square.

So  $x+y$  be 11. Possible options are (9,2), (8,3), (7,4), (6,5) ----- (2)

From the above two conditions only (6,5) satisfies the condition

Only 1 number 56 satisfies.

5. Find the 55th word of SHUVANK in dictionary

Sol: Arranging the letters in alphabetical order we get : A H K N S U V

Now Total words start with A are 6!

Total words start with AH are 5! = 120

Now

Total words start with AHK are 4! = 24

Total words start with AHN are 4! = 24

Total words start with AHSK are 3! = 6

Now AHSNKUV will be the last word required.

6. Car A leaves city C at 5pm and is driven at a speed of 40kmph. 2 hours later another car B

leaves city C and is driven in the same direction as car A. In how much time will car B be 9 kms

ahead of car A if the speed of car is 60kmph

Relative speed =  $60 - 40 = 20$  kmph

Initial gap as car B leaves after 2 hours =  $40 \times 2 = 80$  kms

Car B should be 9 km ahead of the A at a required time so it must be 89 km away

Time =  $89 / 20 = 4.45$  hrs or 267 mins

7. Find the average of the terms in the series 1-2+3-4+5.....+199-200

Sol:  $(1-2) + (3-4) + (5-6) + \dots + (199-200) = -100$

Average =  $100 / 200 = -0.5$

8. n is a natural number and  $n^3$  has 16 factors. Then how many factors can  $n^4$  have?

Total factors of a number  $N = a^p \cdot b^q \cdot c^r \dots$  is  $(p+1)(q+1)(r+1) \dots$

As  $n^3$  has 16 factors  $n^3$  can be one of the two formats given below

$$n^3 = a^{15}$$

$$n^3 = a^3 \cdot b^3$$

If  $n^3 = a^{15}$  then  $n = a^5$  and number of factors of  $n^4 = 21$

$n^3 = a^3 \cdot b^3$  then  $n = ab$  and number of factors  $n^4 = 25$

9. Two cars start from the same point at the same time towards the same destination which is 420

km away. The first and second car travel at respective speeds of 60 kmph and 90 kmph. After

travelling for sometime the speeds of the two cars get interchanged. Finally the second car

reaches the destination one hour earlier than the first. Find the time after which the speeds get

interchanged?

Let the total time taken by the cars be a and b

Let the time after which the speed is interchanged be t

For car A,  $60t + 90(a-t) = 420$ ,  $90a - 30t = 420 \dots\dots(1)$

For car B,  $90t + 60(b-t) = 420$ ,  $60b + 30t = 420 \dots\dots(2)$

Using both (1) and (2), we get  $90a + 60b = 840$

But as  $a - b = 1$ ,  $90a + 60(a-1) = 840$ .

Solving a = 6.

Substituting in equation 1, we get  $t = 4$

1. A and B run a 1 km race. If A gives B a start of 50m, A wins by 14 seconds and if A

gives B a start of 22 seconds, B wins by 20 meters. Find the time taken by A to run 1 km.

To solve these type of questions, always keep in your mind that, the ratio of the speeds of two

contestants never change.

A gives B a start of 50 m means, A runs 1000 m and B runs only 950. By the time A reaches the

target, B has to take 22 seconds to reach the target.

$$a \cdot b = 1000 \cdot 950 - 14b = 9801000 - 22b$$

$$50,000 - 1100b = 46550 - 686b$$

Solving we get  $b = 25/3$

Now Assume A's speed =  $x$

$$1000 \cdot 950 - 14(25/3) = x \cdot 25/3$$

$$x = 10$$

So  $x$  takes  $1000/10 = 100$  seconds.

2. A owes B Rs.50. He agrees to pay B over a number of consecutive days on a Monday, paying

single note or Rs.10 or Rs.20 on each day. In how many different ways can A repay B.

He can pay by all 10 rupee notes = 1 way

3 Ten rupee + 1 twenty rupee =  $4!3! \times 1! = 4$  ways

1 Ten rupee + 2 twenty rupee notes =  $3!2! \times 1! = 3$  ways

Total ways =  $1 + 4 + 3 = 8$

3. W, X, Y, Z are integers. The expression  $X - Y - Z$  is even and the expression  $Y - Z - W$  is

odd. If X is even what must be true?

- a) W must be odd
- b) Y - Z must be odd
- c) Z must be even
- d) Z must be odd

Sol: X is even so Y, Z both are even or both are odd.

Now Y - Z in both cases even. So  $(Y - Z) - W = \text{odd}$  happens only when w is odd

Ans: W is odd

4. Raj writes a number. He sees that the number of two digits exceeds four times the sum of its

digits by 3. If the number is increased by 18, the results is the same as the number formed by

reversing the digits. Find the next immediate prime greater than the number.

Let the number be  $xy = 10x + y$

$$10x + y = 4(x+y) + 3 \Rightarrow 2x - y = 3 \text{ -----(1)}$$

$$\text{Also } 10x + y + 18 = 10y + x, 9(y-x) = 18, y-x = 2 \text{ -----(2)}$$

Solving we get  $x = 3, y = 5$

The number is 35. So next immediate prime is 37

5. Kate wanted to buy 2kgs of apples. The vendor kept the 2kg weight on the right side and

weighed 4 apples for that. She doubted on the correctness of the balance and placed 2 kg weight

on the left side and she could weight 14 apples for 2 kgs. If the balance was correct how many

apples she would have got?

As she got less apples when the weight put on the right side, the left pan has more weight say w

kgs.

$$\text{Now } w + 4a = 2$$

$$\text{and } w + 2 = 14a$$

Solving we get  $a = \frac{2}{9}$  Kgs.

So she gets,  $2 / (\frac{2}{9}) = 9$  apples

6. Find the remainder when  $32^{33^{34}}$  is divided by 11

We know that when the divisor is a prime number, Fermat little theorem says,  $a^{p-1}$  when

divided by  $p$ , remainder is 1

So  $32^{10}$  gives remainder 1.

Now we have to write  $32^{33^{34}}$  in this format. So we have to find the remainder  $33^{34}$  when

divided by 10. The remainder is nothing but unit digit of the number. Click here to learn this

concept

$33^{34}$  gives unit digit of 9.

$$\text{So } 33^{34} = 10K + 9$$

$$32^{33^{34}} = 32^{(10K+9)} = (32^{10})^K \cdot 32^9$$

Now this expression when divided by 11 leaves a remainder of 329 which in turn is equal

$$\text{to } (-1)^9 = -1 = 10$$

7. Find the option to replace the question mark in the series below

$$5 \ ? \ 15 \ 75 \ 525 \ 4725$$

$$\text{Sol: } 5 \times 1 = 5$$

$$5 \times 3 = 15$$

$$15 \times 5 = 75$$

$$75 \times 7 = 525$$

$$525 \times 9 = 4725$$

$$\text{So } ? = 5$$

8. There are several bags of same weight. A bag is 6 kgs plus three fourth of the weight of an

other bag. What is the weight of a bag?

Let the bags weight is  $x$

$$\text{Then } 6 + \frac{3}{4}x = x,$$

Solving we get  $x = 24$

9. Find the remainder when  $6^{50}$  is divided by 215

$$\text{Ans: } 6^{50} = (6^3)^{16} \cdot 6^2 = 216^{16} \cdot 36$$

So this expression gives a remainder of 36

10. Find last two digits of the following expression  
 $(201 \cdot 202 \cdot 203 \cdot 204 \cdot 246 \cdot 247 \cdot 248 \cdot 249)^2$

To find the last two digits of a product take the last two digits in each number and multiply.  $01 \cdot 02 \cdot 03 \dots 48 \cdot 49$  (use onscreen calculator)

this gives 24. So  $24^2 = 576$  So last two digits are 76

1. Ahmed, Babu, Chitra, David and Eesha each choose a large different number. Ahmed says, “

My number is not the largest and not the smallest”. Babu says, “My number is not the largest and

not the smallest”. Chitra says, “My number is the largest”. David says, “ My number is the

smallest”. Eesha says, “ My number is not the smallest”. Exactly one of the five children is

lying. The others are telling the truth. Who has the largest number?

2. a) Eesha

3. b) David



4. c) Chitra

5. d) Babu

6.

7. Ans: A

Largest -> A B C D E

A F T/F T/F T/F T/F

B T/F F T/F T/F T/F

C F F T F F

D T/F T/F T/F F T/F

E T/F T/F T/F T/F T

8.

9. From the above table, If we assume that A has the largest then A and C both are lying.

Similarly if we find the truthfulness of the remaining people, it is clear that E has the largest

and C lied. (Only one F in the last column)

10.

11. 2. In the equation  $A + B + C + D + E = FG$  where FG is the two digit number whose

value is  $10F + G$  and letters A, B, C, D, E, F and G each represent different digits. If FG is as

large as possible. What is the value of G?

12. a) 4

13. b) 2

14. c) 1

15. d) 3

16. Ans: B

17. FG is as large as possible and all the 7 numbers should be different.

18. By trial and Error method,

19.  $9 + 8 + 7 + 6 + 5 = 35$ ...5 is getting repeated twice.

20.  $9 + 8 + 7 + 6 + 4 = 34$ ...4 is getting repeated

21.  $9 + 8 + 7 + 5 + 4 = 33$ ...3 repeats

22.  $9 + 8 + 6 + 5 + 4 = 32$

23. None of the numbers repeat in the above case and 32 is the maximum number FG can

have. The value of G is 2.

24.

25. 3. A farmer has a rose garden. Every day he either plucks 7 or 6 or 24 or 23 roses. The

rose plants are intelligent and when the farmer plucks these numbers of roses, the next day 37 or

36 or 9 or 18 new roses bloom in the garden respectively. On Monday, he counts 189 roses in the

garden. He plucks the roses as per his plan on consecutive days and the new roses bloom as per

intelligence of the plants mentioned above. After some days which of the following can be the

number of roses in the garden?

26. a) 4

27. b) 7

28. c) 30

29. d) 37

30. Ans: A

31. If he plucks 23, then only 18 grows the next day. This means total roses get decreases by

5. So after  $n$  days assume the number of roses got decreased 185 where  $n = 37$ , then 4 roses left.

32.

33. 4. What is the value of  $(44444445 \cdot 88888885 \cdot 44444442 + 444444438) / 44444444^2$

34. a) 88888883

35. b) 88888884

36. c) 88888888

37. d) 44444443

38. Ans: A

39. Let  $x = 44444444$

40.  $(x+1) \times (2x-3) \times (x-2) + (x-6)x^2$

41.  $(x^2-x-2) \times (2x-3) + (x-6)x^2$

42.  $2x^3 - 2x^2 - 4x - 3x^2 + 3x + 6 + x - 6x^2$

43.  $2x^3 - 5x^2x^2 = 2x - 5$

44. Substituting the value of  $x$  in  $2x - 5$ , we get 88888883

45.

46. 4. For which of the following " $n$ " is the number  $2^{74} + 2^{2058} + 2^{2n}$  is a perfect square?

47. a) 2012

48. b) 2100

49. c) 2011

50. d) 2020

51. Ans: D

52.  $2^{74} + 2^{2058} + 2^{2n} = K^2$

53.  $2^{74} + 2^{2058} + 2^{2n} = (237)^2 + 22058 + (2n)^2$

54. We try to write this expression as  $(a+b)^2 = a^2 + 2ab + b^2$

55. Now  $a = 237$ ,  $2ab = 22058$  and  $b = 2n$

56. Substituting the value of  $a$  in  $2ab$ , we get  $b = 2020$

57.

58. 5. Raj writes a number. He sees that the number of two digits exceeds four times the sum

of its digit by 3. If the number is increased by 18, the result is the same as the number formed by

reversing the digit. Find the number

59. a) 35

60. b) 57

61. c) 42

62. d) 49

63. Ans: A

64. Going by the options,  $35 = 8(4) + 3$ .

65.

66. 6. Weight of M, D and I is 74. Sum of D and I is 46 greater than M. I is 60% less than

D. What is D's weight.

67. Ans: 10

68.  $M + D + I = 74 \Rightarrow M = 74 - D - I$

69.  $M = D + I + 46$

70.  $I = 410 D$

71.  $74 - D - I = D + I + 46$

72.  $74 - D - 410 D = D + 410 D + 46$

73.  $\Rightarrow D = 10$

74.

75. 7. Father is 5 times faster than son. Father completes a work in 40 days before son. If

both of them work together, when will the work get complete?

76. a. 8 days

77. b.  $8 \frac{1}{3}$  days

78. c. 10 days

79. d. 20 days

80. Ans: B

81. As efficiency is inversely proportional to days, If Father : son's efficiency is 5 : 1, then

Days taken by them should be 1 : 5. Assume, the days taken by them are  $k$ ,  $5k$ .

82. Given that father takes 40 days less. So  $5k - k = 40 \Rightarrow k = 10$

83. Father takes 10 days to complete the work. Total work is  $10 \times 5 = 50$  units.

84. If both of them work together, they complete  $5 + 1$  units a day. 6/day. To complete 50

units, they take  $50/6 = 8 \frac{1}{3}$  days.

85.

86. 8. A beaker contains 180 liters of alcohol. On 1st day, 60 l of alcohol is taken out and

replaced by water. 2nd day, 60 l of mixture is taken out and replaced by water and the process

continues day after day. What will be the quantity of alcohol in beaker after 3 days

87. Ans: 53.3

88. Use the formula,

89.  $\text{FinalAlcohol} = \text{InitialAlcohol} (1 - \frac{\text{Replacement quantity}}{\text{Final Volume}})^n$

90.  $\text{FinalAlcohol} = 180 (1 - \frac{60}{180})^3 = 180 \times (\frac{2}{3})^3 = 53.3$

91.

92. 9. If  $f(f(n)) + f(n) = 2n+3$ ,  $f(0) = 1$  then  $f(2012) = ?$

93. Ans: 2013

94.  $f(f(0)) + f(0) = 2(0) + 3 \Rightarrow f(1) = 3-1 = 2$ ,  $f(1) = 2$

95.  $f(f(1)) + f(1) = 2(1) + 3 \Rightarrow f(2) = 5-2 = 3$ ,  $f(2) = 3$

96.  $f(f(2)) + f(2) = 2(2) + 3 \Rightarrow f(3) = 7-3 = 4$ ,  $f(3) = 4$

97. ....

98.  $f(2012) = 2013$

99.

100. 10. What will be in the next series

101. 1, 7, 8, 49, 56, 57, 343, ...

102. Ans: 344

103.  $1 = 1$

104.  $7 = 1 \times 7$

105.  $8 = 1 \times 7 + 1$

106.  $49 = 7 \times 7 + 1$

107.  $50 = 7 \times 7 + 1$

108.  $56 = 8 \times 7$

109.  $57 = 8 \times 7 + 1$

110.  $343 = 49 \times 7$

111. Next term should be  $49 \times 7 + 1 = 344$

112.

113. 11. In a  $3 \times 3$  grid, comprising 9 tiles can be painted in red or blue. When tile is rotated

by 180 degrees, there is no difference which can be spotted. How many such possibilities are

there?

114. a. 16

115. b. 32

116. c. 64

117. d. 256

118. Ans: B

This grid even rotated 180 degrees the relative positions of the tiles do not change. So we paint tile number 1's with red or blue (only one color should be used) , 2's with

red or blue.....tile 5 red or blue. Then total possibilities are  $2^5 = 32$

1. In a staircase, there are 10 steps. A child is attempting to climb the staircase. Each time she can

either make 1 step or 2 steps. In how many different ways can she climb the staircase?

a) 10

b) 21

c) 36

d) None of these

Ans: d

Use fibonacci series, with starting two terms as 1, 2. So next terms are 3, 5, 8, 13, 21, 34, 55, 89

2. A boy buys 18 sharpeners, (Brown/white) for Rs.100. For every white sharpener, he pays one

rupee more than the brown sharpener. What is the cost of white sharpener and how much did he

buy?

a) 5, 13

b) 5, 10

c) 6, 10

d) None of these

Ans: C

Assume that he bought  $b$ , brown sharpeners and  $w$ , white sharpeners and the cost of brown

sharpener is  $x$  and white sharpener is  $x + 1$

So  $w(x+1) + bx = 100$

$w + b = 18$

$b = 18 - w$

Substituting in equation 1, we get  $w(x+1) + (18 - w)x = 100$  so  $w + 18x = 100$

Take option 1: If white sharpeners are 13,  $x = (100 - 13) / 18 = 4.833$

Option 2, If white sharpeners are 10,  $x = (100 - 10) / 18 = 5$  So white sharpeners cost is 6.

