09.09.2020 FN SESSION CTS

29. Rahul can finish one-fifth of his homework in one hour. Neha can finish three-seventh of her homework in one hour thirty minutes and Riya can finish three fourth of her homework in three hours thirty minutes. If all of them start their homework at 12.00 p.m. and can go to play as soon as they all finish their homework, when can they start to play, if they take a break at 3.30 p.m. for thirty minutes?

Rahul takes 1 hr to complete 1 / 5 of his work.

**Rahul completes his work in 5 hrs will complete at 5 : 30**

Neha takes 3 / 2 hrs to complete 3 / 7 of her work.

Neha takes 1 hr to complete ? (3 / 7 \* 2 / 3) = 2 / 7

**Neha will complete her work in 7 / 2 hrs will complete at 3: 30**

Riya takes 7 / 2 hrs to complete 3 / 4 of her work

Riya 1 hr work is 3 / 4 \* 2 / 7 = 3 / 14

**Riya will complete her work in 14 / 3 hrs,will complete at 5 : 10**

1. Find the person who is taking the most time.

2. There is a break of 30 mins.

All 3 start at 12.00 pm and Rahul will complete on 5 : 30 pm.( 5 hrs + 30 mins of break)

30. What is the largest power of 20 contained in 100!?

100! = 1 \* 2 \* 3 \* 4 \* 5 \* 6 \* 7 \* …………….. \* 98 \* 99 \* 100.

20 = 2 \* 2 \* 5(two 2’s & one 5)

Find the no of 2’s and 5’s in 100!

Method for no of 2’s in 100! And not 100.

No of 2’s will be = 100 / 2 + 100 / 22 + 100 / 23 + 100 / 24 + 100 / 25 + 100 / 26 (Until Denominator<Numerator)

No of 5’s will be = 100 / 5 + 100 / 52

No of 2’s = 50 + 25 + 12 + 6 + 3 + 1 = 97 .

No of 5’s = 20 + 4 = 24.

One 20 = two 2’s & one 5

Twenty four 20s = forty eight 2’s & twenty four 5s

Twenty four 20s with Twenty four 5s

Here the highest power of 20 or no of 20s in 100! Is 24.

31. If 22n-1 = (1 / 8)n-3 then the value of n is:

am \* an = am+n

am / an = am-n

(am)n = amn

a-m = (1 / a)m

22n-1 = (1 / 8)n-3

22n-1 = 83-n

22n-1 = (2)3 \* (3-n)

22n-1 = (2)9-3n

2n – 1 = 9 – 3n

5n = 10

n = 2.

32. In a poultry farm, 50 hens lay 200 eggs in 2 days. In how many days will 20 hens lay 400 eggs?

Workdone = Efficiency \* Time

(M1 D1 H1) / W1 = (M2 D2 H2) / W2

(50 \* 2) / 200 = (20 \* x) / 400

1 / 2 = x / 20

x = 10 days

33. A quiz has one multiple choice question with answer choices A, B and C, and two true/false questions. What is the probability of answering all three questions correctly by guessing?

1) A. B. C. P(1)= 1 / 3

2) True False P(2) = 1 / 2

3) True False P(3) = 1 / 2

To find the probability of answering all the questions correctly

P(1) \* P(2) \* P(3) = 1 / 3 \* 1 / 2 \* 1 / 2 = 1 / 12.

P(1) + P(1)1 = 1

P(2) + P(2)1 = 1

P(3) + P(3)1 = 1

P(1) – Probability of getting 1st question correct

P(1)1 – Probability of getting 1st question wrong

P(2) – Probability of getting 2nd question correct

P(2)1 – Probability of getting 2nd question wrong

P(3) – Probability of getting 3rd question correct

P(3)1 – Probability of getting 3rd question wrong

What is the Probability of answering exactly 1 question correctly

Get exactly 1 correct.

P(1) \* P(2)1 \* P(3)1 + P(1)1 \* P(2) \* P(3)1 + P(1)1 \* P(2)1 \* P(3)

1 / 3 \* (1-1 / 2) \* (1 – 1 / 2) + (1 – 1 / 3) (1 / 2) (1 – 1 / 2) + (1 – 1 / 3)(1 -1 / 2)(1 / 2) = 5 / 12

4 / 3

0< P < 1

What is the probability of getting atleast 1 correct.

34. What is the value of (10101)2 in decimal number system?

128 64 32 16 8 4 2 1

0 0 0 1 0 1 0 1

16 + 4 + 1 = 21.

35. Varun is guessing which of the 2 hands holds a coin. What is the probability that Varun guesses correctly three times in a row?

Probability of varun guessing correctly for the first time is 1 / 2.

Probability of varun guessing correctly for the second time is 1 / 2.

Probability of varun guessing correctly for the third time is 1 / 2.

Probability of varun guessing correctly three times in a row is 1 / 2 \* 1 / 2 \* 1 / 2 = 1 / 8.

