Find the Remainder

by Pankaj Jyoti Mahanta - Monday, January 28, 2013

http://gonitsora.com/find-the-remainder/

1) The remainder when $latex 3^{31}$ is divided by 5 is

A) 2 B) 3 C) 4 D) 1

(Hint: - gcd(3,5)=1 and $latex \phi (5)=4,$ thus $latex 3^4\equiv 1(mod 5).$)

2) The reminder when $latex 5^{99}$ is divided by 13 is

A) 0 B) 8 C) 1 D) 4

3) The reminder when $latex 7^{2010}$ is divided by 25 is

A) 9 B) 18 C) 3 D) 24

4) The reminder when $latex 7^{51}$ is divided by 144 is

A) 49 B) 55 C) 21 D) 143

(Hint: gcd(7,144)=1. $latex \phi (144)=48$)

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5) What is the value of $latex 123^{241} \pmod{35}$?

A) 18 B) 24 C) 32 D) 16

(Hint: $latex 123\equiv 18(\pmod{35}).$)

6) A number when divided by 765 leaves a remainder 42. What will be the remainder if the number is divided by 17? *[Asked in "MAT"]*

A) 8 B) 7 C) 6 D) 5

7) The remainder, when $latex 15^{23}+23^{23}$ is divided by 19 is *[Asked in “CAT”]*
A) 4 B) 15 C) 0 D) 18

8) The rightmost non zero digit of the number $latex 30^{2720}$ is *[Asked in “CAT”]*
A) 1 B) 3 C) 7 D) 9

9) If $latex P=16^3+17^3+18^3+19^3$ then P divided by 70 leaves a remainder of *[Asked in CAT]*
A) 0 B) 1 C) 69 D) 35

[Hint:- P= 35 x (an even number)]

10) What are the last two digits of $latex 7^{2008}$? *[CAT]*
A) 21 B) 61 C) 01 D) 41 E) 81

(Hint:- 7 belongs to U(100) and U(100) is isomorphic to $latex Z_2+Z_{20},$ thus $latex 7^{20}=1$ in U(100).)

11) What are the last three digits of $latex 17^{102}$?

A) 001 B) 017 C) 289 D) 513

(Hint:- 17 belongs to U(1000) and U(1000) is isomorphic to $latex Z_2+Z_2+Z_{100},$ thus $latex 17^{100}=1$ in U(1000).)

12) Let p = 1! + (2 2!) + (3 3!) + ... + (10 10!), then p+2 when divided by 11! leaves a remainder of
A) 10 B) 0 C) 7 D) 1

(Hint:- 1! + (2 2!) = (2-1) 1! + (3-1) 2! = (2! - 1!) + (3! - 2!) = 3! – 1.)
13) The remainder, when 1! + 2! + 3! + ... + 99! + 100! is divided by 12 is
A) 11 B) 9 C) 3 D) 1

14) The remainder, when $latex 1^5+2^5+3^5+\dots 99^5+100^5$ is divided by 4 is
A) 2 B) 0 C) 1 D) 3

(Hint:- $latex (2n)^5\equiv 0 (mod 4),$ $latex 1\equiv 1 (mod 4)$ and $latex 3\equiv -1 (mod 4).$)

15) The remainder, when $latex 1^4+2^4+3^4+\dots 99^4+100^4$ is divided by 4 is
A) 2 B) 0 C) 1 D) 3

Answers:

1) A 2) B 3) D 4) B 5) A 6) A 7) C 8) D 9) A 10) C 11) C 12) D 13) B 14) B 15) A