HCF and LCM.

TOPIC : Number system and divisibility test 1

1) Unit Digits.
2) Divisibility test.

1. प्रत्येक 12 मिनेट, 20 मिनेट र 36 मिनेटमा एक पटक तीनवटा घण्टी बज्छ। यदि तिनीहरू सबै बिहान 6:30 बजे एक साथ बज्छन् भने, तिनीहरू सबै एकै दिन बिहान अर्को पटक कुन समयमा बज्छन्।

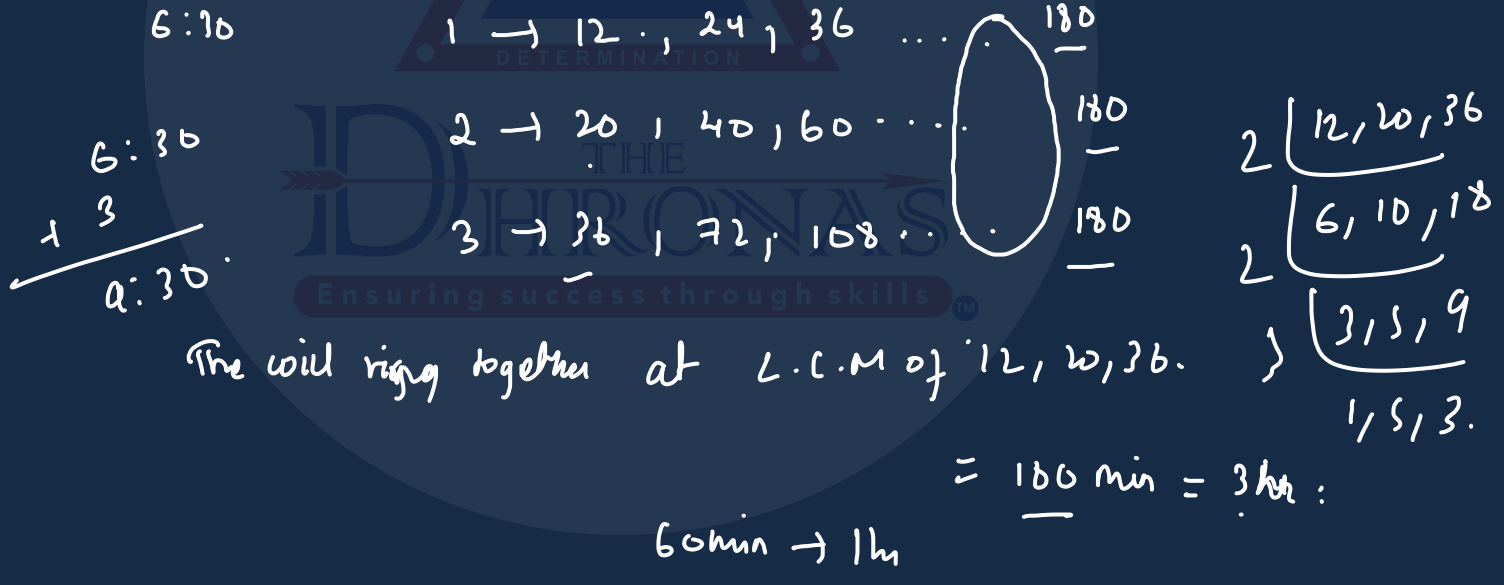
Three bells ring once every 12 minutes, 20 minutes and 36 minutes respectively. If all of them ring together at 6:30 am, then at what time will they all ring together for the next time on the same day morning.

(A) 8:30

(B) 9:30

(C) 10:30

(D) 11:30



2. क्रमशः 6 सेकेन्ड, 12 सेकेन्ड, 15 सेकेन्ड र 20 सेकेन्डको अन्तरालमा चार घण्टीहरू एकैसाथ बज्छन्। 2 घण्टामा तिनीहरूले सँगै कति पटक बजाउँछन्?

Four bells ring simultaneously at starting and an interval of 6 sec, 12 sec, 15 sec and 20 sec respectively. How many times they ring together in 2 hours?

(A) 120 ×

(B) 60

(C) 121

(D) 112

(1) + 1 (1st, 6 sec, 12 sec, 15 sec, 20 sec)

t = 0, 1', 121, ..., t = 2hr = 120

L.C.M of 6, 12, 15, 20 = 60 sec = 1 min

1 min, 2 min, 3 min

2 hr = 120 min → 120.