AND/\*/n OR/+/U

36. Find the largest two digit number that divides 673 and 865, leaving remainder 1 in each.

11 / 5 🡪 Rem 1

(11-1) / 5

13 / 5 🡪 Rem 3

(13 – 3) / 5

What are the numbers that divide 673 & 865 called ?

Factors of 673 , Factors of 865

Common factors in Factors of 673 , Factors of 865

Largest common factor or Highest Common Factor

Let’s find the largest 2 digit no which doesn’t leave any remainder.

The Dividends for a 0 remainder should be 673 – 1 , 865 – 1🡪 672 & 864

HCF (672 & 864)

The diff is 192.

192 = 2 \* 96

Because 96 can divide 672 & 864 , 96 is the HCF and therefore the answer.

37. One gear of pulley rotates at a speed of 3 revolutions per second: another gear rotates at 5 revolutions per second. If both start together, after how many seconds will they be together again?

38. (a2 – b2 ) / (a-b)2 = 2 and a=4,then what is b ?

(a+b) (a-b) / (a-b)2 = 2

(a+b) / (a-b) = 2

(4 + b) / (4 – b) = 2

4 + b = 8 – 2b

3b = 4

b = 4 / 3.

39. a, b, and c are such that b is the simple interest on a, and c is the simple interest on b for the same period and same rate of interest. The relation between these three is:

a. a2 = bc b. b2 = ac c. c2 = ab d. a = b = c

Interest on principal 🡪 SI

Interest on Amount 🡪 CI

Case 1 : a – Prinicpal , b – SI NR/100

Case 2 : b – Principal , c – SI NR/100

SI = PNR / 100

b = aNR / 100 🡪 (1)

c = bNR / 100 🡪 (2)

b / c = a / b

b2 = ac

40. Every year before the festive season, a shopkeeper increases the price of the products by 35% and then introduces two successive discounts of 10% and 15% respectively. What is his net percentage loss or gain?

35 % inc , 10 % dec , 15 % dec.

+35 -10 -15

100 🡪 (100 + 35)135 🡪 (135-13.5)121.5 🡪 (121.5 – 18.225)103.275

100 🡪 103.275 gained 3.275 %

There is a gain of 3.275%

Successive change formula

A = 35 ; B = - 10

A + B + (AB/100) = 35 – 10 – (350 / 100) = 25 – 3.5 = 21.5 %

A + B + (AB / 100) = 21.5 – 15 – (322.5 / 100) = 6 .5 – 3.225 = 3.275 %

41. Shobhit bought 300 litres of milk at Rs,19 per litre. He added 200 litres of water to it and sold 400 litres of this milk at Rs, 20 per litre. To the rest, he added 10 litres more water and then sold it for Rs. 15 per litre, If he used mineral water that costs Rs.10 per litre, then the total money earned by Shobhit is:

300 l of milk + 200 l of water = 500 l of Mixture milk and Water = 400 l of mixture + (100 l mixture+ 10 l water)

5 700 + 2 000 8 000 + 1 650

7 700 (CP of 500 l mixture) 9 650( SP of 510 l mixture)

7 800 (CP of 510 l mixture) 9 650( SP of 510 l mixture)

CP of 300 litres of milk = 300 \* 19 = 5 700

CP of 200 litres of water = 200 \* 10 = 2 000

CP of 500 litres of Mixture = 7 700

CP of 510 litres of mixture = 7 800.

SP of 400 litres of mixture = 400 \* 20 = 8 000

SP of (100+10 water)110 litres of mixture = 110 \* 15 = 1 650

SP of 510 litres of mixture = 9 650

Profit = SP of 510 litres – CP of 510 litres = 9 650 – 7 800 = 1850.

42. Find the number to be multiplied by (-6)-1, so as to get (-8)-1 as the product?

(X) \*( -(1/ 6)) = -(1 / 8)

X = 3 / 4

43. In how many ways can the team members be arranged for the team picture if all the males are always together and if the team comprises of 7 males and 6 females?

M1, M2, M3, M4, M5, M6, M7 F1, F2, F3, F4, F5, F6 = 7! \* 6!

7 ! \* 7 !

LEWDA

A, E, D, L,W

The letters of the word LEWDA can be arranged in 5 ! Ways = 120 words (with/without meaning)

The letters of the word LEWDA can be arranged in \_48\_\_ Ways so that the vowels always come together

AEDLW = 4! \* 2! = 24 \* 2 = 48

ABC🡪 3!

ABC,ACB,BAC,BCA,CAB,CBA

ABC 🡪 2 ! \* 2 ! = 2 \* 2 = 4

ABC,BAC,CAB,CBA

44. What is the value of (33 \* 812 \* 20) / 95?

am \* an =am+n

am / an =am-n

(am)n = amn

a-m = (1 / a)m

(33 \* (3)4\*2 \* 1) / (3)2\*5

311 / 310 = 311-10 . = 31.