Option 3 Satisfies this condition.

3. Letters of alphabets no from 1 to 26 are consecutively with 1 assigned to A and 26 to Z. By

27th letter we mean A, 28th B. In general  $26m+n$ ,  $m$  and  $n$  negative integers is same as the letters

numbered  $n$ .

Let  $P = 6$ , strange country military general sends this secret message according to the following

codification scheme. In codifying a sentence, the 1st time a letter occurs it is replaced by the  $p$ th

letter from it. 2nd time if occurred it is replaced by  $P^2$  letter from it. 3rd time it occurred it is

replaced by  $P^3$  letter from it. What is the code word for ABBATIAL

a) GHNNZOOR

b) GHKJZOHR



c) GHHGZOGR

d) GHLKZOIR

Ans: D

A should be coded as  $1+6 = G$  (it occurred for first time)

B should be coded as  $2+6 = H$  (it occurred for first time)

B Should be coded as  $2 + 36 = 38 - 26 = 12 = L$  (it occurred for second time)

Option D is correct

4. Of a set of 30 numbers, average of 1st 10 numbers is equal to average of last 20 numbers. The

sum of last 20 numbers is?

a) 2 x sum of last 10 numbers

b) 2 x sum of 1st 10 numbers

c) sum of 1st 10 numbers

d) Cannot be determined

Ans: B

Let average of first 10 numbers is a. Then sum =  $10a$

Average of last 10 numbers also a. Then their sum =  $20a$

From the options B correct

5. In how many ways a team of 11 must be selected a team 5 men and 11 women such that the

team must comprise of not more than 3 men.

a) 1565

b) 2256

c) 2456

d) 1243

Ans: B

Maximum 3 men can be played which means there can be 0, 1, 2, 3 men in the team.

$$({}^5C_0 \times {}^{11}C_{11}) + ({}^5C_1 \times {}^{11}C_{10}) + ({}^5C_2 \times {}^{11}C_9) + ({}^5C_3 \times {}^{11}C_8) = 2256$$

6. The wages of 24 men and 16 women amount to 11600 per day. Half the number of men and

37 women has same money. The daily wages paid to each man is

a) 375

b) 400

c) 350

d) 325

Ans: C

$$24m + 16w = 11600$$

$$12m + 37w = 11600$$

Solving we get  $12m = 21w$

Substituting in the first equation we get,  $42w + 16w = 11600 \Rightarrow w = 200$

$$M = 350$$

7. A number when successively divided by 5, 3, 2 gives remainder 0, 2, 1 respectively in that

order. What will be the remainder when the same number is divided successively by 2, 3, 5 in

that order

a) 4, 3, 2

b) 1, 0, 4

c) 2, 1, 3

d) 4, 1, 2

Ans: B

use this simple technique.  $[(1 \times 3) + 2] = 5$

$$[(5 \times 5) + 0] = 25$$

Procedure:

Let the number = N

$$\text{Now } N = 5K$$

$$K = 3L + 2$$

$$L = 2M + 1$$

$$K = 3(2M + 1) + 2 = 6M + 5$$

$$N = 5(6M + 5) = 30M + 25$$

For  $M = 0$  we get the least number as 25. Now when 25 is divided by 2, we get 12 as quotient

and 1 as remainder. When 12 is divided by 3 we get 4 as quotient, and 0 as remainder. When 4 is

divided by 5 we get 4 as remainder.

8.  $a, b, c, d, e$  are distinct numbers. if  $(75-a)(75-b)(75-c)(75-d)(75-e) = 2299$  then  $a+b+c+d = ?$

Hint: 2299 is divisible by 11.

$$2299 = 11 \times 11 \times 19 \times 1 \times 1 = 11 \times -11 \times 19 \times -1 \times 1 =$$

Two of the terms in the given expression should equal to 1. As all the digits are distinct, two of

the terms should be negative.

$$\text{One possible solution} = (75 - 64)(75 - 56)(75 - 86)(75 - 74)(75 - 76)$$

$$\text{Then } a + b + c + d + e = 64 + 56 + 86 + 74 + 76 = 356$$

But as the sum of only 4 terms was asked, we have to subtract one term.

So given answer can be one of 292, 306, 270, 282, 280

9. If  $A^B$  means A raised to the power of B, in which of the following choices must P be greater

than Q

a)  $0.9^P = 0.9^Q$

b)  $0.9^P = 0.92^Q$

c)  $0.9^P > 0.9^Q$

Option A is wrong as  $P = Q$

Option B is wrong as  $PQ = \log 0.92 \log 0.9 = 0.79139$

Option C is also wrong as  $a^P > a^Q$  then  $P > Q$  if  $a > 1$

10. 2 gears one with 12 teeth and other one with 14 teeth are engaged with each other. One tooth

in smaller and one tooth in bigger are marked and initially those 2 marked teeth are in contact

with each other. After how many rotations of the smaller gear with the marked teeth in the other

gear will again come into contact for the first time?

a) 7

b) 12

c) Data insufficient

d) 84

Correct Option : A

Assume the distance between the teeth is 1 cm. Then the circumference of first gear is 12 cm and

the second is 14 cm.

Now LCM (12, 14) = 84. So to cover 84 cm, the first gear has to rotate  $84/12 = 7$  rounds (the

second gear rotates  $84 / 14 = 6$  rounds as it is bigger)

1. One day Eesha started 30 min late from home and reached her office 50 min late while driving

25% slower than her usual speed. How much time in min does eesha usually take to reach her

office from home?

Ans: We know that Speed is inversely proportional to time

While she drives 25% slower means she drove at  $\frac{3}{4}(S)$

We know that  $D = S \times T$

When speed became  $\frac{3}{4}(S)$  then Time taken should be  $\frac{4}{3}(T)$

i.e, She has taken  $\frac{4}{3}(T) - T$  extra to cover the distance.

Extra Time =  $T_3 = 20$  min (as 20 min late due to slow driving)

Actual time  $T = 60$  Minutes

2. In 2003 there are 28 days in February and 365 days in a year in 2004 there are 29 days in

February and 366 days in the year. If the date march 11 2003 is Tuesday, then which one of the

following would the date march 11 2004 would be?

Ans: If 11-3-2003 is Tuesday, Then 11-3 - 2004 is Thursday

The number of odd days between the two dates are  $[366/7] \text{Rem} = 2$ .

3) How many positive integers less than 500 can be formed using the numbers 1,2,3,and 5 for

digits, each digit being used only once.

Ans: Single digit numbers = 4

Double digit numbers =  $4 \times 3 = 12$

Three digit numbers =  $3 \times 3 \times 2 \times 1 = 18$

Total = 34

4) A circular swimming pool is surrounded by a concrete wall 4 feet wide.if the area of the wall

is  $\frac{11}{25}$  of the area of the pool, then the radius of the pool in feet is?

Let the radius of the pool be  $r$ . Then area of the wall and pool =  $\pi(r+4)^2$

Area of the pool =  $\pi(r)^2$

$$\text{Area of the wall} = \pi(r+4)^2 - \pi(r)^2$$

$$\text{Given } \pi(r+4)^2 - \pi(r)^2 = 1125(\pi r^2)$$

$$r^2 + 8r + 16 - r^2 = 1125r^2$$

$$11r^2 - 200r - 400 = 0$$

$$\text{Solving } r = 20$$

5) A survey of  $n$  people in the town of badaville found that 50% of them prefer brand A. Another

survey of 100 people in the town of chottaville found that 60% prefer brand A. In total 55% of all

the people surveyed together prefer Brand A. What is the total number of people surveyed?

$$\text{Sol: } 50\% (n) + 60\% (100) = 55\% (n + 100)$$

$$\text{Solving we get } n = 200$$

6) In the simple subtraction problem below some single digits are replaced by letters. Find the

value of  $7A + 5D + 6CD$ ?

$$\begin{array}{r} A5C5 \\ -1B87 \\ \hline 674D \end{array}$$

$$\text{Sol: } 15 - 7 = 8 \text{ So } D = 8$$

$$10 + (C - 1) - 8 = 4 \text{ So } C = 3$$

$$10 + (5 - 1) - B = 7 \text{ So } B = 7$$

$$(A - 1) - 1 = 6 \text{ So } A = 8$$

$$7A + 5D + 6CD = 56 + 40 + 144 = 240$$

7) Two full tanks one shaped like the cylinder and the other like a cone contain liquid fuel the

cylindrical tank held 500 lts more than the conical tank After 200 lts of fuel is pumped out

from each tank the cylindrical tank now contains twice the amount of fuel in the conical tank

How many lts of fuel did the cylindrical tank have when it was full?

Ans: Let the cylindrical tank capacity  $x + 500$  then the conical tank capacity =  $x$

After 200 lts pumped out, then remaining fuel with the tanks =  $x + 300, x - 200$

Given that first term is double the second.

$$x + 300 = 2(x - 200)$$

Solving we get  $x = 700$

Cylindrical tank capacity = 1200 lts

8. A shop sells chocolates It is used to sell chocolates for Rs.2 each but there were no sales at

that price. When it reduced the price all the chocolates sold out enabling the shopkeeper to realize

Rs 164.90 from the chocolates alone If the new price was not less than half the original price

quoted How many chocolates were sold?

$$\text{Sol: } 164.90 = 2 \times 5 \times 17 \times 97$$

Now new chocolate price should be greater than 1 and less than 2. So  $2 \times 5 \times 17 = 170$

So Total chocolates sold = 97 and New chocolate price = Rs.1.7

9) Eesha bought two varieties of rice costing 50Rs per kg and 60 Rs per kg and mixed them in

some ratio. Then she sold that mixture at 70 Rs per kg making a profit of 20 % What was the

ratio of the mixture?

Sol: Selling price of the mixture = 70 and profit = 20%

Cost price of the mixture =  $70 \times 100 + 120 = 70 \times 56$

By applying alligation rule:

So ratio =  $60 - 1753 : 1753 - 50 = 1 : 5$

10. Star question:

If  $f(1)=4$  and  $f(x+y)=f(x)+f(y)+7xy+4$ , then  $f(2)+f(5)=?$

Sol: Let  $x=1$  and  $y=1$

$$f(1+1) = f(1) + f(1) + 7 \times 1 \times 1 + 4$$

Let  $x=2$  and  $y=2$

$$f(2+2) = 19 + 19 + 7 \times 2 \times 2 + 4$$

Let  $x=1$  and  $y=4$

$$f(1+4) = 4 + 70 + 28 + 4 = 106$$

$$f(2) + f(5) = 125$$

1. If  $f(f(n))+f(n)=2n+3$  and  $f(0)=1$ , what is the value of

a) 2011

b) 2012

c) 2013

d) 4095

Ans: Option C

Put  $n=0$

$$\text{Then } f(f(0))+f(0) = 2(0) + 3 \Rightarrow f(1)$$

Put  $n=1$

$$f(f(1)) + f(1) = 2(1) + 3 \Rightarrow f(2) + 2 = 5$$

Put  $n=2$

$$f(f(2)) + f(2) = 2(2) + 3 \Rightarrow f(3) + 3 = 7$$

.....



$$f(2012) = 2013$$

2. If  $5+3+2=151022$ ,  $9+2+4=183652$ , then  $7+2+5=?$

Ans: 143547

If the given number is  $a + b + c$  then  $a.b \mid a.c \mid a.b$

$$\Rightarrow 5+3+2 = 5.3 \mid 5.2 \mid 5.3 + 5.2 - 3 = 151022$$

$$\Rightarrow 9+2+4 = 9.2 \mid 9.4 \mid 9.2 + 9.4 - 2 = 183652$$

$$7+2+5 = 7.2 \mid 7.5 \mid 7.2 + 7.5 - 2 = 143547$$

3. The savings of employee equals income minus expenditure. If the income of A, B, C are in the

ratio 1:2:3 and their expense ratio 3:2:1 then what is the order of the employees in increasing

order of their size of their savings?

Ans:  $A < B < C$

$$\Rightarrow f(2) = 19$$

$$\Rightarrow f(4) = 70$$

$f(2012)?$

$$+ 1 = 3 \Rightarrow f(1) = 2$$

$$\Rightarrow f(2) = 3$$

$$\Rightarrow f(3) = 4$$

$$+ a.c - b$$

order

As the the ratio of their incomes are in ascending order, and their expenses are in descending

order, their savings also in their incomes order.

So savings order =  $A < B < C$

4. Entry fee is Re.1. there are 3 rides each is of Re.1. total boys entering are 3000. total income is

Rs.7200. 800 students do all 3 rides. 1400 go for atleast 2 rides. none go the same ride twice. then

no of students who do not go any ride is?

Ans: 1000

Total entries are 3000 So fee collected through entry fee =  $3000 \times 1 = \text{Rs.}3000$

Income generated through rides =  $7200 - 3000 = 4200$

Now 800 went for 3 rides so total fee paid by these 800 =  $800 \times 3 = 2400$

$(1400 - 800)$  went for 2 rides so fee paid by these 600 =  $600 \times 2 = 1200$

Assume K went for exactly 1 ride

Then  $K \times 1 + 1200 + 2400 = 4200 \Rightarrow K = 600$

So number of boys who did not go for any ride =  $3000 - (600 + 600 + 800) = 1000$

5. The average mark obtained by 22 candidates in an examination is 45. The average of the first

ten is 55 while the last eleven is 40 .The marks obtained by the 11th candidate is ?

Ans: 0

It is clear that  $22 \times 45 = 10 \times 55 + K + 11 \times 40 \Rightarrow K = 0$

6. What is the largest positive integer n for which  $3^n$  divides  $44^{44}$ ?

Ans:  $n = 0$

The digit sum of 4444 is when remainder obtained 4444 divided by 9

$4444 = (45-1)44$

Each term is a multiple of 9 but the last term which is  $(-1)44 = 1$

So the digit sum of 4444 is 1.

Now the divisibility rule for 3, 9, 27... is the sum of the digits should be divisible by 3, 9, 27

respectively. In each case the digit sum is either multiple of 3 or 9.

So for any value of  $n > 1$ , the given expression is not divisible by  $3n$

7.  $1(1!)+2(2!)+3(3!)+\dots+2012(2012!) = ?$

Ans:  $2013!-1$

$$1(1!)=1 \Rightarrow 2!-1$$

$$1(1!)+2(2!)=1+4=5 \Rightarrow 3!-1$$

$$1(1!)+2(2!)+3(3!)=1+4+18=23 \Rightarrow 4!-1$$

.....

.....

$$1(1!)+2(2!)+3(3!)+\dots+2012(2012!)=2013!-1$$

1. 1. A two digit number is 18 less than the square of the sum of its digits. How many such

numbers are there?

(1)1

(2)2

(3)3

(4)4

Ans: Option 1

Take  $N = 10a+b$ .

Given that,  $10a+b+18 = (a+b)^2$

for  $a = 1$  to 9, the L.H.S. will be,  $28+b, 38+b, 48+b, \dots, 108+b$ .

As LHS is perfect square for the values of  $b = 1$  to 9, only  $28+b, 48+b, 58+b, 78+b$  can be equal

to 36, 49, 64, 81 for  $b = 8, 1, 6, 3$  respectively. But only  $78+b = 81$  for  $b = 3$  So only one such

number is possible. I.e, 63

2. A two digit number is 18 less than the sum of the squares of its digits. How many such

numbers are there?

