TCS Set 2

1. **Eesha bought 18 sharpeners for Rs.100. She paid 1 rupee more for each white sharpener than for each brown sharpener. What is the price of a white sharpener and how many white sharpeners did she buy?**

   a. Rs. 5, 10
   b. Rs. 6, 8
   c. Rs. 6, 10
   d. Rs. 5, 8

   Ans: c
   Explanation:
   Let's solve from the options, if she bought 10 white sharpeners at Rs.6 per piece, She has spent Rs.60 already. And with the remaining Rs.40, she bought 8 brown sharpeners at 40/8 = Rs.5 which is Rs.1 less than the White sharpener. Hence Rs. 6 and 10 white sharpeners.

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2. **The sum of the digits of a three digit number is 17, and the sum of the squares of its digits is 109. If we subtract 495 from the number, we shall get a number consisting of the same digits written in the reverse order. Find the number.**

   a. 683
   b. 863
   c. 944
   d. 773

   Ans: b
   Explanation:
   Let's solve from the options, Sum of the squares should be equal to 109. Only Options a and b satisfying. When we subtract 495, only 863 becomes 368.

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3. **Raj goes to the market to buy oranges. If he can bargain and reduce the price per orange by Rs.2, he can buy 30 oranges instead of 20 oranges with the money he has. How much money does he have?**

a. Rs. 50
b. Rs. 150
c. Rs. 120
d. Rs. 100

Ans: d
Explanation:
Let the money with Raj is M. So (M/20) – (M/30) = 2. Check options. Option c satisfies.

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4. **A city in the US has a basketball league with three basketball teams, the Aziecs, the Braves and the Celtics. A sportswriter notices that the tallest player of the Aziecs is shorter than the shortest player of the Braves. The shortest of the Celtics is shorter than the shortest of the Aziecs, while the tallest of the Braves is shorter than the tallest of the Celtics. The tallest of the Braves is taller than the tallest of the Aziecs. Which of the following can be judged with certainty?**

X) Paul, a Brave is taller than David, an Aziec
Y) David, a Celtic, is shorter than Edward, an Aziec

a. Both X and Y
b. X only
c. Y only
d. Neither X nor Y

Ans: B
Explanation:
By assuming the values, let's solve it. Be the shortest of Braves is 4 feet, then tallest of Aziecs is less than 4. So let it be 3 feet. A -> 2 – 3, B -> 4 – 6, C -> 1 – 7. From the above, we can safely conclude X is correct. but Y cannot be determined.

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5. **A BB CCC DDDD EEEEE….. What is the 120th letter?**

a. L
b. O
c. K
d. N

Ans: b
Explanation:

Number of letters in each term are in AP. 1, 2, 3, … So, n(n+1)/2 <= 120. For n = 15, we get LHS = 120. So 15th letter in the alphabet is O. So 15th term contains 15 Os.

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6. **There are 120 male and 100 female in society. Out of 25% male and 20% female are rural. 20% of male and 25% of female rural people passed in the exam. What % of rural students have passed the exam?**

a. 20%
b. 18%
c. 22%
d. 15%

Ans: c
Explanation:
From the given information, Rural male = 25%(120) = 30, Rural female = 20%(100) = 20. Passed students from rural: male = 20%(30) = 6, female = 25%(20) = 5. Required percentage = 11/50 * 100 = 22%.

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7. **On the fabled Island of Knights and Knaves, we meet three people, A, B, and C, one of whom is a knight, one a knave, and one a spy. The knight always tells the truth, the knave always lies, and the spy can either lie or tell the truth. A says: "C is a knave."B says: "A is a knight."C says: "I am the spy."Who is the knight, who the knave, and who the spy?**

a. A – Knight, B – Knave, C – Spy
b. A – Spy, B – Knight, C – Knave
c. A – Knave, B – Spy, C – Knight
d. A – Knight, B – Spy, C – Knave

Ans: d
Explanation:
Let us say A is Knight and speaks the truth. So C is Knave and B is a spy. So Cs statement is false and Bs statement is true. This case is possible. If B is Knight, this is not possible as A also becomes Knight as B speaks the truth.
Suppose C is Knight, this is clearly contradicted by C's statement itself.