1 min → 1

120 min → 1 × 120 = 120

3. यदि तेह्र - अंकको संख्या 507x13219256y लाई 72 ले भाग गर्न सकिन्छ भने, $\sqrt{5x+3y}$ को अधिकतम मान हुनेछ:

If a thirteen - digit number 507x13219256y is divisible by 72, then the maximum value of $\sqrt{5x + 3y}$ will be:

(A) 6

(B) 8

(C) 46

(D) 7

$\sqrt{5(5)+3(8)} = \sqrt{25+24} = \sqrt{49} = 7$

4. 25^{25} लाई 26 ले भाग गरिन्छ, तकि ससेगभहुन्छ?

25^{25} is divided by 26, the remainder is

(A) 1
(B) 2
(C) 24
(D) 25

$25^{25} + 1^{25} - 1^{25}$.

$25^{25} + 1^{25}$ → 52

52 − 1

Divisible by 26.

$26 \overline{)51}$ (1, 26, 25)

25.

(*) { $a^n + b^n$ is divisible by $a+b$ if n = odd }.

$6^{23} + 7^{23}$ → 13

$7^{23} + 8^{23}$ → 15

5. यदि m र n सकारात्मक पूर्णाङ्कहरू हुन् भने, 5^n+6^m कौ एकाइको स्थानमा अंक सधैं के हुन्छ।

If m and n are positive integers, then the digit in the unit's place of $5^n + 6^m$ is always

(A) 1

(C) 6

(B) 5

(D) n + m

$5^n =$ U.D 5.

$6^n =$ 6.

$5^n =$ 5. + $6^n =$ 6. = 11

$5^n + 6^m$.

$5^1 + 6^1 = 11$

$5^2 + 6^2 = 25 + 36 = ..1$

$5^3 + 6^3 = 5 + 6. = 1.$

6. 1 2 3 4 .... 10 = 55 दिएमा, त्यसपछि 6 12 18 24 .... 60 बराबर कति हुन्छ

* Given that 1 + 2 + 3 + 4 + ... + 10 = 55, then the sum 6 + 12 + 18 + 24 + ... + 60 is equal to

(A) 300

(B) 330

(C) 455

(D) 655

$6 + 12 + 18 + 24 + \ldots + 60$.

$= 6(1 + 2 + 3 + 4 + \ldots + 10)$

$= 6 \times 55 = 330$.

7. कम्तिमा 6-अङ्कको संख्या पत्ता लगाउनुहोस् जुन 349 ले ठीक भाग हुन्छ।

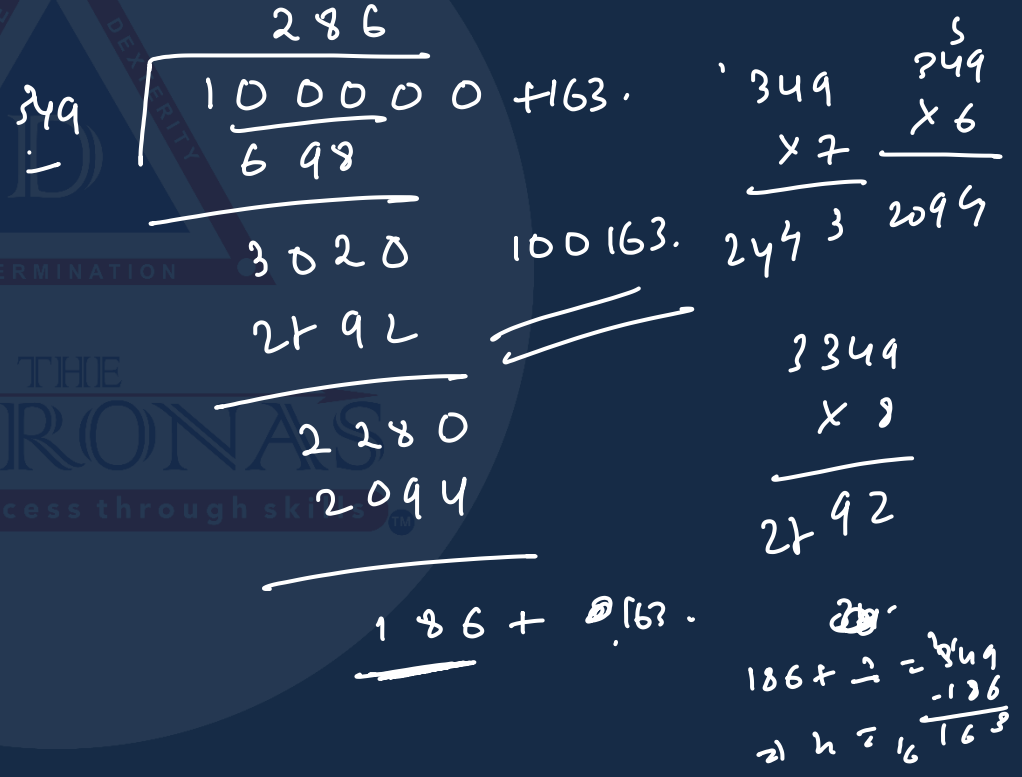
Find the least 6-digit number which is exactly divisible by 349.