(1)1

(2)2

(3)3

(4)4

Ans: Option 2

Only 47 and 67 satisfy the condition

3. For real number  $x$ ,  $\text{int}(x)$  denotes integer part of  $x$ .  $\text{int}(x)$  is the largest integer less than or equal

to  $x$ .  $\text{int}(1,2)=1, \text{int}(-2,4)=-3$ . Find the value of  $\text{int}(1/2)+\text{int}(1/2+100)+\text{int}(1/2+2/100)+\dots+\text{int}(1/2+99/100)$

Sol:  $\text{int}(1/2) = 0$

$\text{int}(1/2 + 100) = 100$

$\text{int}(1/2 + 2/100) = 0$

.....

$\text{int}(1/2 + 50/100) = 1$

$\text{int}(1/2 + 51/100) = 1$

.....

$\text{int}(1/2 + 99/100) = 1$

So  $100 + 1 + 1 + \dots 50 \text{ times} = 150$

4. Given a square of length 2m. Its corners are cut such that to represent a regular octagon. Find

the length of side of octagon

Sol:

2.

3. Let  $x$  is the side of the octagon and  $x + 2y$  is the side of the square.

4. In the given octagon,  $y^2 + y^2 = x^2 \Rightarrow 2y^2 = x^2 \Rightarrow y = x\sqrt{2}$

But  $x\sqrt{2} + x + x\sqrt{2} = 2$

$$\Rightarrow 2\sqrt{2}x + x = 2$$

$$\Rightarrow x = \frac{2}{2\sqrt{2} + 1} = \frac{2}{2\sqrt{2} + 1} \times \frac{2\sqrt{2} - 1}{2\sqrt{2} - 1} = 2(2\sqrt{2} - 1)$$

5. Find the number of ways a batsman can score a double century only in terms of 4's & 6's?

Assume the batsman scored x 4's and y 6's.

$$4x + 6y = 200 \Rightarrow 2x + 3y = 100 \Rightarrow x = \frac{100 - 3y}{2} = 50 - \frac{3y}{2}$$

As x is an integer, y should be a multiple of 2.

If

$$y = 0, x = 50$$

$$y = 2, x = 47$$

$$y = 4, x = 44$$

...

$$y = 32, x = 2$$

So total ways are  $\frac{(32-0)}{2} + 1 = 17$  (if 0 6's are possible) otherwise 16

6. 5000 voted in an election between two candidates. 14% of the votes were invalid. The winner

won by a margin approximately closer to 15%. Find the number of votes secured by the person

$$\text{Invalid Votes} = 14\% (5000) = 700$$

$$\text{Valid Votes} = 5000 - 700 = 4300$$

Assume the loser got x votes. Then the winner must have got  $x + 15\% (x)$

$$\text{But } x + x + 15\% (x) = 4300$$

$$\text{Solving } x = 2000$$

So Loser got 2000 and winner got 2300

7. There are 100 wine glasses. I offered my servant to 3 paise for every broken glass to be

delivered safely and forfeit 9 paise for every glass broken at the end of day. He received Rs.2.40

.how many glass did he break.

a. 20 b. 73 c. 5 d. 8

If a glass has been broken, he has to lose 3 paise + 9 paise = 12 paise

Assume K glasses got broken

$$100 \times 3 - 12 \times K = 240 \Rightarrow K=5$$

8. A is 20 percent more efficient than B. If the two person can complete a piece of work in 60

days.in how many days. A working alone can complete the work

a. 80 b. 90 c. 100 d. 110

As A is 20% more efficient than B, If B's per day work is 100 units then A's 120.

Both persons together completes (100 + 120) units = 220 units a day.

They took 60 days to complete the work. So total work = 60 x 220

If A alone set to complete the work, he takes =  $60 \times 220 / 120 = 110$  days

9. A property was originally on a 99 years lease and two thirds of the time passed is equal to the

four fifth of the time to come.how many years are there to go.

a. 45 b. 50 c. 60 d. 55

Assume x years have passed and y years to go

$$\text{Given } \frac{2}{3}x = \frac{4}{5}y \Rightarrow x = \frac{4}{5} \times \frac{3}{2}y = \frac{6}{5}y$$

$$\text{But } x + y = 99$$

$$\text{So } \frac{6}{5}y + y = 99$$

Solving we get y = 45 years

10. In how many different ways can the letters of the word "LEADING" be arranged in such a

way that the vowels always come together.

- a. 360
- b. 720
- c. 480
- d. 5040

Given letters are A, E, I, D, L, N, G

Of which AEI are vowels. Let us combine them into a single letter x. Now total letters are x, D,

L, N, G

These letter are arranged in  $5!$  ways. But 3 vowels can arrange themselves in  $3!$  ways. So total

ways  $5! \times 3! = 720$

11. There is a plane contains 32 points.all the 32 points have equal distance from point x. which

of the following is true .

- a. all 32 points lie in circle
- b. the distance from x to all 32 points is less than the distance between each other
- c. both a and b
- d. none of these

Sol: Option 3

X must be the center of the circle and 32 points are on the circumference. So Option A is correct

Number of diagonals of a regular polygon =  $\frac{n(n-3)}{2}$

So for a polygon of 32 sides, Number of diagonals = 464. Now the minimum distance between

any two points =  $2\pi r \cdot 32 = 1156r$

Now total length of all the distances from 32 points =  $2\pi r$  + Sum of the lengths of all the 464

diagonals.

Sum of the lengths of x to all the 32 points = 32 radius =  $32r$

But the 464 diagonals have 16 diameters connecting 2 opposite points connecting via center. So

Sum of the lengths of distances from point to point is clearly greater than sum of the length from

x to all 32 points. Option B is correct

Correct Option 3

12. When asked what the time is, a person answered that the amount of time left is  $\frac{1}{5}$  of the time

already completed. what is the time.

1. 8 pm

2. 8 am

3. 12 pm

4. 12 am

Sol: A day has 24 hrs. Assume x hours have passed. Remaining time is  $(24 - x)$

$$24 - x = \frac{1}{5}x \Rightarrow x = 20$$

Time is 8 PM

13. Perimeter of the backwheel = 9 feet, front wheel = 7 feet on a certain distance, the front wheel

gets 10 revolution more than the back wheel. what is the distance

Let the backwheel made x revolutions then front wheel makes  $x + 10$

$$x \times 9 = (x + 10) \times 7$$

$$x = 35$$



**So distance traveled =  $35 \times 9 = 315$**

**14. There are 2 groups named brown and red. They can n't marry in the same group. If the**

**husband or wife dies then the person will revert to their own group. If a person is married then**

**the husband will have to change his group to his wife's group. Children will own the mother's**

**group. If man is red then his mother's brother belong to which group if he is married**

**a. red**

**b. brown**

**c. red and brown**

**d. none**

**Option: b**

**If a man is Red, his mother must be red, his mothers brother also red but after marriage, he gets**

**converted to Brown.**

**15. A rectangular park 60 m long and 40 m wide has concrete crossroads running in the middle**

**of the park and rest of the park has been used as a lawn.if the area of the lawn is 2109 sq.m,then**

**what is the width of the road.**

**a. 2.91 m**

**b. 3m**

**c. 5.82 m**

**d. none**

**Option : B**

**5.**

6. Let us shift the path to the left hand side and top. This does not change the area of the

lawn.

7. Now lawn area =  $(60 - x)(40 - x)$

for  $x = 3$ , we get lawn area = 2109. 1. A man is known to speak truth 3 out of 4 times. He

throws die and reports that it is a 6. The probability that it is actually a 6 is

Sol: If 6 actually appeared, he can report it with the probability of  $\frac{3}{4}$ . If 6 has not appeared, still

he can report it wrongly with the probability of  $\frac{1}{4}$

So the probability that it is actually a 6 = (Probability to appear 6 x His truthfulness to report +

Probability to appear any other number x His lying probability) =  
 $16 \times \frac{3}{4} + 56 \times \frac{1}{4} = 13$

The probability that it is actually 6 = Probability that he reports 6 / Total probability to appear

$6 = \frac{34 \times 16}{34 \times 16 + 14 \times 56} = \frac{38}{138}$

2. In how many ways can we distribute 10 pencils to 4 children so each child gets atleast one

pencil?

Number of ways of distributing  $r$  identical objects to  $n$  distinct objects so that each get atleast one

$= (n-1)C(r-1) = (10-1)C(4-1) = 9C3$

3. A drawer holds 4 red hats and 4 blue hats. what is probability of getting exactly 3 red hats or 3

blue hats when taking out 4 hats randomly out of drawer and immediately returning every hat to

drawer before taking out next??

As the objects are replaced, the probability of drawing red or blue is equal.

Probability to draw 3 red hats consecutively =  $12 \times 12 \times 12 = 18$

Similarly probability to draw 3 blue hats consecutively =  $12 \times 12 \times 12 = 18$

Total probability =  $12 \times 12 \times 12 = 18 + 12 \times 12 \times 12 = 18 = 14$

4. A father purchased dress for his 3 daughters. The dresses are of same color but diff size and

they are kept in dark room. what is probability that all the 3 will not choose their own dress?

This is a case of de-arrangements =  $D_n = n!(12! - 13! + 14! - \dots)$

So number of ways that none of them chooses their own dress =  
 $D_3 = 3!(12! - 13!) = 2$

So probability =  $2/3! = 1/3$

5. 60% of male in a town and 70% of female in a town are eligible to vote. out of which 70% of

male and 60% of female who are eligible to vote voted for candidate A. what is the value of

votes in % did A get?

Let the ratio of men and women are 100 : k

Male eligible votes = 60 and female eligible votes = 70% (k)

Number of males who voted for A = 70% (60) = 42

Number of females who voted for A = 60%(70% (K) = 42% (k)

Percentage of votes got by A =

$$42 + 42 \frac{100(K)60 + 70100(K)}{6000 + 70K} \times 100 = 4200 + 42K \frac{6000 + 70K}{6000 + 70K} \times 100$$

So this value cannot be determined as the value of K is not known

6. George and Mark can paint 720 boxes in 20 days. Mark and Harry in 24 days and Harry and

George in 15 days. George works for 4 days, Mark for 8 days and Harry for 8 days. The total

number of boxes painted by them is

$$\text{Capacity of G + M} = 720 / 20 = 36$$

$$\text{M + H} = 720 / 24 = 30$$

$$\text{H + G} = 720 / 15 = 48$$

$$\text{Combined capacity} = 2 (\text{G + H + M}) = 114$$

$$\text{G + H + M} = 114 / 2 = 57$$

$$\text{Now capacity of G} = (\text{G+H+M}) - (\text{H + M}) = 57 - 30 = 27$$

$$\text{M} = (\text{G+H+M}) - (\text{H + G}) = 57 - 48 = 9$$

$$\text{H} = (\text{G+H+M}) - (\text{G + M}) = 57 - 36 = 21$$

Given that G worked for 4 days, and mark for 8 and harry for 8 days

$$\text{So total work by them} = 4 \times 27 + 8 \times 9 + 8 \times 21 = 348$$

7. Two equilateral triangle of side 12cm are placed one on top another, such a 6 pointed star is

formed if the six vertices lie on a circle what is the area of the circle not enclosed by the Star?

a)61

b)57

c)68

d)83

Sol: Given that two equilateral triangles of length 12 has inscribed in a circle.

$$\text{Altitude of the triangle} = 3\sqrt{2}a = 3\sqrt{2}(12) = 63\sqrt{2}$$

We know that centroid divides the altitude in the ratio 2 : 1 and 2/3(Altitude) = Circum radius

$$\text{Circum radius} = 2/3(63\sqrt{2})=42\sqrt{2}$$

$$\text{Area of the circle} = \pi r^2=3.14 \times (42\sqrt{2})^2$$

Now the two triangles in the circle forms 12 small equilateral triangles with side 4. So their total

$$\text{area} = 12 \times 3\sqrt{2}a^2 = 12 \times 3\sqrt{2}4^2$$

Area which is not covered by the equilateral triangles =  $3.14 \times (43\sqrt{2})^2 - 12 \times 3\sqrt{442} = 67.65 \square 68$

8. There are 4 different letters and 4 addressed envelopes. In how many ways can the letters be

put in the envelopes so that atleast one letter goes to the correct address ?

a)15 b)16 c)18 d)12

Total ways of putting r letters to r covers =  $r! = 4! = 24$

Number of ways that none of them goes into the right envelope =  $D_4 = 4!(12! - 13! + 14!) = 9$

So atleast one envelope goes into the right one =  $24 - 9 = 15$

9. There are 250 men and 150 women in a committee, if all will work they will complete 12 units

per day, if all men work they will complete 15 units per day, how many units will women

complete per day?

I think there is a mistake in this question. If all men and women together complete 12 units, how

only men can do 15 Units of work a day?

Forgetting about the reality, Women can do -3 units a day.

10. How many odd and even numbers are there between 42 and 400?? Find the sum of odd

numbers and the sum of even numbers!

Sol: Odd numbers are from 43 to 399. Number of odd numbers =  $l - a + 1 = 399 - 43 + 1 = 179$

Their sum =  $n^2(l + a) = 39559$

Even numbers are from 44 to 398. Number of even numbers =  $l - a + 1 = 398 - 44 + 1 = 178$

Their sum =  $178(398 + 44) = 39338$

**11. The famous church in the city of Kumbakonnam has a big clock tower and is said to be over**

**300 years old. Every Monday 10.00 A M the clock is set by Antony, doing service in the church.**

**The Clock loses 6 mins every hour. What will be the actual time when the faulty clock shows 3**

**P.M on Friday?**

**a. 4 AM**

**b.3.16 PM**

**c. 4.54 AM**

**d. 3 AM**

**Total time passed in the faulty clock = Monday 10 am to Friday 3 pm =  $24 \times 4 + 5$  hours = 96**

**and 5 hours = 101 hrs**

**54 min in the faulty clock = 60 minutes of the correct clock**

**101 hrs in the faulty clock = ?**

**$101 \times \frac{54}{60} = 90.9$  Hrs.**

**96 Hrs + 16.2 Hrs**

**Friday 10 am + 16 hrs = Saturday 2am**

**$0.2 \times 60 \text{ min} = 12 \text{ min}$**

**So Saturday 2.12 min AM**

**12. Suresh Raina and Gautam Gambhir after a scintillating IPL match decide to travel by cycle to**

**their respective villages. Both of them start their journey travelling in opposite directions. Each**

**of their speeds is 6 miles per hour. When they are at a distance of 50 miles, a housefly starts**

fly from Suresh Raina's cycle towards Gautam Gambhir at a relative speed of 17 miles per

hour with respect to Raina's speed. What will be the time taken by housefly to reach Gambhir?

- a. 10 hrs
- b. 15 hrs
- c. 20 hrs
- d. 25 hrs

**Sol:**

Fly speed is 17 kmph w.r.t to suresh as fly is moving in opposite direction to suresh, its

actual speed is  $17 - 6 = 11$ .

Now relative speed of fly and gambhir =  $11 - 6 = 5$  kmph

So fly takes =  $50 / 11 - 6 = 10$  Hrs

1. The value of diamond varies directly as the square of its weight. If a diamond falls and breaks

into two pieces with weights in the ratio 2:3. what is the loss percentage in the value?

**Sol:** Let weight be "x"

the cost of diamond in the original state is proportional to  $x^2$

when it is fallen it breaks into two pieces  $2y$  and the  $3y$

$$x = 5y$$

$$\text{Original value of diamond} = (5y)^2 = 25y^2$$

$$\text{Value of diamond after breakage} = (2y)^2 + (3y)^2 = 13y^2$$

$$\text{so the percentage loss will be} = \frac{25y^2 - 13y^2}{25y^2} \times 100 = 48\%$$

2. Five college students met at a party and exchanged gossips. Uma said, "Only one of us is

lying". David said, "Exactly two of us are lying". Thara said, "Exactly 3 of us are lying".