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8. **The average temperature of Tuesday, Wednesday and Thursday is 37 C. The average temperature of Wednesday, Thursday and Friday is 38 C. If the temperature on Friday is 39 C. Find the temperature on Tuesday.**

a. 37.33
b. 38.33
c. 36
d. None of the above

Ans: c
Explanation:
The average temperature of Tuesday, Wednesday and Thursday is (Tue + Wed + Thu) / 3 = 37
Tue + Wed + Thu = 111 —— (A)
The average temperature of Wednesday, Thursday and Friday is (Wed + Thu + Fri) / 3 = 38
Wed + Thu + Fri = 114 ——- (B)
Given Friday's temperature as 39, then (B) – (A) –> Fri – Tue = 3. So 39 – Tue = 3 –> Tue = 36.
Hence, the temperature on Tuesday is 36

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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?

a. 20
b. 23
c. 50
d. 53

Ans: d
Explanation:
Let the people in the city be 100, Congress supporters = 60% of 100 = 60 and 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
In total = 45 + 8 = 53, Hence the total percentage of registered candidates – 53%

10. How many pairs (m,n) of integers satisfy the equation 4^m = n^2 + 15? Please do not add white space around the answer _____

Answer: 4

11. Of all the nonempty subsets S of { 1, 2, 3, 4, 5, 6, 7}, how many do not contain the number |S|, where |S| denotes the number of elements in S? For example, {3, 4} is one such subset, since it does not contain the number 2. Please do not add white space around the answer

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Answer: 63

12. A chord of a circle has length 3n, where n is a positive integer. The segment cut off by the chord has height n, as shown. What is the smallest value of n for which the radius of the circle ia also a positive integer? Please do not add white space around the answer _____

Answer: 8

13. In how many ways can we give change for Rs.100 using 1 rupee and 2 rupee coins? For example, for 5 rs we can give three ways.

Answer: 51
Explanation: The straightforward method to solve this question is to create 3 scenarios for Rs 100.
1) Only 1 rupee coins – There's 1 way in which we can do this.
2) Only 2 rupee coins – There's 1 way in which we can do this.
3) Combination of 1 and 2 rupee coins – In a combination, we can have from one 2 rupee coin (and 98 one rupee coins) to 49 two rupee coins (and 2 1 rupee coins). This gives us 49 ways.
Total number of ways = 51.

14. Find the number of positive integers N<2000 which can be expressed as N=2^m+2^n where m and n are integers (for example, 33=2^0+2^5).

a) 25
b) 65
c) 100
d) 150

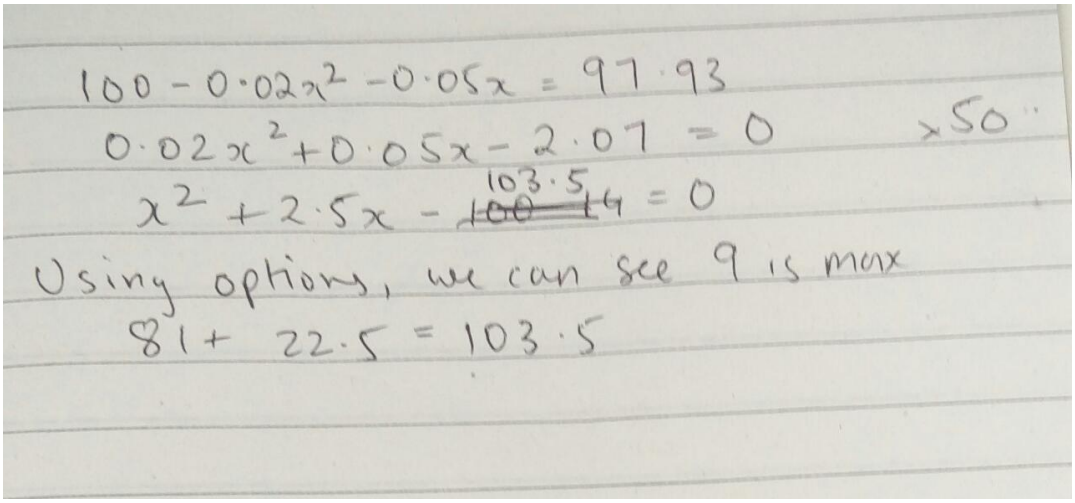
Answer: b
Explanation: We know that 2^10 = 1024 < 2000 < 2048 = 2^11
Since 2^10+2^9 = 1536 < 2000, any combination of 2^m + 2^n < 2000 (as long as both m or n are not 10)
So, we would have the following possibilities;
2^10 + 2^n, (n = 1,2….9)
2^9 + 2^n, (n = 1,2….8)
And so on;
Therefore, the answer is (10*11)/2 = 65.

