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 x 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 = $\frac{T}{3}$ = 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 $\left[\frac{366}{7}\right]_{Rem}$ = 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 x 3 = 12

Three digit numbers = 3 x 3 x 2 x 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 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 = $\pi(r)^2$

Area of the wall = $\pi(r+4)^2-\pi(r)^2$

Given $\pi(r+4)^2-\pi(r)^2 = \frac{11}{25}(\pi r^2)$

$r^2+8r+16-r^2=\frac{11}{25}r^2$

$11r_2-200r-400=0$

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?

Sol: 50% (n) + 60% (100) = 55% (n + 100)
Solving we get n = 200

6) In the simple subtraction problem below some single digits are replaced by letters .Fined the value of 7A+5D+6CD?
  A5C5
-1B87
  674D

Sol: 15 - 7 = 8 So D = 8

10 + (C -1) - 8 = 4 So C = 3

10 + (5-1) - B = 7 So B = 7

(A-1) - 1 = 6 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 then the conolical tank After 200 lts of fuel is pumped out from each tank the cylindrical tank now contains twice the amount of fuel in the canonical 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 doubt the second.
$x+300x-200=21$
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?

Sol: 16490 $= 2 \times 5 \times 17 \times 97$

Now now chocolate price should be greater than 1 and less than 2. So 2 x 5 x 17 = 170

So Total chocolates sold = 97 and New chocolate price = Rs.1.7

9) Eesha bought two varities 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 micxture?

Sol: Selling price of the mixture = 70 and profit = 20%

Cost price of the mixture = $70 \times \frac{100}{120} = 70 \times \frac{5}{6}$

By applying alligation rule:
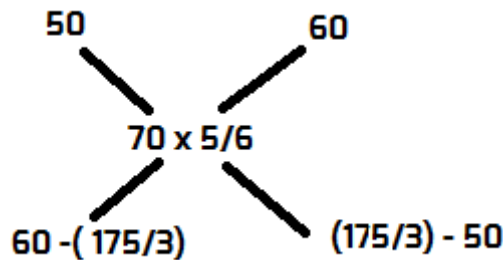
So ratio = $60 - \frac{175}{3} : \frac{175}{3} - 50$ = 1 : 5

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 x 1 x 1 + 4 $\Rightarrow$ f(2) = 19
Let x =2 and y = 2
f(2 + 2) = 19 + 19 + 7 x 2 x 2 + 4 $\Rightarrow$ f(4) = 70

Let x = 1 and y = 4

f(1 + 4) = 4 + 70 + 28 + 4 = 106

f(2) + f(5) = 125

11. If f(f(n))+f(n)=2n+3 and f(0)=1, what is the value of f(2012)?
a) 2011
b) 2012
c) 2013
d) 4095
Ans: Option C
Put n = 0
Then f(f(0))+f(0) = 2(0) + 3 ⇒ f(1) + 1 = 3 ⇒ f(1) = 2
Put n = 1
f(f(1)) + f(1) = 2(1) + 3 ⇒ f(2) + 2 = 5 ⇒f(2) = 3
Put n = 2
f(f(2)) + f(2) = 2(2) + 3 ⇒ f(3) + 3 = 7 ⇒ f(3) = 4
......
f(2012) = 2013

12. 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 | a.c | a.b + a.c - b
⇒ 5+3+2 = 5.3 | 5.2| 5.3 + 5.2 - 3 = 151022
⇒ 9+2+4 = 9.2 | 9.4 | 9.2 + 9.4 - 2 = 183652
7+2+5= 7.2 | 7.5 | 7.2 + 7.5 - 2 = 143547

13. 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
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

14. 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 x 1 = Rs.3000
Income generated through rides = 7200 - 3000 = 4200
Now 800 went for 3 rides so total fee paid by these 800 = 800 x 3 = 2400
(1400 - 800) went for 2 rides so fee paid by these 600 = 600 x 2 = 1200
Assume K went for exactly 1 ride
Then K x 1 + 1200 + 2400 = 4200 ⇒ K = 600
So number of boys who did not go for any ride = 3000 - (600 + 600 + 800) = 1000

15. 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 x 45 = 10 x 55 + K + 11 x 40 $ \Rightarrow $ K = 0

16. What is the largest positive integer n for which 3^n divides 44^44?

Ans: n = 0

The digit sum of 444^{44} is when remainder obtained 444^{44} divided by 9

$444^{44} = (45-1)^{44}$

Each term is a multiple of 9 but the last term which is $(-1)^{44} = 1$

So the digit sum of 444^{44} 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 3^n

17. 1(1!)+2(2!)+3(3!)....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!)+........+2012(2012!)=2013!-1

18. 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,.....,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

19. 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

20. For real number x, int(x) denotes integer part of x.int(x) is the largest integer less than or equal to x.int(1,2)=1,int(-2,4)=-3. Find the value of int(1/2)+int(1/2+ 100)+int(1/2+2/100)+....+int(1/2+99/100)

