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(1)

If $\log \frac{a}{b} + \log \frac{b}{a} = \log (a + b)$, then:

[A] $a + b = 1$

[B] $a - b = 1$

[C] $a = b$

[D] $a^2 - b^2 = 1$

Answer : [A]

Explanation:

$\log \frac{a}{b} + \log \frac{b}{a} = \log (a + b)$

$\Rightarrow \log (a + b) = \log\left(\frac{a}{b} \times \frac{b}{a}\right) = \log 1.$

So, $a + b = 1$.

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(2) If log 27 = 1.431, then the value of log 9 is:

[A] 0.934

[B] 0.945

[C] 0.954

[D] 0.958

Answer : [C]

Explanation:

log 27 = 1.431

$\Rightarrow \log (3^3) = 1.431$

$\Rightarrow 3 \log 3 = 1.431$

$\Rightarrow \log 3 = 0.477$

$\therefore \log 9 = \log(3^2) = 2 \log 3 = (2 \times 0.477) = 0.954.$

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(3) If log 2 = 0.3010 and log 3 = 0.4771, the value of $\log_5 512$ is:

[A] 2.870

[B] 2.967

[C] 3.876

[D] 3.912

Answer : [C]

Explanation:

$\log_5 512 = \frac{\log 512}{\log 5}$

$= \frac{\log 2^9}{\log (10/2)}$

$= \frac{9 \log 2}{\log 10 - \log 2}$

$= \frac{(9 \times 0.3010)}{1 - 0.3010}$

$= \frac{2.709}{0.699}$

$= \frac{2709}{699}$

$= 3.876$

(4) If $\log_{10} 2 = 0.3010$, the value of $\log_{10} 80$ is:

[A] 1.6020

[B] 1.9030

[C] 3.9030

[D] None of these

Answer : [B]

Explanation:

$\log_{10} 80 = \log_{10} (8 \times 10)$

$= \log_{10} 8 + \log_{10} 10$

$= \log_{10} (2^3) + 1$

$= 3 \log_{10} 2 + 1$

$= (3 \times 0.3010) + 1$

$= 1.9030.$

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(5)

If $\log_x \left(\frac{9}{16}\right) = -\frac{1}{2}$, then x is equal to:

[A]
$-\frac{3}{4}$

[B]
$\frac{3}{4}$

[C]
$\frac{81}{256}$

[D]
$\frac{256}{81}$

Answer : [D]

Explanation:

$\log_x \left(\frac{9}{16}\right) = -\frac{1}{2}$

$\Rightarrow x^{-1/2} = \frac{9}{16}$

$\Rightarrow \frac{1}{x} = \frac{9}{16}$

$\Rightarrow x = \frac{16}{9}$

$\Rightarrow x = \left(\frac{16}{9}\right)^2$

$\Rightarrow x = \frac{256}{81}$

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(6) It is being given that (2^{32} + 1) is completely divisible by a whole number. Which of the following numbers is completely divisible by this number?

[A] (2^{16} + 1)

[B] (2^{16} - 1)

[C] (7 x 2^{23})

[D] (2^{96} + 1)

Answer : [D]

Explanation:
Let $2^{32} = x$. Then, (2^{32} + 1) = (x + 1).
Let (x + 1) be completely divisible by the natural number N. Then,
(2^{96} + 1) = [$(2^{32})^3$ + 1] = (x^3 + 1) = (x + 1)(x^2 - x + 1), which is completely divisible by N, since (x + 1) is divisible by N.

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(7) How many of the following numbers are divisible by 132 ?
264, 396, 462, 792, 968, 2178, 5184, 6336

[A] 4

[B] 5

[C] 6

[D] 7

Answer : [A]

Explanation:
132 = 4 x 3 x 11
So, if the number divisible by all the three number 4, 3 and 11, then the number is divisible by 132 also.
264 → 11,3,4 (/)
396 → 11,3,4 (/)
462 → 11,3 (X)
792 → 11,3,4 (/)
968 → 11,4 (X)
2178 → 11,3 (X)
5184 → 3,4 (X)
6336 → 11,3,4 (/)
Therefore the following numbers are divisible by 132 : 264, 396, 792 and 6336.
Required number of number = 4.

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(8) Which one of the following is the common factor of (47^{43} + 43^{43}) and (47^{47} + 43^{47}) ?

[A] (47 - 43)

[B] (47 + 43)

[C] (47^{43} + 43^{43})

[D] None of these

Answer : [B]

Explanation:
When n is odd, (x^n + a^n) is always divisible by (x + a).
∴ Each one of (47^{43} + 43^{43}) and (47^{47} + 43^{47}) is divisible by (47 + 43).

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(9) If the number 91876 * 2 is completely divisible by 8, then the smallest whole number in place of * will be:

[A] 1

[B] 2

[C] 3

[D] 4

[E] None of these

Answer : [C]

Explanation:
Then number $6x2$ must be divisible by 8.
$\therefore$ $x = 3$, as 632 is divisible 8.