45. What is the value of the expression 423 \* 520 \* 6-2 \* 32 \* 5-5 \* 2-46 \* 5-10 \* 110 \* 5-5?

= 423 \* 520 \* 6-2 \* 32 \* 5-5 \* 2-46 \* 5-10 \* 5-5

=(2)2 \* 23 \* (2 \* 3)-2 \* 32 \* 2-46 \* 520 \* 5-5 \* 5-10 \* 5-5

= 246 \* 2-2 \* 3-2 \* 32 \* 2-46 \* 520-5-10-5

= 246 \* 2-2 \* 3-2 \* 32 \* 2-46 \* 50

=246 \* 2-2 \* 30 \* 2-46 \* 50

= 2-2 \* 20 \* 30 \* 50 = 2-2 \* 1 \* 1 \* 1= 2-2

= 2-2 = (1 / 2)2 = 1 / 4.

46. 28 x 22 = 210 = 1024

47. A number when divided by the sum of 625 and 515 gives a quotient that is 5 times the difference between 625 and 515 and remainder as zero. What is the number?

Divisor = 625 + 515 = 1140

Quotient = 5 (625 – 515) = 5 \* 110 = 550

Remainder = 0

Dividend(Number in question) = ?

8

7 60 7 – Divisor ; 60 – Dividend 8 – Quotient 4 - remainder

56

4

Dividend = (Divisor \* Quotient) + Remainder

= (7 \* 8) + 4 = 56 + 4 = 60

Divisor = 625 + 515 = 1140

Quotient = 5 (625 – 515) = 5(110) = 550.

**Dividend = (Divisor \* Quotient) + Remainder**

Number = 1140 \* 550 = 6 27 000

48. A salesman has a record of selling even rejected pieces to his customers without letting them know that the product is actually faulty. His skills are rated with a probability of 80% efficiency. If he is given 20 faulty items, how many will he be able to sell?

His efficiency to sell faulty items is 80 % 🡪 80 / 100 🡪 80 out of 100 faulty items

Out of 100 faulty items he can sell 80 items

20 faulty items he can sell ? (16 items)

49. A number is multiplied by 11 and 11 is added to the product. If the resulting number is divisible by 13, what is the smallest number?

X \* 11 + 11

0 \* 11 + 11 = 11 = 1 \* 11

1 \* 11 + 11 = 22 = 2 \* 11

2 \* 11 + 11 = 33 = 3 \* 11

3 \* 11 + 11 = 44 = 4 \* 11

4 \* 11 + 11 = 55 = 5 \* 11

.

.

12 \* 11 + 11 = 143 = 13 \* 11 first number div by 13.

.

.

.

25 \* 11 + 11 = 26 \* 11

ANSWEER IS 12.

Why is 30 div by 6.Because 30= 5 \* 2 \* 3 / 2

x \* 11 + 11 🡪 div 13

12 \* 11 + 11

11(12 + 1) 🡪 11 \* 13

25 \* 11 + 11

11 \* (25+1)🡪 11 \* 2 \* 13

50. The velocity of water flowing over a water fall is 12 m/sec. After going over the fall the water slows to 6 m/sec in 3 seconds. What is the acceleration of water?

Speed = Dis / Time = km /hr or m /s

Acceleartion = Speed / Time =( Dis / Time) / Time = Dis / Time2 = km / hr2 or m / s2

Acceleration= Change in speed / Time

Acceleration = (12 m/s – 6 m/s) / 3 secs = (6 m / 1 sec) / 3 sec = 6 / 3 m/s2 = 2 m/s2 .

51. A three digit number 7a2 is added to another 3 digit number 685 which results in a 4 digit number 13b7. This 4 digit number is divisible by 11. What is the value of a + b?

a is a digit (0-9)

b is a digit (0-9)

7a2 +

685

13b7 🡪 DIV by 11

Values a, b can take is 0-9.

Sum of even digits – Sum of odd digits = mul of 11 or 0

( 3 + 7 ) - (1 + b ) = 0

b = 9 ; a = 1

a + b = 9 +1 = 10.

52. As noted through past experiences, the rate of increase in price of sugar is 1000% compounded annually. What will be the cost per kg of sugar as sold by Surya Sugars in 2012 if it sells at Rs. 5 in 2010?

SI – Rate of Interest will be applied to principal each time

CI – Rate of Interest will be applied to the amount each time.

SP of sugar in 2012.

Amount= P + SI(0)

Amount = P

In 2010 it was Rs 5. 1000%

50 (Percentage Increase) for 1 st year

In 2011 it was Rs.55 1000%

550 (Percentage Increase) for 2 nd year

In 2012 it will be Rs 605.

53. Sudha purchased 3 kg potato from market. She used 1/3 of it in cooking baked potatoes and 1/2 of remaining in mixed vegetables. What quantity of potatoes is she left with?

1 / 3 of 3kg = 1 kg used in cooking baked potatoes.

Remaining 2 kgs

1 / 2 of 2kg = 1 kg used in mixed vegetables

She is left with 1 kg.

54. Recycling 900 kg of paper saves 17 trees. How many trees are saved when 1200 kg of paper are recycled?

Recycled Quantity No of trees saved

900 kg 17

1200 kg ?

? = 22.65255

No of trees saved 22 trees