15. Fishing is a serious environmental issue. It has been determined by the scientists that if the net of a trawler has mesh size x cm by x (square mesh) then the percentage of fish entering the net that is caught in the net is 100-0.02x^2-0.05x. For example, if the mesh size is zero, 100% of the fish that enter the net will be caught. The trawler with a square mesh that was

suspected of using an illegal size net, dropped its net to the ocean floor near the damans and coast guard officials arrested the crew. The scientists later looked at the size of the fish caught and estimated that the net used by the trawler at least caught 97.93% of the fish entering the net. What is the maximum value of x for the net by the trawler?

a) 8.5
b) 9
c) 11
d) 12

Answer: b



16. 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:

1,1	==>	==>	==>	==>	==>	==>	==>
==>	==>	==>	==>	==>	==>	==>	||
||	3,2	<==	<==	<==	<==	<==	||
<==	<==	<==	<==	<==	<==	<==	<==

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: Column =2*Row
Endpoint (R, C) = {((Row/2) +1), Column/4}
Answer is (51, 50)

17. Two women Renu and Usha are working on an embroidery design. If Usha worked alone, she would need eight hours more to complete the design than if they both worked together. Now if Renu worked alone, it would need 4.5 hours more to complete the design than they both working together. What time would it take Renu alone to complete the design?

A. 10.5 hrs
B. 14.5hrs
C. 12.5hrs
D. 18.5 hrs

if Renu + Usha = x
their combine efficiency = 1/x
usha"s work = x + 8
and her efficiency = 1/x + 8
like this way renu's work = x + 4.5
and her efficiency = 1/x + 4.5
now (1/x = 8)+(1/x + 4.5)= 1/x
∴ x = 6
6 + 4.5
=10.5

18. A certain sum of money is sufficient to pay either George's wages for 15 days or Mark's wages for 10 days. For how long will it suffice if both George and Mark work together?

A. 5 days
B. 6 days
C. 8 days

D. 9 days

Let the money to be paid = 30 rupees.
So, George daily wage = 30/15 = 2
and Mark daily wage = 30/10 = 3.
If both are working,
then 5 rupees to be paid.
So given sum is sufficient for 30 / 5 = 6 days.

19. 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 is rs.5000. how much should be babla be paid if they work together for an entire duration of work?

A. 2000
B. 4000
C. 5000
D. 3000

Bablu work = 1/10

Ashu work = 1/15

Total work = 1/10+1/15 = 3+2/30 = 5/30

Total work = 6 days

Bablu paid = 6/10*5000 = 3000

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OR
_____

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

20. 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 result is the same as the number formed by reversing the digits. Find the number.

A. 35
B. 42
C. 49
D. 57

Let the number be xy = 10x + y
10x + y = 4(x+y) + 3 ⇒⇒ 2x - y -1 -------(1)
Also 10x + y +18 = 10y +x , 9(y-x) = 18, y-x = 2 -------(2)
Solving we get x = 3, y = 5

The number is 35

21. A person walks at 4 kms/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. 4 hours
B. 10 hours
C. 7 hours
D. 6 hours

Case 1 :

d_1 = distance traveled at 4 km/hr in time t_1

distance traveled at 4 km/hr is given as

$d_1 = 4\ t_1$

d_2 = distance traveled at 3 km/hr in time t_2

distance traveled at 3 km/hr is given as

$d_2 = 3\ t_2$

total distance is given as

$d_1 + d_2 = 36$

$4\ t_1 + 3\ t_2 = 36$

$t_1 = (36 - 3\ t_2)/4$ eq-1

Case 2 :

d_1 = distance traveled at 3 km/hr in time t_1

distance traveled at 3 km/hr is given as

$d_1 = 3\ t_1$

d_2 = distance traveled at 4 km/hr in time t_2

distance traveled at 4 km/hr is given as

$d_2 = 4\ t_2$

total distance is given as

$d_1 + d_2 = 36$

$3\ t_1 + 4\ t_2 = 34$

using eq-1

$3((36 - 3\ t_2)/4) + 4\ t_2 = 34$

$t_2 = 4$ hr

using eq-1

$t_1 = (36 - 3\ (4))/4$

$t_1 = 6$ hr

time taken to cover one leg is

$t = t_1 + t_2 = 6 + 4 = 10$ hr

22. After 6 years Raju's father's age will be twice that of the his age and 2 years ago, his mother's age was twice that of Raju's age. What is the sum of Raju's parents' age?

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

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

23. 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%

If original length, breadth & height are 3x, 2x and x respectively, then
volume=3x*2x*x=6x^3
With length doubled, breadth & height halved, new dimensions are 6x, x and x/2 respectively

and volume=6x*x*x/2=3x^3
So % decrease in volume=100*(6x^3-3x^3)/6x^3=50

24. 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 a man is 15 units per day. What is the average productivity of a woman per day?
A. 6
B. 9
C. 7
D. 8

Let the men's be represented by M and Women's be represented by W.