(A) 100163

(B) 101063

(C) 160063

(D) यी मध्ये कुनै पनि छैन



8. यदि दुई संख्याको योगफल 14 र तिनीहरूको भिन्नता 10 छ भने, यी दुई संख्याहरूको गुणनफल पत्ता लगाउनुहोस्।
If the sum of two numbers is 14 and their difference is 10, find the product of these two numbers.

(A) 18
(C) 24
(B) 20
(D) 22

$12 + 2$.

$x + y = 14$

$x - y = 10$

$x + y + x - y = 14 + 10$.

$\Rightarrow 2x = 24$.

$\Rightarrow x = \frac{24}{2} 12$.

$a > b$

$c > d$.

$a + c > b + d$

9. 1 देखि 100 सम्मका सबै प्राकृतिक संख्याहरूको योगफल कति हो?

What is the sum of all natural numbers from 1 to 100?

(A) 5050

(C) 5000

(B) 6000

(D) 5052

1, 2, 3, 4, 5, 6 . . . . . 100.

1+2+3+ . . . . +100.

[Sum of n natural no = $\frac{n(n+1)}{2}$.]

n = 100

$= \frac{50}{100}(100+1)$

$= 50 \times 101 = 5050.$

10. पहिलो 20 बिजोर प्राकृतिक संख्याहरूको योगफल के हो?

What is the sum of the first 20 odd natural numbers?

$= 20^2 = 400$

400

1, 3, 5, 7, ... - 20

1 + 3 + 5 + 7 + ... - 20

Sum of 1st n odd number $= n^2$.

" " 1st n even " $= n(n+1)$

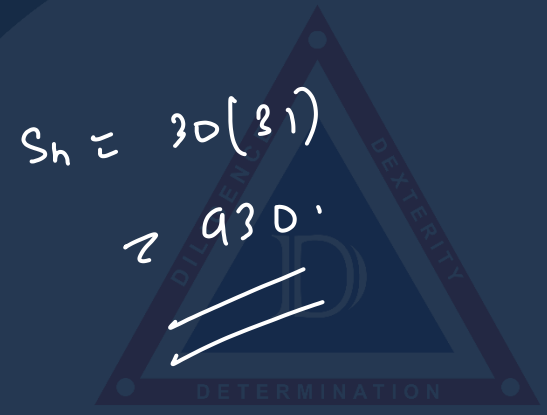
$20(20+1) = 20 \times 21$

$= 420$.

11. पहिलो 30 सम प्राकृतिक संख्याहरूको योगफल कति हो
The sum of the first 30 even natural numbers is

$S_n = \frac{30(31)}{2}$

$= 930.$



12. $(67^{67} + 67)$ लाई 68 ले भाग गर्दा के बाँकी रहन्छ?

What will be remainder when $(67^{67} + 67)$ is divided by 68?

$= 66.$

$67^{67} + 1^{67} + 66$

68

$=$

$a^n + b^n$ is divisible by $a+b$.

$67^{67} + 1^{67}$ is divisible by 68.

13. 88 ले ठीक भाग गर्न सकिने सबैभन्दा ठूलो 4 अंकको संख्या हो:

The largest 4 digit number exactly divisible by 88 is:

(A) 9944

(B) 9768

(C) 9988

(D) 8888

(E) यी मध्ये कुनै पनि होइन

9944
55
9999

88
×1
264

dd place –
sum of even place }
It should be divisible by 11. or 0.

9999 = 88 × 113 + 55

14. 1056 मा कम्तिमा कुन संख्या जोड्नुपर्छ, ताकि योगफललाई 23 ले पूर्ण रूपमा भाग गर्न सकिन्छ?

