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1. Divisibility Rules:-

11	If you sum every second digit and then subtract all other digits and the answer is: • **0**, or • **divisible by 11**	1364 ((3+4) - (1+6) = **0**) **Yes** 3729 ((7+9) - (3+2) = **11**) **Yes** 25176 ((5+7) - (2+1+6) = **3**) **No**
12	The number is divisible by both 3 *and* 4	648 (*By 3?* 6+4+8=18 and 18÷3=6 Yes. By 4? 48÷4=12 Yes) **Yes** 524 (*By 3?* 5+2+4=11, 11÷3= 3 $\frac{2}{3}$ No. Don't need to check by 4.) **No**

Q1. If the number 517*324 is completely divisible by 3,then the smallest whole number in the place of * will be: (TCS)

(1). 2
(2). 3
(3). 1
(4). 4

Q2. If 764xy is divisible by 90, then what will be the value of x+y?   (Accenture)

(1).1
(2).2
(3).3
(4).4

Q3. If3664XX is divisible by 36. find the value of X^2.
                                                                 (Amcat)

(1).0

(2).4
(3).9
(4).16

Q4. 4a56 is a four digit number divisible by 33.what is the value of a? (Amcat)
(1).1
(2).2
(3).3
(4).4

Q5. 12 divides , ab313ab (in decimal notation , where a,b are digits>0,the Smallest value of a+b is? (Wipro)
(1).7
(2).6
(3).2
(4).4

Q6. The product of 4 consecutive even numbers is always divisible by:
A)600
B)768
C)864
D)384

← Divisibility Rules :→

Q①

Sum of all digits divisible by 3

$(5+1+7+x+3+2+4) \% 3 == 0$

$(22+x) \% 3 == 0$

$\boxed{x=2}$

Q②

$(764xy) \% 90 == 0$

$$90$$
$$\overset{\displaystyle 10 \qquad 9}{\diagdown}$$

last digit zero   sum of all digits
                    divisible by 9
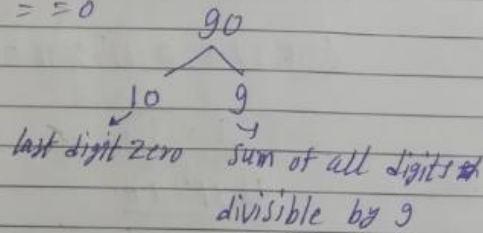
$y = $ last digit $= 0$

$(7+6+4+x+0) \% 9 == 0$

$(x+17) \% 9 == 0$

$\boxed{x=1}$

Q③

$(3664xx) \% 36 == 0$

$$36$$
$$\overset{\displaystyle 9 \qquad 4}{\diagdown}$$

← 9   4 → last two digit divisible
Sum of all digit divisible by 9   by 4

$$\begin{array}{l} 00 \\ 44 \\ 88 \\ \vdots \end{array}$$
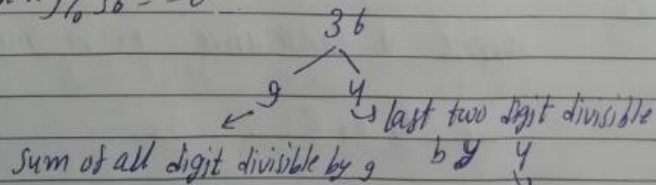
$(3+6+6+4+2x) \% 9 == 0$

$(19+2x) \% 9 == 0 \quad \Rightarrow x = 4$

$27 \% 9 == 0$

$\boxed{x^2 = 16}$

④ $(4a56) \% 33 == 0$ 33

$$\overset{\wedge}{\underset{11 \quad 3}{}}$$

        $\downarrow$ sum of all digit divisible

difference of Sum of odd places digit   by 3

                and

even places digit should be divisible by 11

$$(4 + a + 5 + 6) \% 3 == 0 \quad \cdots (i)$$

$$\{(4+5) - (a+6)\} \% 11 == 0 \quad -(ii)$$

$$\boxed{a = 3}$$

⑤ $\underline{ab313ab}$ $\overset{12}{\underset{4 \quad 3}{\diagup \diagdown}}$

$(ab) \% 4 == 0$ $a, b > 0$

$\quad (7 + 2a + 2b) \% 3 == 0$ 12

                               16

$\quad a = 1 \quad b = 6$ 24

$\quad\quad a + b = 7$ $\vdots$

⑥

Suppose 4 Consecutive even numbers are:-

   2, 4, 6, 8

Product $= 2 \times 4 \times 6 \times 8 = 384$

2 . Unit Digit:-

(I).Unit Digit of a number is the last digit of a number.

(2). The consept in unit digit is cyclicity.

Base	Power			
	1	2	3	4
2	2	4	8	6
3	3	9	7	1
7	7	9	3	1
8	8	4	2	6
4	4	6		
9	9	1		

Number	Cyclicity
1	1
2	4
3	4
4	2
5	1
6	1
7	4
8	4
9	2
10	1

Q 1:The unit digit in the sum of $(124)^{372} + (124)^{373}$ is

a) 5

b) 4

c) 20

d) 0

Q 2: Find the unit place digit in 71 x 72 x 73 x 74 x 76 x 77 x 78 x 79.

