Day - 6

Remainder Theorem

Normal No

$23/5$

Pol. No.

$(x^2+7x+3) \div (x+2)$

$2^1 = 2$

$2^2 = 4$

$2^3 = 8$

$2^4 = 16$

$2^5 = 32$

1) $\frac{23}{5} = 3$

2) $\frac{17}{6} = 5$

3) $\frac{86 \times 23}{11} = 9$

4) $\frac{38 + 71 + 86}{16} \Rightarrow 6+7+6 \Rightarrow \frac{19}{16} \Rightarrow 3$

Note

$\frac{3}{8} = 3$

is not greater than

5) $\frac{123 \times 124 \times 125}{9}$

$= \frac{6 \times 7 \times 8}{9} = \frac{42 \times 8}{9} \Rightarrow \frac{48}{9} = 3$

6) $\frac{7^5}{4} = \frac{7 \times 7 \times 7 \times 7 \times 7}{4} \Rightarrow \frac{9 \times 9 \times 3}{4} = \frac{1 \times 1 \times 3}{4}$

$= \boxed{3}$

7) $\frac{2^{75}}{5} = \frac{(2)^{75}}{5} = \frac{(2^4)^{19} \times 2^1}{5} = \frac{(1)^{19} \times 2}{5} = 2$

8) $\frac{7^{129}}{5} \Rightarrow \frac{(7)^{129}}{5} \Rightarrow \frac{(2)^{129}}{5} = \frac{(2^4)^{32} \times 2^1}{5} = 2$

9) $\left(\frac{517}{5}\right)^{517} = \frac{(2)^{517}}{5} = \frac{(2^4)^{517}}{5} = \frac{(16)^{517/4}}{5} = \frac{(1)^{129} \times 2^1}{5}$

$= 2$

10) what is remainder when 2243^{165} divided by 5

$\frac{(2243)^{165}}{5} = \frac{(3)^{165}}{5} = \frac{(3^4)^{41} \times 3^1}{5}$

$= \frac{(1)^{41} \times 3^1}{5} = 3$

1) $\frac{23}{5} = 3$

2) $\frac{49}{9} = 3$

3) $\frac{7^2}{4} = \frac{(7)^2}{4} = \frac{9}{4} = 1$

4) $\frac{7^5}{4} = \frac{(7)^5}{4} \Rightarrow$ [illegible] $\Rightarrow \frac{243}{4} = 3$

5) $\frac{(123 \times 124)}{9} = \frac{(6) \times 7}{9} \Rightarrow \frac{42}{7} = 6$

6) $\frac{(16)^{15}}{5} \Rightarrow (1)^{15} \Rightarrow 1$

7) $\frac{16^{19} \times 2^3}{5} \Rightarrow \frac{16^{19} \times 8}{5} \Rightarrow (1)^{19} \times 3 \Rightarrow 3$

8) $\frac{(81)^{41}}{5} \Rightarrow$ [illegible] $\Rightarrow (1)^{41} = 1$

9) $\frac{81^{41} \times 3}{5} \Rightarrow 1 \times 3 \Rightarrow 3$

10) $\frac{243}{5} \Rightarrow 3$

11) $\frac{(243)^{165}}{5} \Rightarrow \frac{(3)^{165}}{5} \Rightarrow \frac{(3^4)^{41} \times 3^1}{5} \Rightarrow \frac{(1)^{41} \times 3^1}{5}$

$\Rightarrow 3$

12) If a number N divided by 4 leaves 3 what is the remainder of $N^2 \div 4$?

$$\frac{N}{4} = 3$$

$$\frac{7}{4} = 3$$

$N = 7$

$$\frac{49}{4} = \frac{7^2}{4} = \frac{(3)^2}{4} = \frac{9}{4} = 1$$

13) $$\frac{25 \times 25}{26} \Rightarrow \frac{(25)^2}{26} \Rightarrow (-1)^2 \Rightarrow 1$$

14) $$\frac{17^{200}}{16} = (1)^{200} = 1$$

15) $$\frac{42 \times 8}{6} \Rightarrow 0 \times 2 = 0$$

16) $$\frac{49}{5} \Rightarrow 4$$

17) $$\frac{100 \times 101}{11} \Rightarrow \frac{(1) \times (2)}{0} = 2$$

18) $\frac{15 \times 17 \times 19}{4} \Rightarrow \frac{3 \times 1 \times 3}{4} = \frac{9}{4} = 1$

19) $3^3 \div 5 \Rightarrow \frac{3 \times 3 \times 3}{5} \Rightarrow \frac{9 \times 3}{5} \Rightarrow \frac{4 \times 3}{5} = 2$

20) If $x \div 5$ gives remainder 2, what is the remainder of $(x+2) \div 5$?

$\frac{12}{5} = 2$

$x = 12$

$(12+2) \div 5$

$\frac{14}{5} = 4$