Elementary Statistics Questions for RRB Group-D PDF

Instructions

For the following questions answer them individually

Question 1

Four integers w,x,y,z are selected at random from 0 to 1000 numbers both inclusive. The probability that wz-xy is even is

A $\frac{1}{16}$

B $\frac{5}{8}$

C $\frac{9}{16}$

D $\frac{5}{16}$

Answer: B

Explanation:

wz-xy will be even only when both wz and xy are even or odd

The probability of wz being odd is $\frac{1}{2} * \frac{1}{2}$

Probability for wz -xy being odd is $(\frac{1}{4})2$

Similarly, the probability of wz to be even is 1-probability of being odd= $\frac{3}{4}$

Probability for wz -xy being even is $(\frac{3}{4})2$

Total probability= $\frac{1}{16} + \frac{9}{16}$

$= \frac{5}{8}$

B is the correct answer.

Question 2

x and y are integers such that $x + y = 12$. What is the sum of all such integral values of y?

Answer:1152

Explanation:

$x + y = 12$

$\Rightarrow xy = 2x + 3y$

$\Rightarrow 24x + 36y = xy$

$\Rightarrow 24x - xy + 36y = 0$

This can be expressed as

$\Rightarrow 24x - xy + 36y + (36 \times 24) - (36 \times 24) = 0$

$\Rightarrow x(24 - y) - 36(24 - y) + (36 \times 24) = 0$

$\Rightarrow (x - 36)(24 - y) = -864$

For the integral values of y, $(24 - y)$ must be an integer as well.

This means that $24 - y$ will be one of the factors of 864.

Now, let us consider a case.

2 is a factor of 864. For 24-y to be equal to 2, y = 22

-2 is also a factor of 864. For 24-y to be equal to -2, y = 26

We know that $864 = 2^5 \times 3^3$

Number of factors of 864 = 6 x 4 = 24

We need to consider that 864 has 24 positive and 24 negative factors.

Thus, the sum of negative and non-negative factors of 864 = 0

Number of negative and non-negative factors = 24+24 = 48

Thus, the sum of values of y = $24 \times 48 = 1152$

Question 3

If $f(x+2) = f(x) + f(x+1)$ for all positive integers x, and $f(11) = 91, f(15) = 617$, then $f(10)$ equals

Answer:54

Explanation:
$f(x+2) = f(x) + f(x+1)$
As we can see, the value of a term is the sum of the 2 terms preceding it.

It has been given that $f(11) = 91$ and $f(15) = 617$.
We have to find the value of $f(10)$.

Let $f(10)$ = b
$f(12)$ = b + 91
$f(13)$ = 91 + b + 91 = 182 + b
$f(14)$ = 182+b+91+b = 273+2b
$f(15)$ = 273+2b+182+b = 455+3b
It has been given that 455+3b = 617
3b = 162
=> b = 54

Therefore, 54 is the correct answer.

Question 4

$|7x-5| < 16$ and $|16y+11| < 37$. If x and y are integers then find the maximum value of $|x+7| * |y-5|$

A 63

B 42

C 81

D None of These

Answer: A

Explanation:
$|7x-5| < 16$
Therefore, $-16 < 7x - 5 < 16$
=> $-11 < 7x < 21$
=> $\frac{-11}{7} < x < 3$
Thus, the maximum value of $|x+7|$ is when $x = 2$.
Thus, the maximum value of $|x+7|$ is 9
$|16y+11| < 37$
Hence, $-37 < 16y + 11 < 37$
=> $-48 < 16y < 37$
=> $-3 < y < \frac{37}{16}$

Hence, the maximum value of $|y-5|$ will be when $y=-2$
Thus, the maximum value of $|y-5|$ is 7
Therefore, the maximum value of $|x+7|*|y-5|$ is $9*7=63$
Hence, option A is the correct answer.

Question 5

The arithmetic mean of 9 distinct integers is 87. If none of the numbers is more than 100 and the average of the smallest five numbers is 78, find the minimum value of the sixth number.

Answer:96

Explanation:
If the average of 9 numbers is 87, then the sum of these 9 distinct numbers will be 9 X 87 = 783
Let the numbers be a1, a2, a3, ...a9 where a9> a8> ...a1.
So, a1+a2+a3+a4+a5 = 78 X 5 = 390
Smallest value of a5 can be 80 when a1, a2, a3, a4, and a5 are 76, 77, 78, 79, 80.
This means that a6 > 80.
Now, the sum of the rest of the four numbers is 738-390 = 393
For a6 to be min, a7, a8, a9 must be max.
=> a6 + 98 + 99 + 100 = 393 or a6 = 96.
Thus, 96 is the correct answer.

Question 6

If f, g, h are all positive integers and $f+g+h=24$, then what is the maximum value of $(f-4)(g-2)(h-6)$ provided (f-4), (g-2), and (h-6) are positive integers?

Answer:64

Explanation:
If $f+g+h=24$
Then $(f-4)+(g-2)+(h-6)=12$
Maximum value of $(f-4)(g-2)(h-6)$ is obtained when each of the three terms are equal
$f-4=g-2=h-6=4$
Therefore, the required maximum value is $4*4*4=64$.

Question 7

The sum of five integers is 5. What is the minimum value of the sum of reciprocal of the five numbers?

A - 45/7

B -35/9

C 5

D -2

E none of these

Answer: B

Explanation:
Let the five integers be a, b, c, d and e. Given, a + b + c + d + e = 5
We have to find the minimum value of $\frac{1}{a}+\frac{1}{b}+\frac{1}{c}+\frac{1}{d}+\frac{1}{e}$
The above equation would be minimum if its value is negative and magnitude is maximum.
This occurs when a = b = c = d = -1 and e = 9
Thus, the minimum value is -1 + -1 + -1 + -1 + 1/9 = -35/9

Question 8

For two positive integers a and b define the function h(a,b):as the greatest common factor (G.C.F) of a, b. Let A be a set of n positive integers. G(A), the GCF of the elements of set A is computed by repeatedly using the function h.
The minimum number of times h is required to be used to compute G is:

A 1/2 n

B (n - 1)

C n

D None of these

Answer: B

Explanation:
Let p and q be any two elements of the set A.
For the computation of the GCF of elements of the set A, we can replace both p and q by just the GCF(p,q) and the result is unchanged.

So, for every application of the function h, we are reducing the number of elements of the set A by 1. (In this case two numbers p and q are replaced by one number GCF(p,q)).
Expanding this concept further, the minimum number of times the function h should be called is n-1

Question 9

Find b-a if the arithmetic mean of ordered set of integers S={5, a, 13, 16, b, 24} is 14?

A 8

B 10

C 12

D Cannot be determined

Answer: D

Explanation:
The arithmetic mean of the numbers is the average of the numbers.
Hence, from the given information, we know that the sum of all the numbers is 14*6 = 84.
So, a+b=14*6-58=26.
From the set ordering, 'b' can be from 17-21 with 'a' correspondingly being 9-5. Hence, answer cannot be determined.

Question 10

Find b-a if the arithmetic mean of ordered set of non-repeating integers S={8, a, 11, 14, 17, 21, b, 24} is 16?

A 13

B 14

C 16

D Can't be determined

Answer: A

Explanation:

As the mean of S is 16, (8 + a + 11 + 14 + 17 + 21 + b + 24)/8 = 16

=> (a + b + 95)/8 = 16

Thus, a+b=16*8-95=33. From the set ordering, b can be 22 or 23 and a can be 9 or 10. As only one pair 23+10 exists which equals to 33, b-a=23-10=13