Querishi said, "Exactly 4 of us are lying". Chitra said "All of us are lying". Which one was

telling the truth?

a)David

b)Querishi

c)Chitra

d)Thara

**Sol:** As all are contradictory statements, it is clear that **ONLY** one of them is telling the truth. So

remaining 4 of them are lying. Querishi mentioned that exactly 4 are lying. So, he is telling the

truth.

**Explanation:** Let us 1st assume that Uma is telling the truth. Then according to her only one is

lying. But if only one is lying then all the others' statements are contradicting the possibility. In

the same way all the other statements should be checked. If we assume the Querishi is telling the

truth, according to him exactly 4 members are lying. So all the others are telling lies and he is the

one who is telling the truth. This case fits perfectly.

**3.** Cara, a blue whale participated in a weight loss program at the biggest office. At the end of

every month, the decrease in weight from original weight was measured and noted as 1, 2, 6, 21,

86, 445, 2676. While Cara made a steadfast effort, the weighing machine showed an erroneous



weight once. What was that.

a) 2676

b) 2

c) 445

d) 86

**SOL:** This is a number series problem nothing to do with the data given.

$$1 \times 1 + 1 = 2$$

$$2 \times 2 + 2 = 6$$

$$6 \times 3 + 3 = 21$$

$$21 \times 4 + 4 = 88 \text{ and not } 86$$

$$88 \times 5 + 5 = 445$$

$$445 \times 6 + 6 = 2676$$

4. The letters in the word ADOPTS are permuted in all possible ways and arranged in

alphabetical order then find the word at position 42 in the permuted alphabetical order?

a) AOTDSP

b) AOTPDS

c) AOTDPS

d) AOSTPD

**SOL:**

In alphabetical order : A D O P S T

A \_ \_ \_ \_ : the places filled in  $5!$  ways = 120, But we need a rank less than 120.  
So the word

starts with A.

A D \_ \_ \_ : empty places can be filled in  $4! = 24$

**A O \_ \_ \_ : the places filled with 4! ways = 24. If we add 24 + 24 this total crosses 42. So We**

**should not consider all the words starting with AO.**

**A O D \_ \_ : 3!= 6**

**A O P \_ \_ : 3!=6**

**Till this 36 words are obtained, we need the 42nd word.**

**AOS \_ \_ \_ : 3!= 6**

**Exactly we are getting the sum 42. So last 3 letters in the descending order are TPD.**

**So given word is AOSTPD**

**4. A man who goes to work long before sunrise every morning gets dressed in the dark. In his**

**sock drawer he has 6 black and 8 blue socks. What is the probability that his first pick was a**

**black sock, but his second pick was a blue sock?**

**SOL: This is a case of without replacement. We have to multiply two probabilities. 1.**

**Probability of picking up a black sock, and probability of picking a blue sock, given that first**

**sock is black.**

$$6C1 \cdot 14C1 \times 8C1 / 113C1 = 24/91$$

**5. There are 6 red balls, 8 blue balls and 7 green balls in a bag. If 5 are drawn with replacement,**

**what is the probability at least three are red?**

**Sol: At least 3 reds means we get either : 3 red or 4 red or 5 red. And this is a case of**

**replacement.**

**case 1 : 3 red balls :  $\frac{6}{21} \times \frac{6}{21} \times \frac{6}{21} \times \frac{15}{21} \times \frac{15}{21}$**

case 2 : 4 red balls :  $\frac{6}{21} \times \frac{6}{21} \times \frac{6}{21} \times \frac{6}{21} \times \frac{15}{21}$

case 3 : 5 red balls :  $\frac{6}{21} \times \frac{6}{21} \times \frac{6}{21} \times \frac{6}{21} \times \frac{6}{21}$

Total probability =  $\left(\frac{6}{21} \times \frac{6}{21} \times \frac{6}{21} \times \frac{15}{21} \times \frac{15}{21}\right) + \left(\frac{6}{21} \times \frac{6}{21} \times \frac{6}{21} \times \frac{6}{21} \times \frac{6}{21}\right)$

$\frac{312}{16807}$

6. Total number of 4 digit number do not having the digit 3 or 6.

Sol:

consider 4 digits \_ \_ \_ \_

1st blank can be filled in  ${}^7C_1$  ways (0,3,6 are neglected as the first digit should not be 0)

2st blank can be filled in  ${}^8C_1$  ways (0 considered along with 1,2,4,5,7,8,9)

3st blank can be filled in  ${}^8C_1$  ways

4st blank can be filled in  ${}^8C_1$  ways

Therefore total 4 digit number without 3 and 6 is  $7 \times 8 \times 8 \times 8 = 3584$

7. Find the missing in the series: 70, 54, 45, 41, \_\_\_\_.

Sol: 40

$$70 - 54 = 16 = 4^2$$

$$54 - 45 = 9 = 3^2$$

$$45 - 41 = 4 = 2^2$$

$$41 - 40 = 1 = 1^2$$

8. A school has 120, 192 and 144 students enrolled for its science, arts and commerce

courses. All students have to be seated in rooms for an exam such that each room has students of

only the same course and also all rooms have equal number of students. What is the least number

of rooms needed?

**Sol:** We have to find the maximum number which divides all the given numbers so that number

of roots get minimized. HCF of 120,192 & 144 is 24. Each room have 24 students of the same

course.

Then rooms needed  $120/24 + 192/24 + 144/24 = 5 + 8 + 6 = 19$

**9.** A farmer has a rose garden. Every day he picks either 7,6,24 or 23 roses. When he plucks

these number of flowers the next day 37,36,9 or 18 new flowers bloom. On Monday he counts

189 roses. If he continues on his plan each day, after some days what can be the number of roses

left behind? (Hint : Consider number of roses remaining every day)

a)7

b)4

c)30

d)37

**SOL:**

let us consider the case of 23. when he picks up 23 roses the next day there will be 18 new, so in

this case., 5 flowers will be less every day. So when he counts 189, the next day 184,

179,174,169,.....

finally the no. of roses left behind will be 4.

**10.** What is the 32nd word of "WAITING" in a dictionary?

**Sol:** Arranging the words of waiting in Alphabetical Order : A,G,I,I,N,T,W

Start with A\_ \_ \_ \_ \_ This can be arranged in  $6!/2! \text{ ways} = 720/2 = 360 \text{ ways}$

so can't be arranged starting with A alone as it is asking for 32nd word so it is out of range

AG \_ \_ \_ \_ then the remaining letters can be arranged in  $5!/2!$  ways so,  $120/2=60$  ways. Out of

range as it has to be within 32 words.

AGI \_ \_ \_ Now the remaining letters can be arranged in  $4!$  ways =24

AGN \_ \_ \_ can be arranged in  $4!/2!$  ways or 12 ways

so,  $24+12=36$ th word so out of range. So we should not consider all the words start with AGN

now AGNI \_ \_ can be arranged in  $3!$  ways =6 ways

so  $24+6=30$  within range

Now only two word left so, arrange in alphabetical order.

AGNTIIW - 31st word

AGNTIWI - 32nd word

9. 1. A manufacturer of chocolates makes 6 different flavors of chocolates. The chocolates

are sold in boxes of 10. How many "different" boxes of chocolates can be made?

Sol:

If  $n$  similar articles are to be distributed to  $r$  persons,  $x_1+x_2+x_3+\dots+x_r=n$  each person is eligible to

take any number of articles then the total ways are  $n+r-1C_{r-1}$

In this case  $x_1+x_2+x_3+\dots+x_6=10$

in such a case the formula for non negative integral solutions is  $n+r-1C_{r-1}$

Here  $n=6$  and  $r=10$ . So total ways are  $10+6-1C_{6-1} = 3003$

2. In a single throw with two dice, find the probability that their sum is a multiple either of 3 or

4.

- a.  $\frac{1}{3}$
- b.  $\frac{1}{2}$
- c.  $\frac{5}{9}$
- d.  $\frac{17}{36}$

**Sol:** Their sum can be 3,4,6,8,9,12

For two dice, any number from 2 to 7 can be get in  $(n-1)$  ways and any number from 8 to 12 can

be get in  $(13 - n)$  ways.

Then possible ways are  $2 + 3 + 5 + 5 + 4 + 1 = 20$  possible cases.

So probability is  $(\frac{20}{36}) = (\frac{5}{9})$

3. B alone can do piece of work in 10 days. A alone can do it in 15 days. If the total wages for

the work is Rs 5000, how much should B be paid if they work together for the entire duration of

the work?

- a. 2000
- b. 4000
- c. 5000
- d. 3000

**Sol:**

Time taken by A and B is in the ratio of = 3:2

Ratio of the Work = 2 : 3 (since, time and work are inversely proportional)

Total money is divided in the ratio of 2 : 3 and B gets Rs.3000

4. On a 26 question test, 5 points were deducted for each wrong answer and 8 points were added

for right answers. If all the questions were answered how many were correct if the score was

zero.

a. 10

b. 11

c. 13

d. 12

**Sol:**

Let x ques were correct. Therefore, (26- x) were wrong

$$8x - 5(26 - x) = 0$$

Solving we get  $x = 10$

5. Arun makes a popular brand of ice cream in a rectangular shaped bar 6cm long, 5cm wide and

2cm thick. To cut costs, the company had decided to reduce the volume of the bar by 19%. The

thickness will remain same, but the length and width will be decreased by some percentage. The

new width will be,

a. 5.5

b. 4.5

c. 7.5

d. 6.5

**Sol:**

$$\text{Volume} = l \times b \times h = 6 \times 5 \times 2 = 60 \text{ cm}^3$$

Now volume is reduced by 19%.

$$\text{Therefore, new volume} = (100 - 19)100 \times 60 = 48.6$$

Now, thickness remains same and let length and breadth be reduced to x%

$$\text{so, new volume: } (x100 \times 6)(x100 \times 5)2 = 48.6$$

Solving we get  $x = 90$

thus length and width is reduced by 10%

New width =  $5 - (10\% \text{ of } 5) = 4.5$

6. If all the numbers between 11 and 100 are written on a piece of paper. How many times will

the number 4 be used?

Sol: We have to consider the number of 4's in two digit numbers. \_ \_

If we fix 4 in the 10th place, unit place be filled with 10 ways. If we fix 4 in units place, 10th

place be filled with 9 ways (0 is not allowed)

So total 19 ways.

Alternatively:

There are total 9 4's in 14, 24, 34...,94

& total 10 4's in 40,41,42....49

thus,  $9 + 10 = 19$ .

7. If twenty four men and sixteen women work on a day, the total wages to be paid is 11,600. If

twelve men and thirty seven women work on a day, the total wages to be paid remains the same.

What is the wages paid to a man for a day's work?

Sol: Let man daily wages and woman daily wages be M and W respectively

$$24M + 16W = 11600$$

$$12M + 37W = 11600$$

solving the above equations gives  $M = 350$  and  $W = 200$

8. The cost price of a cow and a horse is Rs 3 lakhs. The cow is sold at 20% profit and the horse

is sold at 10% loss. Overall gain is Rs 4200. What is the cost price of the cow?



**Sol:**

$$\text{Profit} = 4200$$

$$\text{Profit} = \text{SP} - \text{CP}$$

$$4200 = \text{SP} - 300000 \text{ therefore } \text{SP} = 304200$$

$$x + y = 300000$$

$$1.2x + 0.9y = 304200$$

Solving for  $x = 114000 = \text{CP of cow.}$

9. 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 1, 1, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 4, 4, 4, 1, 1, 1, 2, 2, 2, 2,

2, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 4.....

In the above sequence what is the number of the position 2888 of the sequence.

a) 1

b) 4

c) 3

d) 2

**Sol:** First if we count 1223334444. they are 10

In the next term they are 20

Next they are 30 and so on

So Using  $n(n+1)2 \times 10 \leq 2888$

10. For  $n = 23$  we get LHS as 2760. Remaining terms 128.

11.

12. Now in the 24th term, we have 24 1's, and next 48 terms are 2's. So next 72 terms are

3's.

13. The 2888 term will be "3".

10. How many 4-digit numbers contain no.2?

**Sol: Total number of four digit numbers =9000 (i.e 1000 to 9999 )**

**We try to find the number of numbers not having digit 2 in them.**

**Now consider the units place it can be selected in 9 ways (i.e 0,1,3,4,5,6,7,8,9)**

**Tens place it can be selected in 9 ways (i.e 0,1,3,4,5,6,7,8,9)**

**Hundreds place it can be selected in 9 ways (i.e 0,1,3,4,5,6,7,8,9)**

**Thousands place can be selected in 8 ways (i.e 1,3,4,5,6,7,8,9) here '0' cannot be taken**

**Total number of numbers not having digit 2 in it =9 x 9 x 9 x 8 =5832**

**Total number of numbers having digit 2 in it = 9000-5832 =3168**

**14. 1. 2ab5 is a four digit number divisible by 25. If a number formed from the two digits ab**

**is a multiple of 13, then ab is**

**a. 52**

**b. 45**

**c.10**

**d.25**

**Sol: For a number to be divisible by 25, last two digits of that number should be divisible**

**by 25. So b must be either 2 or 7**

**it is given that ab must be divisible by 13 and in the options only 52 is divisible by 13.**

**2. The average temperature of Tuesday Wednesday and Thursday was 37 C. The average**

**temperature of Wednesday and Thursday and Friday was 38 C. if the temperature on**

**Friday was 39 C.**

**Find the temperature on Tuesday.**

a. 37.33

b. 38.33

c. 36

d. None of the above

Sol:

$$(\text{tues} + \text{wed} + \text{thurs})/3=37$$

$$\text{tues} + \text{wed} + \text{thurs}=111...(1)$$

$$(\text{wed} + \text{thurs} + \text{fri})/3=38$$

$$(\text{wed} + \text{thurs} + \text{fri}) =114...(2)$$

Given friday is 39.

$$\text{then, (2) - (1) Fri - Tues} = 3$$

$$\text{So } 39 - \text{Tues} = 3$$

$$\text{Tuesday} =36$$

3. There are 5 boxes in a cargo. The weight of the 1st box is 200 KG, the weight of the

2nd box is 20% higher than the third box, whose weight is 25% higher than the 1st box

weight. The 4th box which weighs 350 KG is 30% lighter than the 5th box. Find the

difference in average weight of the 4 heaviest boxes and the four lightest boxes.

$$\text{Sol: weight of 1st box}=200$$

$$\text{weight of 3rd box}=(125/100)*200=250$$

$$\text{weight of 2nd box}=(120/100)*250=300$$

$$\text{weight of 4th box} =350$$

$$\text{weight of 5th box}=(10/7)*350=500$$

$$\text{average of 4 highest weighted boxes}=(500+350+300+250)/4=350$$

average of 4 lightest boxes= $(350+300+250+200)/4=275$

therefore difference= $350-275=75$

4. The length, breadth and height of a room are in the ratio 3:2:1. If the breadth and

height are halved, while the length is doubled. Then the total area of the 4 walls of the

room will be decreased by

a. 30%

b. 18.75%

c. 15%

d. 13.6%

Sol: Given  $l:b:h=3:2:1$

let  $h=10$ ,  $b = 20$ , and  $l = 30$

area =  $2(l+b)h$

area =  $2*(30+20)*10=1000$

Now after those adjustments in the measurements,

$l=60$ ,  $b=10$ ,  $h=5$

area =  $2(l+b)h = 2(60+10)5=700$

Percentage decrease =  $\frac{1000-700}{1000} \times 100=30\%$

5. A circle circumscribes three unit circles that touch each other. What is the area of the

larger circle? Note that  $\pi$  is the ratio of the circumference to the diameter of a circle (

3.14159265).

Sol:

15.

16. By joining centres of 3 unit circles we will get an equilateral triangle of length 2 unit. We

have to find the length of the orange line.