What least number must be added to 1056, so that the sum is completely divisible by 23 ?

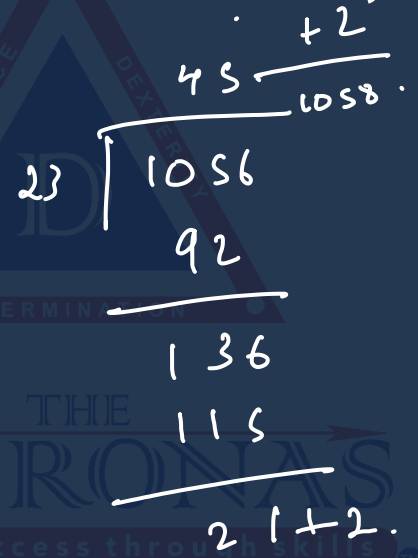
(A) 2

(B) 3

(C) 18

(D) 21

(E) यी मध्ये कुनै पनि छैन



$1056 = 23 \times 45 + 21$

15. तलका मध्ये कुन संख्यालाई 15 ले भाग गर्न सकिन्छ?

Which one of the following numbers is divisible by 15?

(A) 17325 = 15✓

(B) 23755 = 22✗

(C) 29515 = 22✗

(D) 30560 = 14✗

16. तलका मध्ये कुन संख्यालाई 11 ले भाग गर्न सकिन्छ?

(A) 4823718 (B) 4832718 (C) 8423718 (D) 8432718

21

Sum of odd − Sum of even = 0 or divisible by 11

21 − 10 = 8 ✗

22 − 11 = 11

11

17. दुई नम्बरहरूको LCM अनि HCF 36 अनि 6 भए यदि सानो नम्बर 12 भए ठूलो नम्बर के हुन्छ?

(A) 18

(B) 15

(C) 24

(D) 20

L.C.M × H.C.F = x × y.

⇒ 36 × 6 = 12 × y.

⇒ 18 = y.

18. एउटा चिड़ियाघरमा कतिपय सिंहहरू अनि सुधाहरू छन। यदि ती दुवैको टाउकाको संख्या 100 अनि खुट्टाहरूको संख्या 290 भए। त्यस चिड़ियाघरमा कटिवटा जम्मा सुधा छ?