Now,

Given that there are 250 Mens and 150 womens.

= > 250M + 150W.

= > 400,

Given that the average productivity of all works is 12 units per day.

= > 400 * 12

= > 4800.

Given that the average productivity of men is 15 units per day.

= > M/250 = 15

= > M = 250 * 15

= > 3750.

Then,

Productivity of Women = 4800 - 3750

= > 1050.

Therefore, Average productivity of women = (1050)/150 = 7.

25. If a lemon and an apple together costs 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 the price of a lemon?

A. Rs. 2

B. Rs. 4
C. Rs. 3
D. Re. 1

L + A = 12 ...(1)
T + L = 4 .....(2)
L + 8 = A
Taking 1 and 3, we get A = 10 and L = 2

26. Truck A and truck B move grain into a box at the rate of 20 kilos/ min and 13 1/3 kilos a minute 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 ½ hrs
b. 3/5 hrs
c. 1 5/7 hrs
d. 2 1/8 hrs.

Correct Answer: 1 5/7

27. Two full tanks, one shaped like a cylinder and the other like a cone, contain liquid fuel. The cylinder tank held 500 litres more than the conical tank. After 200 litres of fuel is pumped out from each tank the cylindrical tank now contains twice the amount of fuel in the conical tank. How many litres of fuel did the cylindrical tank have when it was full?

a. 1200
b. 1000
c. 700
d. 1100

Answer - 1200

Let the capacity of conical tank *be x litres*
⇒ *Capacity of cylindrical* tank *is* $(500 + x)$ *litres*
After 200 *litre of fuel has been pumped out from each* tank,
the capacity of the cylindrical tank *will be* $(300 + x)$ *litres and that of conical* tank *will be* $x - 200$ *litres*
According to the question,
$300 + x = 2(x - 200)$
$\Rightarrow 300 + x = 2x - 400$
$\Rightarrow x = 700$
Thus, *the capacity of conical* tank *is* 700 *litres*.
Hence, *the cylindrical* tank *contained* 1200 *litres of fuel when it was full*.

28. 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)1680
b) 1142
c) 640

d) 1640

"The general formulae for instalments in case of compound interest is P =x/(1+r/100) + x/(1+r/100)^2 ....x/(1+000)

And here we have to find P

Given x = 882 r = 5 and n=2

On substituting the values

We get P =882/ (1+5/100) + 882/ (1+5/100) ^2 p = 882*20/21 + 882*400/441

P= 840 + 800 = 1640

29. A person starts writing all the 4 digit numbers, how many times he has written the digit 2?

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

answer is 3700

Step-by-step explanation:

4 digit number = _ _ _ _

STEP 1: if first digit is 2 then other 3 digits have 0-9 i.e 10 ways therefore total no. of ways for first digit =2 are 10*10*10=1000;

STEP 2 : now if 2nd digit is 2 ; then we have 1-9 options for first digit (as if we put 0 at first digit it become 3 digit number) and 3rd and 4th digit have 0-9 i.e 10 ways

therefore if 2nd digit is 2 we have ways= 9*10*10=900

STEP 3 : SIMILARLY as in STEP 2 : if 3rd digit is 2 ; then we have 1-9 options for first digit (as if we put 0 at first digit it become 3 digit number) and 2nd and 4th digit have 0-9 i.e 10 ways

therefore no. of ways for 3rd digit as 2 = 9*10*10=900;

STEP 4 : same as step 3:

now total number of ways = 1000+900+900+900=3700

When a = 2, b / c / d can be filled in 10 ways each.

So, 2 will appear in place of 'a' 10*10*10 = 1000 times

When b = 2, a can be filled in 9 ways whereas c / d can be filled in 10 ways each.

So, 2 will appear in place of 'b' 9*10*10 = 900 times

Similarly, 2 will appear in place of 'c' 900 times and in place of 'd' 900 times.

Total number of times digit '2' will appear = 1000 + 900 + 900 + 900 = 3700 times

30. 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

Let distance = x

speed of young man = $\frac{x}{20}$

Speed of old man = $\frac{x}{30}$

relative speed $\frac{x}{20} - \frac{x}{30} = \frac{x}{60}$

Distance traveled by old man in 5 min = $\frac{x}{30} \times 5 = \frac{x}{6}$

Time taken by the young man to catch up the old man $= \frac{\frac{x}{6}}{\frac{x}{60}}$ =10 min

So,young man will catch up man the old man at 10:15 am.