And center of the equilateral triangle will be the center of the big circle.

So radius of the big circle will be =  $(1 + \text{Circum radius of the equilateral triangle})$

Circum radius of equilateral triangle =  $2 \times \frac{\sqrt{3}}{2} = \sqrt{3}$

Area of big circle will be =  $\pi r^2 = 3.14 \times (1 + \sqrt{3})^2$

6. Rajesh calculated his average over the last 24 tests and found it to be 76. He finds out that the

marks for three tests have been inverted by mistake. The correct marks for these tests are 87, 79

and 98. What is the approximate percentage difference between his actual average and his

incorrect average?

Sol: No Change

Incorrect value is: 78, 97, 89

correct values are: 87, 79, 98

difference between correct and incorrect value is =  $9 + 9 - 18 = 0$

7. Joke is faster than Paul, Joke and Paul each walk 24 KM. The sum of their speed is 7 Km per

hour. And the sum of times taken by them is 14 hours. Then, Joke speed is

a. 3 KM/Hr

b. 4 KM/Hr

c. 5 KM/Hr

d. 7 KM/Hr

Sol:

Speed =  $\frac{\text{Time}}{\text{distance}}$

let the speed of joke  $x$  then speed of paul will be  $7-x$

$$24x + 247 - x = 14$$

Try to plugin the values from the options. If Joke speed is 4 the paul is 3.

8. The crew of a rowing team of 8 members is to be chosen from 12 men ( $M_1, M_2, \dots, M_{12}$ )

and 8 women ( $W_1, W_2, \dots, W_8$ ), such that there are two rows, each row occupying one the two

sides of the boat and that each side must have 4 members including at least one women. Further

it is also known  $W_1$  and  $M_7$  must be selected for one of its sides while  $M_2, M_3$  and  $M_{10}$  must

be selected for other side. What is the number of ways in which rowing team can be arranged.

SoL:

We need two person for one side and 1 women for the another side. We select that women in 7

ways. Now that second side people can sit in  $7 \times 4!$  ways.

Now for the first side we need two people from the remaining 14. So this can be done

in  ${}^{14}C_2$  ways and this side people can sit in  ${}^4C_2 \times 4!$  ways.

Again the first group may take any of the two sides. So total ways are  $2 \times 7 \times 4! \times {}^{14}C_2 \times 4!$

9. In a certain city, 60% of the registered voters are congress supporters and the rest are BJP

supporters. In an assembly election, if 75% of the registered congress supporters and 20% of the

registered BJP supporters are expected to vote for candidate A, what percent of the registered

voters are expected to vote for candidate A?

**Sol: let the people in the city be 100**

**Congress supporters = 60% of 100 = 60**

**40% are BJP=40% of 100 = 40**

**out of 60,75% voted for congress= $75\%(60)=45$**

**out of 40%,20% voted for congress= $20\%(40)=8$**

**Total= $45 + 8 = 53$**

**Total percent= 53%**

**10. Anusha, Banu and Esha run a running race of 100 meters. Anusha is the fastest followed by**

**Banu and then Esha. Anusha, Banu and Esha maintain constant speeds during the entire race.**

**When Anusha reached the goal post, Banu was 10m behind. When Banu reached the goal post**

**Esha was 10m behind. How far was behind Anusha when the latter reached the goal post.**

**option**

**a) 70**

**b) 81**

**c) 90**

**d) 80**

**Sol:**

**By that time Anusha covered 100m, Bhanu covered 90m. So ratio of their speeds = 10 : 9**

**By that time Bhanu reached 100m, Esha covered 90m. So ratio of their speeds = 10 : 9**

**Ratio of the speed of all the three = 100 : 90 : 81**

**By that time Anusha covered 100m, Esha Covers only 81.**

11. Seven different objects must be divided among three persons. In how many ways this can be

done if at least one of them gets exactly one object.

Sol: Division of  $m+n+p$  objects into three groups is given by  $(m+n+p)!/m! \times n! \times p!$

But  $7 = 1 + 3 + 3$  or  $1 + 2 + 4$  or  $1 + 1 + 5$

So The number of ways are  $(7)!/1! \times 3! \times 3! + (7)!/1! \times 2! \times 4! + (7)!/1! \times 1! \times 5! = 70 + 105 + 21$

$= 196$

12. George while driving along the highway saw road markers which are at equal distances from

each other. He crosses the markers every 20 seconds. If he increases his speed by  $x$  meters per

second, he crosses the markers at every 15 seconds. But if he increases his speed by  $y$  meters per

second, he crosses the marker at every 10th second. If  $y-x = 40$  meters per second, then what is

the distance between two markers.

Sol: Let speed be  $=z$  m/s then Distance  $= 20z$  m

$(z+x)15=20z$ ;  $(z+y)10=20z$

Also given that  $y - x = 40$

solving we get  $20z=1200$

13. How many different 9 digit numbers can be formed from the number 223355888 by rearranging

its digits so that the odd digits occupy even position?

Sol: Odd places are 4 and these are occupied by 3355. So this can be done in  $4!/(2! 2!) = 6$

There are 5 even numbers which have to be placed at 5 odd places. So  $5!/(2!3!) = 10$  ways



so total number of ways of arranging all these numbers are  $10 * 6 = 60$  ways

14. In a vessel, there are 10 litres of alcohol. An operation is defined as taking out five litres of

what is present in the vessel and adding 10 litres of pure water to it. What is the ratio of alcohol

to water after two operations?

a) 1 : 5

b) 2 : 3

c) 1 : 6

d) 3 : 2

Sol: Final concentration = Initial concentration  $(1 - \frac{\text{replacement quantity}}{\text{Final volume}})$

Final concentration =  $1 \times (1 - \frac{10}{15}) = \frac{2}{3}$

Final concentration =  $\frac{2}{3} \times (1 - \frac{10}{20}) = \frac{1}{3}$

So ratio of alcohol : water = 1 : 5

1. Adam sat with his friends in the Chinnaswamy stadium at Madurai to watch the 100 metres

running race organized by the Asian athletics Association. Five rounds were run. After every

round half the teams were eliminated. Finally, one team wins the game. How many teams

participated in the race?

Ans: Total five rounds were run. So in the final round 2 teams must have participated. In the

penultimate round 4 teams, and 3rd round 8, 2nd round 16 and in the first round 32 teams must

have participated as in each round half of the teams got eliminated.

2. From the top of a 9 metres high building AB, the angle of elevation of the top of a tower CD is

$30^\circ$  and the angle of depression of the foot of the tower is  $60^\circ$ . What is the height of the tower?

Ans:

Ans: We have to find the value of CD. We use Sine rule to find the answer easily.  
Sine rule

is  $a\sin A = b\sin B = c\sin C$

In triangle BDE,  $9\sin 60 = x\sin 30$

So  $9\sqrt{2} = x \cdot 12 \Rightarrow x = 9\sqrt{2}$

In triangle BCD,  $CD\sin 30 = 9\sqrt{2}\sin 60$

$CD \cdot \frac{1}{2} = 9\sqrt{2} \cdot \frac{\sqrt{3}}{2} \Rightarrow CD = 9\sqrt{3}$

So height of the tower =  $9 + 3 = 12$

3. 49 members attended the party. In that 22 are males, 27 are females. The shake hands are done

between males, females, male and female. Total 12 people given shake hands.  
How many such

kinds of such shake hands are possible?

Ans: If only 12 people shook their hands, then total hand shakes are  $12C2 = 66$

4. Ferrari S.P.A is an Italian sports car manufacturer based in Maranello, Italy.  
Founded by Enzo

Ferrari in 1928 as Scuderia Ferrari, the company sponsored drivers and manufactured race cars

before moving into production of street-legal vehicles in 1947 as Ferrari S.P.A.  
Throughout its

history, the company has been noted for its continued participation in racing, especially in

Formula One where it has employed great success. Rohit once bought a Ferrari. It could go 4

times as fast as Mohan's old Mercedes. If the speed of Mohan's Mercedes is 35 km/hr and the

distance traveled by the Ferrari is 490 km, find the total time taken for Rohit to drive that

distance.

Ans: As Ferrari's speed is four times that of the Mercedes, its speed is  $35 \times 4 = 140$

So time taken by the Ferrari =  $490 / 140 = 3.5$  Hours

5. A sheet of paper has statements numbered from 1 to 40. For all values of  $n$  from 1 to 40,

statement  $n$  says: 'Exactly  $n$  of the statements on this sheet are false.' Which statements are true

and which are false?

a) The even numbered statements are true and the odd numbered statements are false.

b) The odd numbered statements are true and the even numbered statements are false.

c) All the statements are false.

d) The 39th statement is true and the rest are false

Ans: Assume there is only one statement is there. The statement should read "Exactly 1

statement on this sheet is false". If the truth value of the statement is true, then given statement

should be false. This is contradiction. If the statement is false, Then the given statement is true.

but there is not other true statement.

Assume there are two statements. By the above logic, 2nd statement should not be true. But 1st

statement is true as it truthfully says the truthfulness. By this logic we know that If there are " $n$ "

statements,  $(n-1)$ th statement is the only true statement And all other are false

6. If there are 30 cans out of them one is poisoned if a person tastes very little he will die within

14 hours so if there are mice to test and 24 hours to test, what is the minimum no. of mice's

required to find poisoned can?

Ans:

If only 3 person are used, by giving wine drops suggested by the diagram, we can find the

poisoned casks upto 8.

for example, If the 2nd and 3rd persons die, then 7th cask is poisoned. As a rule of thumb, If we

have  $n$  mice, we can easily find the poison casks upto  $2n$ . As the number of casks are less than

32 we can use only 5 mice.

7. How many 9 digit numbers are possible by using the digits 1, 2, 3, 4, 5 which are divisible by

4 if the repetition is allowed?

Ans: If A number has to be divisible by 4, the last two digits must be divisible by 4. So

possibilities are, 12, 24, 32, 44, 52. And the of the remaining 7 places, each place got filled by

any of the five digits. So these 7 places got filled by  $5 \times 5 \times \dots (7 \text{ times}) = 5^7$  ways. So total

ways are  $5 \times 5^7 = 5^8$

8. A hare and a tortoise have a race along a circle of 100 yards diameter. The tortoise goes in one

direction and the hare in the other. The hare starts after the tortoise has covered  $\frac{1}{5}$  of its

distance and that too leisurely. The hare and tortoise meet when the hare has covered only  $\frac{1}{8}$  of

the distance. By what factor should the hare increase its speed so as to tie the race?

Assume the circumference of the circle is 200 meters. Hare and tortoise started at the

same point but moves in the opposite direction. It is given that by that time tortoise

covered 40 m ( $\frac{1}{5}$ th of the distance), Hare started and both met after hare has covered 25.

This implies, in the time hare has covered 25m, hare has covered  $200 - 40 - 25 = 135$

meters.

So Hare : tortoise speeds =  $25 : 135 = 5 : 27$

Now Hare and tortoise has to reach the starting point means, Hare has to cover 175

meters and Tortoise has to cover only 25 meters in the same time.

As time =  $\frac{\text{Distance}}{\text{Speed}} = \frac{25}{27} = \frac{175}{5 \times K}$

ie., Hare has to increase its speed by a factor K. Solving we get  $K = 37.8$

9. For the FIFA world cup, Paul the octopus has been predicting the winner of each

match with amazing success. It is rumored that in a match between 2 teams A and B, Paul

picks A with the same probability as A's chances of winning. Let's assume such rumors

to be true and that in a match between Ghana and Bolivia; Ghana the stronger team has a

probability of  $\frac{2}{3}$  of winning the game. What is the probability that Paul will correctly

pick the winner of the Ghana-Bolivia game?

a)  $\frac{1}{9}$

b)  $\frac{4}{9}$

c)  $\frac{5}{9}$

d)  $\frac{2}{3}$

The probability that Paul correctly picks the winner = (A's Chances of winning) x (Paul's

picking the winner correctly) + (A's chances of losing) x (Paul picks wrongly)

$$= \frac{2}{3} \times \frac{2}{3} + \frac{1}{3} \times \frac{1}{3} = \frac{5}{9}$$

10. 36 people  $\{a_1, a_2, \dots, a_{36}\}$  meet and shake hands in a circular fashion. In other words,

there are totally 36 handshakes involving the pairs,  $\{a_1, a_2\}, \{a_2, a_3\}, \dots, \{a_{35}, a_{36}\},$

$\{a_{36}, a_1\}$ . Then size of the smallest set of people such that the rest have shaken hands

with at least one person in the set is

a) 12

b) 11

c) 13

d) 18

Ans:  $\{a_1, a_2\}, \{a_2, a_3\}, \{a_3, a_4\}, \{a_4, a_5\}, \{a_5, a_6\}, \{a_6, a_7\}, \dots, \{a_{35}, a_{36}\}, \{a_{36}, a_1\}$

From the above arrangement, If we separate  $a_3, a_6, a_9, \dots, a_{36}$ . Total 12 persons the

remaining persons must have shaken hand with at least one person. So answer is 12.

11. There are two boxes, one containing 10 red balls and the other containing 10 green

balls. You are allowed to move the balls between the boxes so that when you choose a

box at random and a ball at random from the chosen box, the probability of getting a red

ball is maximized. This maximum probability is

If rearrangement is not allowed, then actual probability of picking up a red ball

$$= \frac{12(10)}{12(10)+12(0)} = \frac{10}{22}$$

As we are allowed to move the ball, we keep only 1 red in the first box, and shift the

remaining 9 to the second.

$$\text{So } = \frac{12(1)+9(9)}{12(1)+9(9)+12(0)} = \frac{14}{21}$$

12. The difference between two no is 9 and the product of the two is 14. What is the

square of their sum?

We know that  $(a+b)^2 = (a-b)^2 + 4ab$

$$\text{Substituting } a - b = 9, \text{ and } ab = 14, (a+b)^2 = (9)^2 + 4(14) = 137$$

13. There are two water tanks A and B, A is much smaller than B. While water fills at the

rate of one liter every hour in A, it gets filled up like 10, 20, 40, 80, 160 in tank B.

(At the

end of first hour, B has 10 liters, second hour it has 20, third hour it has 40 and so on). If

tank B is  $\frac{1}{32}$  filled after 21 hours, what is the total duration required to fill it

completely?

Ans: The data related to the first tank A is not necessary. As you can see, the capacity

that gets filled in the tank B after each hour is doubled. So If the tank is  $\frac{1}{32}$ nd part is

full after 21 hours, it is  $\frac{1}{16}$ th part full after 22 hours,  $\frac{1}{8}$ th part full after 23 hours,  $\frac{1}{4}$ th

part full after 24 hours, 1/2 full after 25 hours, completely full after 26 hours.

14. 3 friends A, B, C went for week end party to McDonald's restaurant and there they

measure their weights in some order in 7 rounds. A, B, C, AB, BC, AC, ABC. Final round measure is 155kg then find the average weight of all the 7 rounds?

Average weight =  $[(a + b + c + (a+b) + (b+c) + (c+a) + (a+b+c)) / 7] = 4(a+b+c) / 7 = 4 \times 155 / 7 = 88.5 \text{ kgs}$

15. A grandfather has 3 grandchildren. Age difference of two children among them is 3.

Eldest child age is 3 times the youngest child's age and the eldest child age is two years

more than the sum of age of other two children. What is the age of the eldest child?

Ans: As the eldest son's age is 3 times that of the youngest, eldest son's age should be a

multiple of 3. From the given options take 15 as the eldest son's age. Then youngest son's

age becomes 5. But Eldest son's age is 2 more than the sum of the remaining two sons. So

Sum of the remaining two sons is 13. So the age of the middle son is  $13 - 5 = 8$ . Which

satisfies another condition in the question that the difference between the two sons' age is

3. So answer is 15.

16. In a mixture of a, b and c, if a and b are mixed in 3:5 ratio and b and c are mixed in

8:5 ratio and if the final mixture is 35 liters, find the amount of b?