Sol: int (1/2) = 0

int (1/2 + 100) = 100

into (1/2 + 2/100) = 0

......

int (1/2 + 50/100) = 1

int (1/2 + 51 /100) = 1

....

int (1/2 + 99/100) = 1

So 100 + 1 + 1 + ...50 times = 150

21. 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:
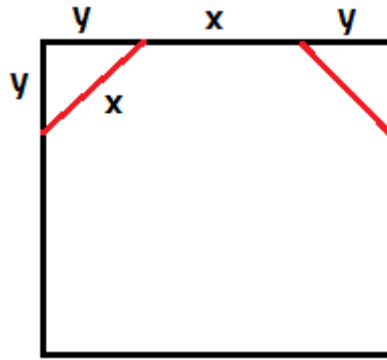
Let x is the side of the octagon and x + 2y is the side of the square.

In the given octagon, $y^2+y^2=x^2 \Rightarrow 2y^2=x^2 \Rightarrow y=\frac{x}{\sqrt{2}}$

But $\frac{x}{\sqrt{2}}+x+\frac{x}{\sqrt{2}}=2$

$\Rightarrow \sqrt{2}x+x=2$

$\Rightarrow x=\frac{2}{\sqrt{2}+1}=\frac{2}{\sqrt{2}+1}\times\frac{\sqrt{2}-1}{\sqrt{2}-1}=2(\sqrt{2}-1)$

22. 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.

$4x + 6y = 200 \Rightarrow 2x+3y=100 \Rightarrow x=\frac{100-3y}{2}=50-\frac{3}{2}y$

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 (32-0)/2 + 1 = 17 (if 0 6's are possible) otherwise 16

23. 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
Invalid Votes = 14 % (5000) = 700
Valid Votes = 5000 - 700 = 4300
Assume the looser got x votes. Then the winner must have got x + 15% (x)
But x + x + 15% (x) = 4300
Solving x = 2000
So Looser got 2000 and winner got 2300

24. There are 100 wine glasses. I offered my servant to 3 paise for every broken glass to be delivered safely and forfeit 9 paisa for every glass broken at the end of day. He recieved 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 loose 3 paisa + 9 paise = 12 paise
Assume K glasses got broken
100 x 3 - 12 x K = 240 $\Rightarrow K=5$

25. 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 = $\frac{60\times220}{120}=110$ days

26. 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

Given $23x = 45y \Rightarrow x = \frac{3}{2} \times \frac{4}{5}y = \frac{6}{5}y$

But x + y = 99

So $\frac{6}{5}y + y = 99$

Solving we get y = 45 years

27. 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! x 3! = 720

28. 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 diagnols of a regular polygon = $\frac{n(n-3)}{2}$
So for a polygon of 32 sides, Number of diagnols = 464. Now the minimum distance between any two points = $\frac{2\pi r}{32} = \frac{1}{156}r$

Now total lengh of all the distances from 32 points = $2\pi r$ + Sum of the lengths of all the 464 diagnols.
Sum of the lengths of x to all the 32 points = 32 radius = 32r
But the 464 diagnols have 16 diameters connecting 2 oposite 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 ponts. Option B is correct
Correct Option 3

29. When asked what the time is,a person answered that the amount of time left is 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

30. 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 x 9 = (x + 10) x 7
x = 35
So distance traveled = 35 x 9 = 315

31. 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.

32. 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
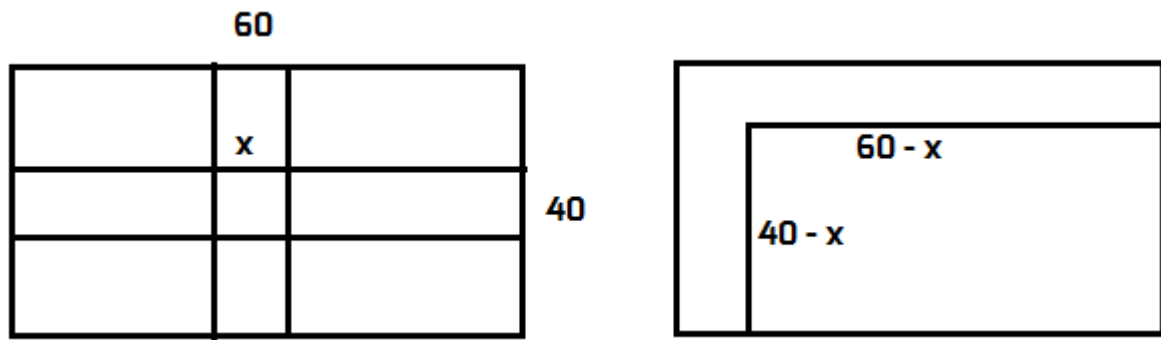
Let us shift the path to the left hand side and top. This does not change the area of the lawn.

Now lawn area = (60 - x) (40 - x)

for x = 3, we get lawn area = 2109.