A) 2

B) 0

C) 4

D) 6

Q3. Find the unit digit of $(217)^{413}$ X $(819)^{547}$ X $(414)^{624}$ X $(342)^{812}$ (Capgemini).

A).2

B).4

C).6

D).8

Q4.what is the unit digit in the product $(3^{65} x 6^{59} x 7^{71})$

(Mind tree)

A).4

B).5

C).6

D) .7

Q5.What is the unit digit for 123 ki power 123! ?

(Zoho)

A).3

B).9

C).7

D) .1

Q6.Find is the unit digit of 1!+2!+3!+…..+300! ? (NTT Data)

A).1

B).2

C).3

D) .4

Q7.Find the unit digit of product of the prime number upto 50?   (Atos syntl)

A).3

B).1

C).7

D) .0

Q8. 8+88+888+…….+88888…888.there are 21 "8" digits in the last term of the series. Find the last three digits of the sum.   (HCL)

A) .888

B).789

C).968

D) .688

Q9.Find the value of 1(1!)+2(2!)+3(3!)+….+n(n!)?

                                                            (TCS Digital)

A) .n!+1

B).(n+1)!

C).(n+1)!-1

D) .(n+1)!+1

Q10. The unit digit of the following expression
(1!)^99+(2!)^98+(3!)^97+(4!)^96+……+(99!)^1 is?

A) .9   (CTS)

B).7

C).5

D) .0

Cyclicity

$$0, 1, 5, 6 \rightarrow \text{Same} \ (1)$$
$$4, 9 \rightarrow 2$$
$$2, 3, 7, 8 \rightarrow 4$$

∴ Unit Digit :-

Q(1)
$$(124)^{372} + (124)^{373}$$

↓ even power   ↓ odd power

$(4)^1 = 4 \rightarrow$ odd power
$(4)^2 = 1\underline{6} \rightarrow$ even power
$(4)^3 = 6\underline{4}$

$$6 + 4 = 1\underline{0}$$

$$\boxed{\text{Ans} = 0}$$

②

$$71 \times 72 \times 73 \times 74 \times 76 \times 77 \times 78 \times 79$$

↓   ↓   ↓   ↓   ↓   ↓   ↓   ↓

$1 \times \ 2 \times 3 \times 4 \ \ \ 6 \times 7 \ \ \ 8 \times 9$

$$24 \qquad \times \qquad 42 \quad \times \quad 72$$

$$4 \quad \times \quad 2 \times 2 \quad = 1\underline{6} \ \text{Ans}$$

③

$$(217)^{413} \times (819)^{547} \times (414)^{624} \times (342)^{812}$$

$\frac{413}{4} = \textcircled{1}$ $\frac{547}{4}$ odd   even $\frac{812}{4}$ ≗ = = 0

$(7)^1 \times \ (4)^3 \times$

$(7)^1 \times (9)^1 \times (4)^2 \times (2)^4$

$\underbrace{3} \quad \times \qquad \underbrace{\frac{6 \times 6}{6}}$

$$= 1\underline{8} \ \text{Ans}$$

Q(4)

$$(3)^{65} \times 6^{59} \times 7^{71} \qquad 7 \times 7 = 4\underline{9} \times 7 = 6\underline{3}$$

↓

$(3)^1 \times 6 \times (7)^3$

$$3 \times 6 \times 3 = 5\underline{4} \ \text{Ans}$$

(5) $(123)^{123!}$

$$(3)^4 \qquad \frac{123!}{4} = \frac{123 \times \cdots \times 4 \times 3 \times 2 \times 1}{4}$$

$\Rightarrow 1$ Ans $rem = 0$

(6) $1! + 2! + 3! + \cdots + 300!$

$1 + 2 + 6 + 24 + 120 + \cdots + \cdots$
$\qquad\qquad\qquad\qquad 720$

$33 + \cdots 0 = \cdots$ ③ Ans

(7)

Prime number upto 50

$2 \times 3 \times 5 \times 7 \times \cdots$

$10 \times$ somthing $= \cdots$ ⓪ Ans

(8)

⑩ 8
Ⓐ 8 8
   8 8 8   ⟩ 21
   ⋮
8 $\cdots$ 888

$\boxed{968}$ Ans

$\begin{array}{c} 21 \\ \times 8 \\ \hline 168 \end{array}$

$\begin{array}{c} 20 \\ \times 8 \\ \hline 160 \\ 16 \\ \hline 176 \end{array}$

$\begin{array}{c} 7 \quad 19 \\ \times 8 \\ \hline 152 \\ 17 \\ \hline 16⑨ \end{array}$

(9) put $n = 1, 2, 3, \cdots$

$n = 1$ \qquad Sum $= 1(1!) = 1$

option ⓒ $= 2! - 1 = ①$

for $n = 2$

$1(1!) + 2(2!) = 5$ ✓

$(2+1)! - 1 = 5$ ✓