Ans: As b is common in both ratios, we should equate b in both ratios by multiplying



**suitable numbers.**

$$\mathbf{a:b = 3 : 5 = 24 : 40}$$

$$\mathbf{b:c = 8 : 5 = 40 : 25}$$

$$\mathbf{Now\ a : b : c = 24 : 40 : 25.}$$

$$\mathbf{Amount\ of\ b\ in\ the\ mixture = 4089 \times 35 = 15.73}$$

**17. After the typist writes 12 letters and addresses 12 envelopes, she inserts the letters**

**randomly into the envelopes (1 letter per envelope). What is the probability that exactly 1**

**letter is inserted in an improper envelope?**

**Ans: Tricky one but simple. How do you put exactly 1 letter in the wrong envelope? we**

**need minimum two. So answer is 0.**

**18. 10 suspects are rounded by the police and questioned about a bank robbery. Only one**

**of them is guilty. The suspects are made to stand in a line and each person declares that**

**the person next to him on his right is guilty. The rightmost person is not questioned.**

**Which of the following possibilities are true?**

**A. All suspects are lying.**

**B. leftmost suspect is innocent.**

**C. leftmost suspect is guilty**

**a) A only**

**b) A or C**

**c) A or B**

**d) B only**

There are only 2 cases. Either left one is guilty or one of the remaining 9 to his right is

guilty.

So If the left most is guilty, All the statements including the guilty one are lies. A and C

are correct.

Or If Any one except left most one is guilty, Then one of the statements given by the

person should be true. In this case all the suspects are lying does not hold. So If B is

correct, A is not correct. i.e., only A or B is correct. Option C is correct.

19. A hollow cube of size 5 cm is taken, with a thickness of 1 cm. It is made of smaller

cubes of size 1 cm. If 1 face of the outer surface of the cube are painted, totally how many

faces of the smaller cubes remain unpainted?

The Hollow cube volume =  $n^3 - (n-2)^2$ , Here n is the number of small cubes lie on the big

cube edge.

Now  $n = 5$  so Hollow cube volume =  $5^3 - (5-2)^2 = 125 - 27 = 98$

So 98 small cubes required to make a hollow cube of size 5 cm. Now total surfaces =  $6 \times$

$98 = 588$

Now if the bigger cube is painted 4 sides, total  $4 \times 25$  small faces got paint. So remaining

small faces which does not have paint after cutting is  $588 - 100 = 488$

20. My flight takes off at 2am from a place at 18N 10E and landed 10 Hrs later at a place

with coordinates 36N70W. What is the local time when my plane landed?

- a) 12 noon
- b) 6: 40 AM
- c) 5: 20 PM
- d) 6:50 AM

Remember, while moving from east to west countries lag in time. Remember when Test

cricket starts in England? 3. 30 in afternoon. Right? ie., We are in after noon means they

are in morning.

If the coordinates change from 10 E to 70W, the plane has moved a total of 80 degrees.

We know that with each degree time increases by 4 minutes while going from east to

west. (How?  $24 \times 60 \text{ min} / 360 \text{ degrees}$ , So 1 degree = 4 min)

So total time change =  $4 \times 80 = 320 \text{ min} = 5 \text{ hrs} + 20 \text{ minutes}$ .

After 10 hours local time is (2 am + 10 - 5.20 hrs) = 6.40 AM.

1) Of the following, which is the closest approximation of  $(50.2 \times 0.49) / 199.8$  ?

Ans: For approximation  $(50.2 \times 0.49) / 199.8$  can be taken as

$$50 \times 0.5 / 200 = 25 / 200 = 1/8 = 0.125$$

2) How many prime numbers between 1 and 100 are factors of 7150?

Ans:  $7, 150 = 2 \times 5^2 \times 11 \times 13$

So there are 4 distinct prime numbers that are below 100

3) Among a group of 2500 people, 35 percent invest in municipal bonds, 18 percent invest in oil

stocks, and 7 percent invest in both municipal bonds and oil stocks. If 1 person is to be randomly

selected from 2500 people, what is the probability that the person selected will be one who

invests in municipal bonds but not in oil stocks

Ans: Here 2500 does not require.

From the diagram we know that only ones who invested in municipal bonds are 28%, the

probability is  $28 / 100 = 7/25$

4) Country Club has an indoor swimming club. Thirty percent of the members of a swim

club have passed the lifesaving test. Among the members who have not passed the test,

12 have taken the preparatory course and 30 have not taken the course. How many

members are there in the swim club?

Ans:  $30 + 12 = 42$  did not pass the test. This is equal to 70 % of the total members. So

total members =  $100 / 70 \times 42 = 60$

5) A necklace is made by stringing N individual beads together in the repeating pattern

red bead, green bead, white bead, blue bead and yellow bead. If the necklace begins with

a red bead and ends with a white bead, then N could be:

Ans: The pattern is R G W B Y R G W B Y R .....

So, White bead comes at these positions 3rd, 8th, 13th, 18th...

If we take this as a arithmetic progression, then this series can be expressed as  $3 + (n - 1)$

5. ( From the formula for general term of AP =  $a + (n-1)d$ ).

This can be expressed as  $5n - 2$

We check the answer options so only 68 satisfy the condition.

6) A dog taken four leaps for every five leaps of hare but three leaps of the dog is equal to

four leaps of the hare. Compare speed?

Ans: In terms of number of leaps, the ratio of the Dog and hare speeds are 4 : 5

But Given that 3 leaps of dog = 4 leaps of hare, i.e., Leap lengths = 4 : 3 (If Dog is covering in 3 leaps what hare as covered in 4 leaps then Leap lengths are inversely

proportional)

So Dog speed =  $4 \times 4 = 16$

Hare speed =  $5 \times 3 = 15$

So speeds ratio = 16 : 15

7) There are two boxes, one containing 39 red balls & the other containing 26 green

balls. you are allowed to move the balls b/w the boxes so that when you choose a box

random & a ball at random from the chosen box, the probability of getting a red ball is

maximized. this maximum probability is

Ans: Very interesting question.

As we are allowed to move the balls, we keep only one red ball in first box and move all

the remaining balls to the second box

So first box contains 1 red ball, second box contains 38 red + 26 green = 64 balls

Probability of choosing any box is  $1/2$ .

So probability of taking one red ball =  $\frac{1}{2} \times 1 + \frac{1}{2} \times \frac{38}{64} = 0.8$

8) In how many ways can 3 postcards can be posted in 5 postboxes?

Ans: First card can go into any of the five boxes, Second can go into any of the five

boxes, Third can go into any of the five boxes =  $5 \times 5 \times 5 = 125$

9) Apple costs L rupees per kilogram for first 30kgs and Q rupees per kilogram for each

additional kilogram. If the price of 33 kilograms is 11.67 and for 36kgs of Apples is 12.48

then the cost of first 10 kgs of Apples is

Ans: By framing equations we get

$$30L + 3Q = 11.67$$

$$30L + 6Q = 12.48$$

Eliminate Q by multiplying the first equation by 2 and subtracting second equation from

the first

Then we get  $L = 0.362$

Cost of 10 kgs of apples =  $0.362 \times 10 = 3.62$

10) letters in the word ABUSER are permuted in all possible ways and arranged in alphabetical order then find the word at position 49 in the permuted alphabetical order?

a) ARBSEU

b) ARBESU

c) ARBSUE

d) ARBEUS

Ans: The best way to solve this problems is Just ask how many words starts with A. If we

fix A, then the remaining letters can be arranged in  $5!$  ways = 120. So the asked word

must start with A.

Arrange all the given letters in alphabetical order. ABERSU

Let us find all the words start with AB.  $AB^{****} = 4! = 24$  ways

Now we find all the words start with AE.  $AE^{****} = 4! = 24$  ways

So next word start with AR and remaining letters are BESU

So option B

11) A is twice efficient than B. A and B can both work together to complete a work in 7

days. Then find in how many days A alone can complete the work?

Ans: Let us assume A can do 2 units of work each day, then B can do only 1 unit a

day. If both can complete the work in 7 days, total work done by these two together =  $(2 +$

$1) \times 7 = 21$  units

If these 21 units to be done by A alone, then he will take  $21 / 2 = 10.5$  days.

12) In a  $8 \times 8$  chess board what is the total number of squares.

Ans: The total number of squares in a  $n \times n$  chess board is equal to "the sum of first  $n$

natural number squares"

i.e.,  $n(n+1)(2n+1)/6$

So Substituting 8 in the above formula we get 204

13) X, Y, W and Z are integers and the expression  $X - Y - Z$  is even and  $Y - W - Z$  is odd. If X is even then which of the following is true?

(a) Y must be odd

(b)  $Y - Z$  must be odd

(c) W must be odd

(d) Z must be odd

Ans. If X is even and  $X - Y - Z$  is even then Y and Z both should be odd or both should

be even.

If  $Y - W - Z$  is odd, and  $Y$  and  $Z$  are also odd  $W$  should be odd

If  $Y - W - Z$  is even, and  $Y$  and  $Z$  are even then  $W$  should be odd.

So option C is correct. i.e.,  $W$  must be ODD

14) The remainder when  $1!+2!+3!+\dots+50!$  divided by  $5!$  will be

The remainder when the terms greater than  $5!$  are divided by  $5!$  becomes 0 so we need to

consider the terms upto  $4!$ .

So remainder will be whatever is obtained by dividing  $1!+2!+3!+4!$  with  $5!$ .

So remainder is obtained by dividing  $(1+2+6+24)=33$  with  $5!$  (120)

So remainder is 33.

15) If there are Six periods in each working day of a school, In how many ways can one

arrange 5 subjects such that each subject is allowed at least one period?

Ans. To arrange 6 periods with 5 subjects, then one subject can be arranged in two slots.

5 Subjects can be arranged in 6 periods in  $6P5$  ways and now we have 1 period which we

can fill with any of the 5 subjects in 5 ways. so  $6P5 \times 5 = 3600$

Alternate method:

Assume the subjects are  $X_1, X_2, A, B, C, D$ . Here  $X$  is the subject which repeats. So

arranging 6 objects in 6 places will be equal to  $6! = 720$  (here no need to divide this

number with  $2!$  as even though the subject is same, but not identical)

But this repeated subject can be any of the five. So total arrangements are  $720 \times 5 = 3600$



**16) An article manufactured by a company consists of two parts X and Y. In the process**

**of manufacturing of part X, 9 out 100 parts may be defective. Similarly , 5 out of 100**

**are likely to be defective in the manufacturer of Y. Calculate the probability that the**

**assembled product will not be defective?**

**a) 0.6485**

**b) 0.6565**

**c) 0.8645**

**d) none of these**

**Ans: Probability that the part X is nondefective is =  $1 - 9/100 = .91$**

**Probability that the part Y is nondefective is =  $1 - 5/100 = .95$**

**so, Probability of nondefective product =  $0.91 \times 0.95 = 0.8645$**

**1) The water from one outlet, flowing at a constant rate, can fill the swimming pool in 9 hours.**

**The water from second outlet, flowing at a constant rate can fill up the same pool in**

**approximately in 5 hours. If both the outlets are used at the same time, approximately what is the**

**number of hours required to fill the pool?**

**Ans: Assume tank capacity is 45 Liters. Given that the first pipe fills the tank in 9 hours. So its**

**capacity is  $45 / 9 = 5$  Liters/ Hour. Second pipe fills the tank in 5 hours. So its capacity is  $45 / 5$**

**= 9 Liters/Hour. If both pipes are opened together, then combined capacity is 14 liters/hour. To**

**fill a tank of capacity 45 liters, Both pipes takes  $45 / 14 = 3.21$  Hours.**

2) If 75 % of a class answered the first question on a certain test correctly, 55 percent answered

the second question on the test correctly, and 20 percent answered neither of the questions

correctly, what percentage answered both correctly?

It is a problem belongs to sets. We use the following formula  $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

Here  $n(A \cup B)$  is the people who answered atleast one of the questions.

It was given that 20% answered neither question then the students who answered atleast one

question is  $100\% - 20\% = 80\%$

Now substituting in the formula we get  $80\% = 75\% + 55\% - n(A \cap B)$

$\Rightarrow n(A \cap B) = 50\%$

3) A student's average ( arithmetic mean) test score on 4 tests is 78. What must be the students

score on a 5th test for the students average score on the 5th test to be 80?

Ans: We know that Average =  $\frac{\text{Sum of the observations}}{\text{No of observations}}$

So Sum of 4 test scores =  $78 \times 4 = 312$

Sum of 5 tests scores =  $80 \times 5 = 400$

$\Rightarrow$  5th test score =  $400 - 312 = 88$

Alternative method: If the student scores 78 in the fifth test also, what could be his average? No

change. Is it not?

But to bring the average to 80, he must have scored enough marks extra so that each of the five

subject scores increase upto 80. i.e., he should have scored  $2 \times 5 = 10$  runs extra in the fifth

subject. So 5th subject score is  $78 + 10 = 88$

**4) Rural households have more purchasing power than do urban households at the same income**

**level, since some of the income urban and suburban households use for food and shelter can be**

**used by the rural households for other needs. Which of the following inferences is best supported**

**by the statement made above?**

**(A) The average rural household includes more people than does the average urban or suburban**

**household.**

**(B) Rural households have lower food and housing costs than do either urban or suburban**

**households.**

**(C) Suburban households generally have more purchasing power than do either rural or urban**

**households.**

**(D) The median income of urban and suburban households is generally higher than that of rural**

**households.**

**(E) All three types of households spend more of their income on housing than on all other**

**purchases combined.**

**Ans: If average rural household includes more people, then how come they have more**

**purchasing power? Infact, they have less purchasing power as they have to feed more**

**people. Option A ruled out.**

**Option C does not explain why rural households have more purchasing power than urban. Ruled**

out.

If median income of urban and suburban households is generally higher than rural households

they are likely to have more purchasing power, assuming other parameters constant. But this

does not explain why rural households have more purchasing power. Options D ruled out.

Option E does not provide any explanation why rural households have more purchasing power.

Ruled out.

Option B is correct as, If rural households spend less income on food and shelter due to less

prices they definitely have more disposable income to spend.

5) Jose is a student of horticulture in the University of Hose. In a horticultural experiment in his

final year, 200 seeds were planted in plot I and 300 were planted in plot II. If 57% of the seeds in

plot I germinated and 42% of the seeds in plot II germinated, what percent of the total number of

planted seeds germinated?

Ans: Total seeds germinated in Plot I = 57% of 200 = 114

Total seeds germinated in Plot II = 42% of 300 = 126

Total germinated seeds = 114 + 126 = 240

The percentage of germinated seeds of the total seeds =  $\frac{240}{500} \times 100 = 48\%$

6) A closed cylindrical tank contains  $36\pi$  cubic feet of water and its filled to half its capacity.

When the tank is placed upright on its circular base on level ground, the height of water in the

tank is 4 feet. When the tank is placed on its side on level ground, what is the height, in feet, of

the surface of the water above the ground?

Ans: We know that the volume of cylinder =  $\pi r^2 h$

Given tank height = 4ft.

$$\Rightarrow \pi r^2 4 = 36\pi$$

$$\Rightarrow r = 3$$

So the radius is 3 which means the diameter is 6.

As the cylinder is filled to initially exactly half of the capacity, When this cylinder is placed on

its side, Water comes upto the height of the radius.

So water comes upto 3 ft.

7) The present ratio of students to teachers at a certain school is 30 to 1. If the student enrollment

were to increase by 50 students and the number of teachers were to increase by 5, the ratio of the

teachers would then be 25 to 1 What is the present number of teachers?

Assume the present students and teachers are 30K, K

After new recruitments of students and teachers the strength becomes 30K + 50, K + 5

respectively. But given that this ratio = 25 : 1

$$\Rightarrow 30K + 50 : K + 5 = 25 : 1$$

Solving we get K = 15

So present teachers are 15.