(A) 55

(B) 45

(C) 75

(D) 65

19. सबैभन्दा कम संख्या 5000 भन्दा धेरै जसलाई 567 ले भाग गर्न सकिन्छ

the least number more than 5000 which is divisible by 567

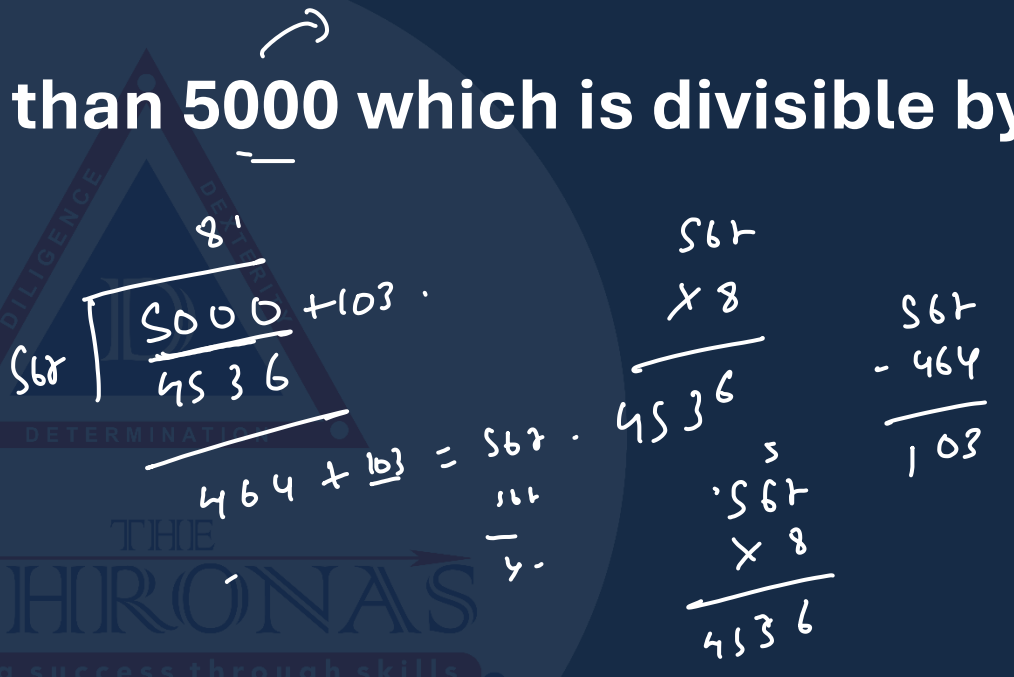
(A) 5009

(B) 5037

(C) 5073

(D) 5099

(C) 5103. ✓



20. $(4^{61} + 4^{62} + 4^{63} + 4^{64})$ द्वारा विभाजित छ

$(4^{61} + 4^{62} + 4^{63} + 4^{64})$ is divisible by

(A) 3 (B) 11 (C) 13 (D) 17

$17 \times 5 = 85$.

$$4^{61}\left[4^0 + 4^1 + 4^2 + 4^3\right]$$

$$= 4^{61}\left[1 + 4 + 16 + 64\right]$$

$$= 4^{61} \times 85$$

$$= 17$$

H/W.

21. $(3^{25} + 3^{26} + 3^{27} + 3^{28})$ द्वारा विभाजित छ

$(3^{25} + 3^{26} + 3^{27} + 3^{28})$ is divisible by

(A) 11 (B) 16 (C) 25 (D) 30

2✓ 3✓ 6✓

216.

For 6, 12, 14, 15, 18.

6 → (2) + (3) → should be divisible by 2 and 3.

12 → (3) + (4) → " " " " 3 and 4.

15 → 5 + 3 → " " " " 5 and 3.

18 → 9 + 2 → " " " " 9 and 2.

22. $(1^2 + 2^2 + 3^2 + ... + 20^2) = 2870$, $(2^2 + 4^2 + 6^2 + ... + 40^2)$ को मान हो।

Given that $(1^2 + 2^2 + 3^2 + ... + 20^2) = 2870$, the value of $(2^2 + 4^2 + 6^2 + ... + 40^2)$ is

(A) 2870

(B) 5740

(C) 11480

(D) 28700

155220

when unit digit in 0 or 5.

should

243 = 2+4+3 = 9 ✗

243 = 2+4+3 = 9

4x ____ . . . . __4.

__ __ __ __ = ____4.

4 28 64

> • Multiplication of unit digit.

54x21 =

25.

25 → unit.

U.D.

= . . . . __

0, 1, 2, 3, 4, 5, 6, 7, 8, 9.

×20

21×23×26×27×25 = 0

08 56 30

unit digit of 2, 3, 7, 8.

U.D.

$2^1 = 2$ ✓ → Remainder 1

$2^2 = 4$ ✓ → Remainder 2

$2^3 = 8$ ✓ → Remainder 3

$16 = 2^4 = 6$ ✓ → Remainder = 0

$32 = 2^5 = 2$ ✓

$64 = 2^6 = 4$ ✓

$128 = 2^7 = 8$ ✓

$256 = 2^8 = 6$ ✓

2^{2017} = U.D.

$4 \overline{)2017}$ = 504, −20, 17, −16, 1.

$64 \overline{)64}$ = 16, −4, 24, 24, 0

2^{2036} = U.D.

$4 \overline{)2036}$ = 509, −20, 36, −36, 0.

$(3022)^{3022}$ = U.D. 4.

$4 \overline{)3022}$ = 755, −28, 22, −20, 22, −20, 2.

Unit digit of 4 and 9.

U.D

$4^1 = 4$

$4^2 = 6$

$4^3 = 4$

$4^{84} = 6$

$4^5 = 4$.

$4^{odd} = 4$ — unit.

$4^{even} = 6$

$4^{2036} \longrightarrow 6$ — U.D.

$4^{2032} \longrightarrow 4$.

$(200034)^{200034} \longrightarrow \ldots\ldots 6$ — U D.

$4^{200034} \longrightarrow 6$

3 Days. } Revision.
4 Days. }

		UD
$9^1 = 9$	=	9
$9^2 = 81$	=	1
$9^3 = 729$ (×9)	=	9
$9^4 =$	=	1
$9^5 = \ldots$	=	9

0, 1, 6, 5, 4, 9.

2, 3, 7, 8.

9^{odd} = Unit digit = 9.

9^{even} = 1.

$(200024)^3 \times (200029)^4$ = UD = 4.

4 × 1

U.D.

$\therefore 9^{27} = 9$.