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(10) A number when divided successively by 4 and 5 leaves remainders 1 and 4 respectively. When it is successively divided by 5 and 4, then the respective remainders will be

[A] 1, 2

[B] 2, 3

[C] 3, 2

[D] 4, 1

Answer : [B]

Explanation:

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4 | x          y = (5 x 1 + 4) = 9  --------  5 | y -1        x = (4 x y + 1) = (4 x 9 + 1) = 37  --------    | 1 -4   Now, 37 when di
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(11) Let N be the greatest number that will divide 1305, 4665 and 6905, leaving the same remainder in each case. Then sum of the digits in N is:

[A] 4

[B] 5

[C] 6

[D] 8

Answer : [A]

Explanation:
N = H.C.F. of (4665 - 1305), (6905 - 4665) and (6905 - 1305)
= H.C.F. of 3360, 2240 and 5600 = 1120.
Sum of digits in N = (1 + 1 + 2 + 0) = 4

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(12) Three number are in the ratio of 3 : 4 : 5 and their L.C.M. is 2400. Their H.C.F. is:

[A] 40

[B] 80

[C] 120

[D] 200

Answer : [A]

Explanation:
Let the numbers be $3x$, $4x$ and $5x$.
Then, their L.C.M. = $60x$.
So, $60x = 2400$ or x = 40.
$\therefore$ The numbers are (3 x 40), (4 x 40) and (5 x 40).
Hence, required H.C.F. = 40.

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(13)
Reduce $\frac{128352}{238368}$ to its lowest terms.

[A]
$\frac{3}{}$

4

[B] $\frac{5}{13}$

[C] $\frac{7}{13}$

[D] $\frac{9}{13}$

Answer : [C]

Explanation:

128352) 238368 (1 128352 ---------- 110016) 128352 (1 110016 --

(14) The ratio of two numbers is 3 : 4 and their H.C.F. is 4. Their L.C.M. is:

[A] 12

[B] 16

[C] 24

[D] 48

Answer : [D]

Explanation:
Let the numbers be $3x$ and $4x$. Then, their H.C.F. = x. So, $x = 4$.
So, the numbers 12 and 16.
L.C.M. of 12 and 16 = 48.

(15) Three numbers which are co-prime to each other are such that the product of the first two is 551 and that of the last two is 1073. The sum of the three numbers is:

[A] 75

[B] 81

[C] 85

[D] 89

Answer : [C]

Explanation:
Since the numbers are co-prime, they contain only 1 as the common factor.
Also, the given two products have the middle number in common.
So, middle number = H.C.F. of 551 and 1073 = 29;
First number = $\left(\frac{551}{29}\right) = 19$; Third number = $\left(\frac{1073}{29}\right) = 37$.

$\therefore$ Required sum = (19 + 29 + 37) = 85.

(16) What will be the day of the week 15th August, 2010?

[A] Sunday

[B] Monday

[C] Tuesday

[D] Friday

Answer : [A]

Explanation:
15th August, 2010 = (2009 years + Period 1.1.2010 to 15.8.2010)
Odd days in 1600 years = 0
Odd days in 400 years = 0
9 years = (2 leap years + 7 ordinary years) = (2 x 2 + 7 x 1) = 11 odd days ≡ 4 odd days.

∴ 227 days = (32 weeks + 3 days) ≡ 3 odd days.
Total number of odd days = (0 + 0 + 4 + 3) = 7 ≡ 0 odd days.
Given day is Sunday.

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(17) It was Sunday on Jan 1, 2006. What was the day of the week Jan 1, 2010?

[A] Sunday

[B] Saturday

[C] Friday

[D] Wednesday

Answer : [C]

Explanation:
On 31st December, 2005 it was Saturday.
Number of odd days from the year 2006 to the year 2009 = (1 + 1 + 2 + 1) = 5 days.
∴ On 31st December 2009, it was Thursday.
Thus, on 1st Jan, 2010 it is Friday.

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(18) Today is Monday. After 61 days, it will be:

[A] Wednesday

[B] Saturday

[C] Tuesday

[D] Thursday

Answer : [B]

Explanation:
Each day of the week is repeated after 7 days.
So, after 63 days, it will be Monday.
∴ After 61 days, it will be Saturday.

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(19) How many days are there in *x* weeks *x* days?

[A] $7x^2$

[B] $8x$

[C] $14x$

[D] 7

Answer : [B]

Explanation:
x weeks x days = $(7x + x)$ days = $8x$ days.

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(20) January 1, 2007 was Monday. What day of the week lies on Jan. 1, 2008?

[A] Monday

[B] Tuesday

[C] Wednesday

[D] Sunday

Answer : [B]

Explanation:
The year 2007 is an ordinary year. So, it has 1 odd day.
1st day of the year 2007 was Monday.
1st day of the year 2008 will be 1 day beyond Monday.
Hence, it will be Tuesday.