8) College T has 1000 students. Of the 200 students majoring in one or more of the sciences, 130

are majoring in Chemistry and 150 are majoring in Biology. If at least 30 of the students are not

majoring in either Chemistry or Biology, then the number of students majoring in both

Chemistry and Biology could be any number from

If we assume exactly 30 students are not majoring in any subject then the students who take

atleast one subject =  $200 - 30 = 170$

We know that  $n(A \cup B) = n(A) + n(B) - n(A \cap B)$

$\Rightarrow 170 = 130 + 150 - n(A \cap B)$

Solving we get  $n(A \cap B) = 110$ .

i.e., Students who can take both subjects are 110

But If more than 30 students are not taking any subject, what can be the maximum number of

students who can take both the subjects?

As there are 130 students are majoring in chemistry, assume these students are taking biology

also. So maximum students who can take both the subjects is 130

So the number of students who can take both subjects can be any number from 110 to 130.

9) Kelly and Chris are moving into a new city. Both of them love books and thus packed several

boxes with books. If Chris packed 60% of the total number of boxes, what was the ratio of the

number of boxes Kelly packed to the number of boxes Chris packed?

Simple questions. If chris packs 60% of the boxes, kelly packs remaining 40%

So Kelly : Chris =  $40\% : 60\% = 2 : 3$

10) Among a group of 2500 people, 35 percent invest in municipal bonds, 18 percent invest in

oil stocks, and 7 percent invest in both municipal bonds and oil stocks. If 1 person is to be

randomly selected from 2500 people, what is the probability that the person selected will be one

who invests in municipal bonds but not in oil stocks?

Ans: Here 2500 is redundant

From the diagram we know that only ones who invested in municipal bonds are 28%, the

probability is  $28 / 100 = 7/25$

11) Machine A produces bolts at a uniform rate of 120 every 40 second, and Machine B

produces bolts at a uniform rate of 100 every 20 seconds. If the two machines run simultaneously, how many seconds will it take for them to produce a total of 200 bolts?

Ans: Machine A produces  $120/40 = 3$  bolts in 1 second and machine B produces  $100/20 = 5$  bolts

in one second.

Hence, both of them will produce 8 bolts per second.

Hence, they will take  $200/8 = 25$  seconds to produce 200 bolts.

12) How many prime numbers between 1 and 100 are factors of 7150?

Ans:  $7, 150 = 2 \times 5^2 \times 11 \times 13$

So there are 4 distinct prime numbers that are below 100

13) Analysing the good returns that Halocircle Insurance Pvt Ltd was giving, Ratika bought a 1-

year, Rs 10,000 certificate of deposit that paid interest at an annual rate of 8% compounded

semi-annually. What was the total amount of interest paid on this certificate at maturity?

**This is a question on compound interest to be calculated semi annually.**

**In the case of semi annual compounding, Interest rate becomes half and Number of periods**

**becomes 2 per year.**

**So  $A = P(1+R/100)^n$**

**$\Rightarrow A = 10,000(1+4/100)^2 = 10,000 \times 2.0816$**

**$= 20,816$**

**Interest =  $A - P = 20,816 - 10,000 = 10,816$**

**14) Juan is a gold medalist in athletics. In the month of May, if Juan takes 11 seconds to run y**

**yards, how many seconds will it take him to run x yards at the same rate?**

**Ans: If Juan takes 11 seconds to run Y yards, for 1 yard he will take  $11 / y$  seconds. To run x**

**yards his time will be  $11 / y \times x = 11x / y$**

**15) A certain company retirement plan has a rule of 70 provision that allows an employee to**

**retire when the employee's age plus years of employment with the company total at least 70. In**

**what year could a female employee hired in 1986 on her 32nd birthday first be eligible to retire**

**under this provision?**

**Assume it has taken x years to the female employee to reach the rule of 70.**

**So her age should be  $32 + x$ . Also she gains x years of experience.**

**$\Rightarrow (32 + x) + x = 70$**

**$\Rightarrow x = 19.$**

**Her age at the time of retirement =  $1986 + 19 = 2005$**

**16) Of the following, which is the closest approximation of  $(50.2 \times 0.49) / 199.8$  ?**



ans: For approximation  $(50.2 \times 0.49)/199.8$  can be taken as

$$50 \times 0.5/200 = 25/200 = 1/8 = 0.125$$

17) Andalusia has been promoting the importance of health maintenance. 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) was enrolled in health maintenance organizations on January 1, 1991?

Ans: If a number  $K$  is to be increased by  $x\%$  it should be multiplied by  $(100+x)/100$

So When the enrollment in January 1, 1991 is multiplied by  $(100+x)/100$  we got 45 million.

$$K \times (100+15)/100 = 45$$

$$K = 45 \times 100/115 = 39.13$$

18) What is the lowest possible integer that is divisible by each of the integers 1 through 7,

inclusive?

Ans: If a number has to be divisible by each number from 1 to 7, that number should be L.C.M

$$\text{of}(1, 2, 3, 4, 5, 6, 7) = 420$$

19) If the area of a square region having sides of length 6 cms is equal to the area of a

rectangular region having width 2.5 cms, then the length of the rectangle, in cms, is

Ans: Given Area of the square = Area of rectangle

$$\Rightarrow a^2 = l.b$$

Substituting the above values in the formula

$$\Rightarrow 62 = 1.2.5$$

$$\Rightarrow l = 14.4 \text{ cm}$$

20) A tank contains 10,000 gallons of a solution that is 5 percent sodium chloride by volume. If

2500 gallons of water evaporate from the tank, the remaining solution will be approximately

what percentage of sodium chloride?

Ans: Sodium chloride in the original solution = 5% of 10,000 = 500

Water in the original solution = 10,000 - 500 = 9,500

If 2,500 Liters of the water is evaporated then the remaining water = 9,500 - 2,500 = 7,000

Sodium chloride concentration =  $\frac{500}{500+7000} \times 100 = 6.67 \%$

(concentration should be calculated always on the total volume)

21) After loading a dock, each worker on the night crew loaded  $\frac{3}{4}$  as many boxes as each

worker on the day of the crew. If the night crew has  $\frac{4}{5}$  as many workers as the day crew, what

fraction of all the boxes loaded by two crews did the day crew load?

Assume the number of boxes loaded in dayshift is equal to 4, then the number of boxes loaded

in night shift = 3

Assume the workers on dayshift = 5, then workers on night shift = 4

So boxes loaded in day shift = 4 x 5 = 20, and boxes loaded in night shift = 3 x 4 = 12

so fraction of boxes loaded in day shift =  $\frac{20}{20+12} = \frac{5}{8}$

22) A bakery opened yesterday with its daily supply of 40 dozen rolls. Half of the rolls

were sold by noon and 80 % of the remaining rolls were sold between noon and closing

time. How many dozen rolls had not been sold when the bakery closed yesterday?

Ans: If half of the rolls were sold by noon, the remaining are 50 % (40) = 20.

Given 80% of the remaining were sold after the noon to closing time

$$\Rightarrow 80\% (20) = 16$$

$$\text{Unsold} = 20 - 16 = 4$$

23) If  $N=4P$ , where  $P$  is a prime number greater than 2, how many different positive even

divisors does  $n$  have including  $n$ ?

Ans:  $N = 2^2 \times P^1$

We know that total factors of a number which is in the format of  $a^P \times b^Q \times c^R \dots = (P + 1)$ .

$$(Q + 1) \cdot (R + 1) \dots = (2 + 1) \cdot (1 + 1) = 6$$

Also odd factors of any number can be calculated easily by not taking 2 and its powers.

So odd factors of  $2^2 \times P^1 =$  the factors of  $P^1 = (1 + 1) = 2$

$$\text{Even factors of the number} = 6 - 2 = 4$$

24) A dealer originally bought 100 identical batteries at a total cost of  $q$  rupees. If each

battery was sold at 50 percent above the original cost per battery, then, in terms of  $q$ , for

how many rupees was each battery sold?

Ans: Per battery cost =  $q / 100$

If each battery is sold for 50% gain, then selling price =  $\text{CostPrice} \times (100 + \text{Gain} / 100)$

$$\Rightarrow q / 100 \times (100 + 50 / 100) = 3q / 200$$

25) The price of lunch for 15 people was 207 pounds, including a 15 percent gratuity of

service. What was the average price per person, EXCLUDING the gratuity?

Ans: Let the net price excluding the gratuity of service =  $x$  pounds

Then, total price including 15% gratuity of service =  $x \times (100 + 15) = 1.15x$  pounds

So,  $1.15x = 207$  pounds

$\Rightarrow x = 207 / 1.15 = 180$  pounds

Net price of lunch for each person =  $180 / 15 = 12$  pounds

If  $f(x) = (1+x+x^2+x^3+\dots+x^{2012})^2 - x^{2012}$

$g(x) = 1+x+x^2+x^3+\dots+x^{2011}$

Then what is the remainder when  $f(x)$  is divided by  $g(x)$

Let us multiply  $g(x)$  with  $x$  on the both sides

$x \cdot g(x) = x+x^2+x^3+\dots+x^{2012}$

add 1 on both sides

$x \cdot g(x) + 1 = 1+x+x^2+x^3+\dots+x^{2012}$

Substitute this value in  $f(x)$

then  $f(x) = (x \cdot g(x) + 1)^2 - x^{2012}$

$f(x) = x^2 \cdot g(x)^2 + 2 \cdot g(x) + 1 - x^{2012}$

Now  $f(x)$  is divisible by  $g(x)$  first two terms are exactly divisible by  $g(x)$  and we get

$1 -$

$x^{2012}$

But  $1 - x^{2012} = (1 - x)(1+x+x^2+x^3+\dots+x^{2011})$

if this expression is divisible by  $g(x)$  we get 0 as remainder.

A number has exactly 3 prime factors, 125 factors of this number are perfect squares and

27 factors of this number are perfect cubes. overall how many factors does the number

have?

We know that the total factors of a number  $N = a^p \cdot b^q \cdot c^r \dots$

Now the total factors which are perfect squares of a number  $N$

$$= ([p/2]+1) \cdot ([q/2]+1) \cdot ([r/2]+1) \dots$$

where  $[x]$  is greatest integer less than that of  $x$ .

$$\text{Given } ([p/2]+1) \cdot ([q/2]+1) \cdot ([r/2]+1) \dots = 125$$

$$\text{So } [p/2]+1 = 5; [q/2]+1 = 5; [r/2]+1 = 5$$

$$[p/2] = 4 \Rightarrow p = 8 \text{ or } 9, \text{ similarly } q = 8 \text{ or } 9, r = 8 \text{ or } 9$$

Given that 27 factors of this number are perfect cubes

$$\text{so } ([p/3]+1) \cdot ([q/3]+1) \cdot ([r/3]+1) \dots = 27$$

$$\text{So } [p/3]+1 = 3 \Rightarrow [p/3] = 2$$

$$\Rightarrow p = 6, 7, 8$$

By combining we know that  $p = q = r = 8$

So the given number should be in the format  $= a^8 \cdot b^8 \cdot c^8 \dots$

$$\text{Number of factors of this number} = (8+1) \cdot (8+1) \cdot (8+1) = 729$$

In a class there are 60% of girls of which 25% poor. What is the probability that a poor

girl is selected is leader?

Assume total students in the class = 100

$$\text{Then Girls} = 60\% (100) = 60$$

$$\text{Poor girls} = 25\% (60) = 15$$

$$\text{So probability that a poor girls is selected leader} = \frac{\text{Poor girls}}{\text{Total students}} = \frac{15}{100} =$$

$$15\%$$

A and B are running around a circular track of length 120 meters with speeds 12 m/s and

6 m/s in the same direction. When will they meet for the first time?

A meets B when A covers one round more than B.

A's relative speed =  $(12 - 6)$  m/s. So he takes  $120 / 6$  seconds to gain one extra round.

So after 20 seconds A meets B.

A completes a work in 20 days B in 60 days C in 45 days. All three persons working

together on a project got a profit of Rs.26000 what is the profit of B?

We know that profits must be shared as the ratio of their efficiencies. But efficiencies are

inversely proportional to the days. So efficiencies of A : B : C =  $1/20 : 1/60 : 1/45 = 9 : 3$

: 4

So B share in the total profit =  $3 / 13 \times 26000 = \text{Rs.}6000$

A completes a piece of work in  $3/4$  of the time in B does, B takes  $4/5$  of the time in C

does. They got a profit of Rs. 40000 how much B gets?

Assume C takes 20 Days. Now B takes  $4/5 (20) = 16$  days. A takes  $3/4(16) = 12$

Now their efficiencies ratio =  $1/20 : 1/16 : 1/12 = 12 : 15 : 20$

B's share in the profit of Rs.40000 =  $15/47 (40000) = \text{Rs.}12765$

An empty tank be filled with an inlet pipe 'A' in 42 minutes. After 12 minutes an outlet

pipe 'B' is opened which can empty the tank in 30 minutes. After 6 minutes another inlet

pipe 'C' opened into the same tank, which can fill the tank in 35 minutes and the tank is

filled. Find the time taken to fill the tank?

Assume total tank capacity = 210 Liters

Now capacity of pipe A =  $210/42 = 5$  Liters

Capacity of B =  $210 / 30 = 7$  Liters

Capacity of C =  $210 / 35 = 6$  min

Assume tank gets filled in  $x$  min after the third pipe got opened.

So  $x \times 5 + 6 \times (-2) + 4x = 210$

$\Rightarrow 48 + 4x = 210 \Rightarrow 4x = 162 \Rightarrow x = 40.5$

Total time taken to fill the tank =  $40.5 + 12 + 6 = 58.5$

Mother, daughter and an infant combined age is 74, and mother's age is 46 more than

daughter and infant. If infant age is 0.4 times of daughter age, then find daughters age.

Assume  $M + D + I = 74$ ; .....(1)

Also given  $M - D - I = 46 \Rightarrow M = D + I + 46$

Also  $I = 0.4 D \Rightarrow I = \frac{2}{5} D$

Substituting  $M$  and  $I$  values in the first equation we get  $D - 25D - 46 + D + 25D = 74$

Solving  $D = 10$

A Grocer bought 24 kg coffee beans at price  $X$  per kg. After a while one third of stock

got spoiled so he sold the rest for \$200 per kg and made a total profit of twice the cost.

What must be the price of  $X$ ?

Total Cost price =  $24 \times X$

As  $\frac{1}{3}$ rd of the beans spoiled, remaining beans are  $\frac{2}{3} (24) = 16$  kgs

Selling price =  $200 \times 16 = 3200$

Profit = Selling price - Cost price =  $3200 - 24 \times X$

**Given Profit = 2 × Cost price**

$$3200 - 24 \times X = 2 \times (24 \times X)$$

**Solving  $X = 44.44$**

**Bhanu spends 30% of his income on petrol on scooter 20% of the remaining on house**

**rent and the balance on food. If he spends Rs.300 on petrol then what is the expenditure**

**on house rent?**

$$\text{Given } 30\% (\text{Income}) = 300 \Rightarrow \text{Income} = 1000$$

**After having spent Rs.300 on petrol, he left with Rs.700.**

$$\text{His spending on house rent} = 20\% (700) = \text{Rs.140}$$

**Let  $\exp(m, n) = m$  to the power  $n$ . If  $\exp(10, m) = n \exp(2, 2)$  where  $m$  and  $n$  are integers**

**then  $n =$**

$$\text{Given } 10^m = n.22$$

$$\Rightarrow 2^m \times 5^m = n.22 \Rightarrow 2^{m-2} \times 5^m = n$$

**For  $m = 2$  we get least value of  $n = 25$ , and for  $m > 2$  we get infinite values are possible**

**for  $n$ .**

**How many kgs. of wheat costing Rs. 5 per kg must be mixed with 45 kg of rice costing**

**Rs. 6.40 per kg so that 20% gain may be obtained by selling the mixture at Rs. 7.20 per**

**kg ?**

**If the selling price of the mixture is Rs.7.2 when sold at 20% profit then**

$$\text{CP} \times 1.2 = 7.2 \Rightarrow \text{CP} = \text{Rs.6}$$

**Now by applying weighted average formula =  $K \times 5 + 45 \times 6.4$   $K + 45 = 6$**



$$\Rightarrow K = 18 \text{ kgs}$$

The diagonal of a square is twice the side of equilateral triangle then the ratio of Area of

the Triangle to the Area of Square is?

