

Q. 1. How many numbers are between 99 and 1000 such that digit 3 occurs in it at least once? (6 marks)

Solution with explanation :-

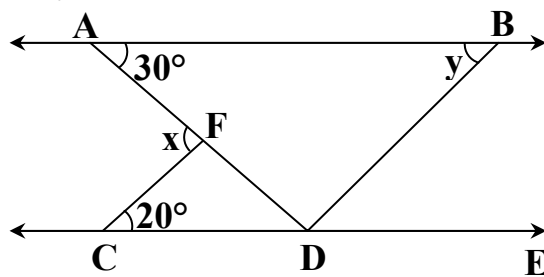
Ans.

(For Rough work)

Q. 2. In the figure given below, line $AB \parallel$ line CE and seg $CF \parallel$ seg BD .

Find $x + y$ and $x - y$.

(6 marks)



Solution with explanation :-

Ans.

$x + y =$

$x - y =$

Q. 3. If $(x)_{10} = (5227)_8$, then find x .

(6 marks)

Also $(x)_{10} = (y)_5$ and $(x)_{10} = (z)_{11}$. Find y and z .

Solution with explanation :-

Ans.

$x =$

$y =$

$z =$

(For Rough work)

Q. 4. Simplify and get the value of $\frac{13}{4} \left[\frac{1}{1560} + \frac{1}{1640} + \frac{1}{1722} + \frac{1}{1806} \right]$ (6 marks)

Solution with explanation :-

Ans.

(For Rough work)

Q. 5. If sequence is defined as $t_n = 2t_{n-1} - t_{n-2}$ and $t_1 = 4, t_2 = 9$, then generate first 10 terms of the sequence. Divide each term of the sequence by 4 and get another sequence of remainders. Find the sum of first 200 terms of new sequence.

(6 marks)

Solution with explanation :-

Ans.

(For Rough work)

Q. 7. If $50! \left[\frac{1}{49!} - \frac{1}{50!} \right] \times 51! \left[\frac{1}{50!} - \frac{1}{51!} \right] = x$, then find x . Also find highest power of 35 dividing x . (8 marks)

Solution with explanation :-

Ans.

$x =$

Highest power of 35 dividing x is

(For Rough work)

- Q. 8. 12 divides $(a \times b)$, where $a, b \in \mathbf{N}$ but 12 does not divide a or b . (8 marks)**
(i) If $1 < a < b$, find at least 10 pairs of (a, b) where a and b are two digit integers.
(ii) Is it necessary for a and b to be relatively prime? (Write Yes or No)

Solution with explanation :-

Ans. (i)

(ii)

Q. 9. In the adjacent figure, $\square ABCD$ is a square with $AD = 12$ cm. (8 marks)

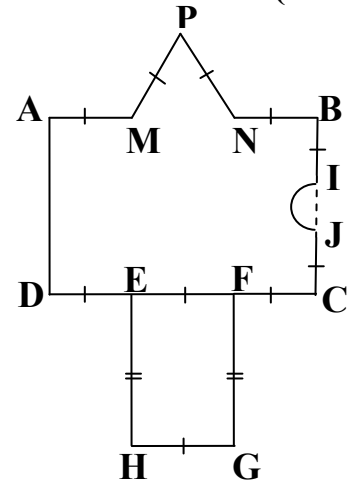
Also, $EH = \frac{3}{2} EF$.

On side BC , there is semi circle with IJ as diameter.

Then find area of whole figure ($\sqrt{3} = 1.73, \pi = 3.14$).

Also find perimeter of whole figure.

Note : Identical marks show equal sides.



Solution with explanation :-

Ans.

Area =

Perimeter =

Q.10. In the given magic square, the smallest number is $\frac{1}{15}$. **(8 marks)**

The largest number is $\frac{3}{5}$.

The middle number is $\frac{1}{3}$.

(i) Find magic constant.

(ii) Complete the magic square.

	$\frac{1}{15}$	
	$\frac{1}{3}$	
	$\frac{3}{5}$	

Solution with explanation :-

Ans. (i)

(ii)

	$\frac{1}{15}$	
	$\frac{1}{3}$	
	$\frac{3}{5}$	

- Q. 11.** A number of 4 different digits is to be formed from digits 1, 2, 3, 4, 5, 6 and 7. **(10 marks)**
- (i)** How many such numbers can be formed?
 - (ii)** How many of them are greater than 3400?
 - (iii)** How many are divisible by 4?

Solution with explanation :-

Ans. (i)

(ii)

(iii)

Q. 12. (A) Identify the base (6 marks) and complete the sum if all the boxes have same digit. Also write the answer in decimal system.

$$\begin{array}{r}
 2\ 5\ \square\ 6 \\
 +\ 1\ 3\ 4\ 2 \\
 +\ \square\ 6\ 6\ 2 \\
 +\ 3\ 2\ 2\ 4 \\
 \hline
 1\ 5\ \square\ \square\ 0
 \end{array}$$

Solution with explanation :-

Ans.

Base is

Digit in the box is

Answer in decimal system is

Q. 12. (B) Subtract (4 marks) (Write the answer in base 9)

$$\begin{array}{r}
 3\ t\ e\ 5_{12} \\
 -\ 2\ 1\ t\ 3_{12} \\
 \hline
 (\ \ \ \)_9
 \end{array}$$

Ans.

Q. 13. Given sequence is : 2, 46, 81012, 14161820, (10 marks)

T_n has n even natural numbers with $n(n + 1)$ as its last block of digits.

Find (i) 10th term (T_{10}) (ii) Number of digits in 50th term (T_{50})

(iii) In which term does number 2020 appear?

Solution with explanation :-

Ans. (i)

(ii)

(iii)

(For Rough work)

(For Rough work)

(For Rough work)