Let the side of equilateral triangle = 1 unit.

We know that area of an equilateral triangle =  $\frac{\sqrt{3}}{4}a^2$

As side = 1 unit area of the equilateral triangle =  $\frac{\sqrt{3}}{4}$

Now Diagonal of the square = 2 (side of the equilateral triangle) = 2

We know that area of the square =  $\frac{1}{2}D^2$  where D = diagonal

So area of the square =  $\frac{1}{2}(2^2) = 1$

Ratio of the areas of equilateral triangle and square =  $\frac{\sqrt{3}}{4} : 1 \Rightarrow \sqrt{3} : 4$

Raj tossed 3 dices and there results are noted down then what is the probability that raj

gets 10?

Always remember when 3 dice are rolled the number of ways of getting n ( where n is the

sum of faces on dice)

=  $(n-1)C_2$  where n = 3 to 8

= 25 where n = 9, 12

= 27 where n = 10, 11

=  $(20-n)C_2$  where n = 13 to 18

The required probability =  $\frac{27}{6^3} = \frac{27}{216}$

1. If  $3y + x > 2$  and  $x + 2y \leq 3$ , What can be said about the value of y?

A.  $y = -1$

B.  $y > -1$

C.  $y < -1$

D.  $y = 1$

Answer: B

Multiply the second equation with -1 then it will become  $-x - 2y \geq -3$ . Add the equations. You

will get  $y > -1$ .

2. If the price of an item is decreased by 10% and then increased by 10%, the net effect on the

price of the item is

A. A decrease of 99%

B. No change

C. A decrease of 1%

D. An increase of 1%

Answer: C

If a certain number is increased by  $x\%$  then decreased by  $x\%$  or vice versa, the net change is

always decrease. This change is given by a simple formula  $-(x/10)^2 = -(10/10)^2 = -1\%$ . Negative

sign indicates decrease.

3. If  $m$  is an odd integer and  $n$  an even integer, which of the following is definitely odd?

A.  $(2m+n)(m-n)$

B.  $(m+n^2)+(m-n^2)$

C.  $m^2+mn+n^2$

D.  $m + n$

Answer: C and D (Original Answer given as D)

You just remember the following  $\text{odd} \pm \text{odd} = \text{even}$ ;  $\text{even} \pm \text{even} = \text{even}$ ;  $\text{even} \pm \text{odd} = \text{odd}$

Also odd x odd = odd; even x even = even; even x odd = even.

4. What is the sum of all even integers between 99 and 301?

A. 40000

B. 20000

C. 40400

D. 20200

Answer: D

The first even number after 99 is 100 and last even number below 301 is 300. We have to find

the sum of even numbers from 100 to 300. i.e.,  $100 + 102 + 104 + \dots + 300$ .

Take 2 Common.  $2 \times (50 + 51 + \dots + 150)$

There are total 101 terms in this series. So formula for the sum of n terms when first term and

last term is known is  $n^2(a+l)$

So  $50 + 51 + \dots + 150 = 1012(50+150)$

So  $2 \times 1012(50+150) = 20200$

5. There are 20 balls which are red, blue or green. If 7 balls are green and the sum of red balls

and green balls is less than 13, at most how many red balls are there?

A. 4

B. 5

C. 6

D. 7

Answer: B

Given  $R + B + G = 17$ ;  $G = 7$ ; and  $R + G < 13$ . Substituting  $G = 7$  in the last equation, We get R

$< 6$ . So maximum value of  $R = 6$

6. If  $n$  is the sum of two consecutive odd integers and less than 100, what is greatest possibility

of  $n$ ?

A. 98

B. 94

C. 96

D. 99

Answer : C

We take two odd numbers as  $(2n + 1)$  and  $(2n - 1)$ .

Their sum should be less than 100. So  $(2n + 1) + (2n - 1) < 100 \Rightarrow 4n < 100$ .

The largest 4 multiple which is less than 100 is 96

7.  $x^2 < 1/100$ , and  $x < 0$  what is the highest range in which  $x$  can lie?

A.  $-1/10 < x < 0$

B.  $-1 < x < 0$

C.  $-1/10 < x < 1/10$

D.  $-1/10 < x$

Answer: A

Remember:

$(x - a)(x - b) < 0$  then value of  $x$  lies in between  $a$  and  $b$ .

$(x - a)(x - b) > 0$  then value of  $x$  does not lie inbetween  $a$  and  $b$ . or  $(-\infty, a)$  and  $(b, \infty)$  if  $a < b$

$x^2 < 1/100 \Rightarrow$

$(x^2 - 1/100) < 0 \Rightarrow (x^2 - (1/10)^2) < 0 \Rightarrow (x - 1/10)(x + 1/10) < 0$

So  $x$  should lie inbetween  $-1/10$  and  $1/10$ . But it was given that  $x$  is -ve. So  $x$  lies in  $-1/10$  to  $0$

8. There are 4 boxes colored red, yellow, green and blue. If 2 boxes are selected, how many

combinations are there for at least one green box or one red box to be selected?

A. 1

B . 6

C. 9

D. 5

Answer: 5

Total ways of selecting two boxes out of 4 is  $4C2 = 6$ . Now, the number of ways of selecting

two boxes where none of the green or red box included is only 1 way. (we select yellow and

blue in only one way). If we subtract this number from total ways we get 5 ways.

9. All faces of a cube with an eight - meter edge are painted red. If the cube is cut into smaller

cubes with a two - meter edge, how many of the two meter cubes have paint on exactly one face?

A. 24

B. 36

C. 60

D. 48

Answer : A

If there are n cubes lie on an edge, then total number of cubes with one side painting is given

by  $6 \times (n-2)^2$ . Here side of the bigger cube is 8, and small cube is 2. So there are 4 cubes lie on

an edge. Hence answer = 24

10. Two cyclists begin training on an oval racecourse at the same time. The professional cyclist

completes each lap in 4 minutes; the novice takes 6 minutes to complete each lap. How many

minutes after the start will both cyclists pass at exactly the same spot where they began to cycle?

A. 10

B. 8

C. 14

D. 12

Answer: D

The faster cyclist comes to the starting point for every 4 min so his times are 4, 8, 12, ..... The

slower cyclist comes to the starting point for every 6 min so his times are 6, 12, 18, ..... So

both comes at the end of the 12th min.

11. M, N, O and P are all different individuals; M is the daughter of N; N is the son of O; O is

the father of P; Among the following statements, which one is true?

A. M is the daughter of P

B. If B is the daughter of N, then M and B are sisters

C. If C is the granddaughter of O, then C and M are sisters

D. P and N are brothers.

Answer: B

From the diagram it is clear that If B is the daughter of N, then M and B are sisters. Rectangle

indicates Male, and Oval indicates Female.

12. In the adjoining diagram, ABCD and EFGH are squares of

side 1 unit such that they intersect in a square of diagonal length  $(CE) = \frac{1}{2}$ . The total area

covered by the squares is

A. Cannot be found from the information

B.  $1 \frac{1}{2}$

C.  $1 \frac{7}{8}$

D. None of these

Answer: C

Let  $CG = x$  then using pythagorean theorem  $CG^2 + GE^2 = CE^2$

$$\Rightarrow x^2 + x^2 = \left(\frac{1}{2}\right)^2 \Rightarrow 2x^2 = \frac{1}{4} \Rightarrow x^2 = \frac{1}{8}$$

Total area covered by two bigger squares =  $ABCD + EFGE$  - Area of small square  
 $= 2 - \frac{1}{8} =$

$\frac{15}{8}$

13. There are 10 stepping stones numbered 1 to 10 as shown at the side. A fly jumps from the first stone as follows; Every minute it jumps to the 4th stone from where it

started - that is from 1st it would go to 5th and from 5th it would go to 9th and from 9th it would

go to 3rd etc. Where would the fly be at the 60th minute if it starts at 1?

A. 1

B. 5

C. 4

D. 9

Answer : A

Assume these steps are in circular fashion.

Then the fly jumps are denoted in the diagram. It is clear that fly came to the 1st position after

5th minute. So again it will be at 1st position after 10th 15th .....60th. min.

So the fly will be at 1st stone after 60th min.

14. What is the remainder when  $617+1176$  is divided by 7?

A. 1

B. 6

C. 0

D. 3

Answer: C

$$617 = (7-1)17 =$$

$$17C0.717-17C1.716.11.....+17C16.71.116-17C17.117$$

If we divide this expansion except the last term each term gives a remainder 0.

Last term gives a

remainder of - 1.

Now From Fermat little theorem,  $[ap-1p]Rem=1$

So  $[1767]Rem=1$

Adding these two remainders we get the final remainder = 0

15. In base 7, a number is written only using the digits 0, 1, 2, .....6. The number 135 in base 7 is

$1 \times 7^2 + 3 \times 7 + 5 = 75$  in base 10. What is the sum of the base 7 numbers 1234 and 6543 in base

7.

A. 11101

B. 11110

C. 10111

D. 11011

Answer: B

In base 7 there is no 7. So to write 7 we use 10. for 8 we use 11..... for 13 we use 16, for 14 we

use 20 and so on.



So from the column d,  $4 + 3 = 7 = 10$ , we write 0 and 1 carried over. now  $1 + 3 + 4 = 8 = 11$ ,

then we write 1 and 1 carried over. again  $1 + 2 + 5 = 8 = 11$  and so on

16. The sequence  $\{A_n\}$  is defined by  $A_1 = 2$  and  $A_{n+1} = A_n + 2n$  what is the value of  $A_{100}$

A. 9902

B. 9900

C. 10100

D. 9904

Answer: A

We know that  $A_1 = 2$  so  $A_2 = A_1 + 1 = A_1 + 2(1) = 4$

$A_3 = A_2 + 2 = A_2 + 2(2) = 8$

$A_4 = A_3 + 3 = A_3 + 2(3) = 14$

So the first few terms are 2, 4, 8, 14, 22, .....

The differences of the above terms are 2, 4, 6, 8, 10...

and the differences of differences are 2, 2, 2, 2. all are equal. so this series represents a

quadratic equation.

Assume  $A_n = an^2 + bn + c$

Now  $A_1 = a + b + c = 2$

$A_2 = 4a + 2b + c = 4$

$A_3 = 9a + 3b + c = 8$

Solving above equations we get  $a = 1$ ,  $b = -1$  and  $C = 2$

So substituting in  $A_n = n^2 + bn + c = n^2 - n + 2$

Substitute 100 in the above equation we get 9902.

17. Find the number of rectangles from the adjoining figure (A square is also considered a

rectangle)

A. 864

B. 3276

C. 1638

D. None

Answer: C

To form a rectangle we need two horizontal lines and two vertical lines. Here there are 13

vertical lines and 7 horizontal lines. The number of ways of selecting 2 lines from 13 vertical

lines is  ${}^{13}C_2$  and the number of ways of selecting 2 lines from 7 horizontals is  ${}^7C_2$ . So total

rectangles =  ${}^7C_2 \times {}^{13}C_2$

18. A, B, C and D go for a picnic. When A stands on a weighing machine, B also climbs on, and

the weight shown was 132 kg. When B stands, C also climbs on, and the machine shows 130

kg. Similarly the weight of C and D is found as 102 kg and that of B and D is 116 kg. What is

D's weight

A. 58kg

B. 78 kg

C. 44 kg

D. None

Answer : C

Given  $A + B = 132$ ;  $B + C = 130$ ;  $C + D = 102$ ,  $B + D = 116$

Eliminate B from 2nd and 4th equation and solving this equation and 3rd we get D value as 44.

19. Roy is now 4 years older than Erik and half of that amount older than Iris. If in 2 years, Roy

will be twice as old as Erik, then in 2 years what would be Roy's age multiplied by Iris's age?

A. 28

B. 48

C. 50

D. 52

Answer: 48

20.  $X$ ,  $Y$ ,  $X$  and  $W$  are integers. The expression  $X - Y - Z$  is even and the expression  $Y - Z - W$

is odd. If  $X$  is even what must be true?

A.  $W$  must be odd

B.  $Y - Z$  must be odd

C.  $W$  must be odd

D.  $Z$  must be odd

Answer: A or C (But go for C)

21. Mr and Mrs Smith have invited 9 of their friends and their spouses for a party at the Waikiki

Beach resort. They stand for a group photograph. If Mr Smith never stands next to Mrs Smith

(as he says they are always together otherwise). How many ways the group can be arranged in a

row for the photograph?

A.  $20!$

B.  $19! + 18!$

C.  $18 \times 19!$

**D.  $2 \times 19!$**

**Answer: C**

**22. In a rectangular coordinate system, what is the area of a triangle whose vertices whose**

**vertices have the coordinates  $(4,0)$ ,  $(6, 3)$  and  $(6, -3)$**

**A. 6**

**B. 7**

**C. 7.5**

**D. 6.5**

**Answer: A**

**23. A drawer holds 4 red hats and 4 blue hats. What is the probability of getting exactly three**

**red hats or exactly three blue hats when taking out 4 hats randomly out of the drawer and**

**immediately returning every hat to the drawer before taking out the next?**

**A.  $1/2$**

**B.  $1/8$**

**C.  $1/4$**

**D.  $3/8$**

**Answer: B**

**24. In how many ways can we distribute 10 identical looking pencils to 4 students so that each**

**student gets at least one pencil?**

**A. 5040**

**B. 210**

**C. 84**

**D. None of these**

**Answer: C**

**25. The prime factorization of integer N is  $A \times A \times B \times C$ , where A, B and C are all distinct prime**

**integers. How many factors does N have?**

**A. 12**

**B. 24**

**C. 4**

**D. 6**

**Answer: A**

**26. Tim and Elan are 90 km from each other. They start to move each other simultaneously. Tim at**

**speed 10 and Elan 5 kmph. If every hour they double their speed what is the distance that Tim**

**will pass until he meets Elan**

**A. 45**

**B. 60**

**C. 20**

**D. 80**

**Answer: B**

**27. A father purchases dress for his three daughters. The dresses are of same color but of different**

**size. The dress is kept in a dark room. What is the probability that all three will not choose their**

**own dress.**

**A.  $\frac{2}{3}$**

**B.  $\frac{1}{3}$**

**C.  $\frac{1}{6}$**

D.  $\frac{1}{9}$

Answer: B

28.  $N$  is an integer and  $N > 2$ , at most how many integers among  $N + 2$ ,  $N + 3$ ,  $N + 4$ ,  $N + 5$ ,  $N +$

6, and  $N + 7$  are prime integers?

A. 1

B. 3

C. 2

D. 4

Answer: C

29. A turtle is crossing a field. What is the total distance (in meters) passed by turtle? Consider

the following two statements

(X) The average speed of the turtle is 2 meters per minute

(Y) Had the turtle walked 1 meter per minute faster than his average speed it would have

finished 40 minutes earlier

A. Statement X alone is enough to get the answer

B. Both statements X and Y are needed to get the answer

C. Statement Y alone is enough to get the answer

D. Data inadequate

Answer: B

30. Given the following information, who is youngest?

C is younger than A; A is taller than B

C is older than B; C is younger than D

B is taller than C; A is older than D

A. D

B. B

C. C

D. A

Answer: B

31. If  $P(x) = ax^4 + bx^3 + cx^2 + dx + e$  has roots at  $x = 1, 2, 3, 4$  and  $P(0) = 48$ , what is  $P(5)$

A. 48

B. 24

C. 0

D. 50

Answer: A