

NUMBER SENSE TIPS (SEPTEMBER 2023)

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1. $984371 \div 9$ has a remainder of _____.

Use “casting out method” to speed up the process. 9 and 8 & 1 can be eliminated since they equal 9, leaving 437. $3 + 7$ equals 10 so casting out 9 leaves 1. Final answer is $4 + 1 = 5$.

General rule: Find the remainder when the sum of the digits is divided by 9. If the sum of the digits is 9, then the remainder is 0.

2. If $1 + 3 + 5 + \dots + k = 36^2$, then $k =$ _____.

$$\left(\frac{k+1}{2}\right)^2 = 36^2; \frac{k+1}{2} = 36; k+1 = 72; k = 71$$

In general, double 36 and subtract 1. Answer is 71.

3. If $2x + 4 = 16$, then $(2x + 4)(2x + 8) =$ _____.

Note: If $2x + 4 = 16$, then $2x + 8 = 2x + 4 + 4 = 20$; $(2x + 4)(2x + 8) = (16)(20) = 320$

4. $\frac{8!+7!}{5 \times 7!} =$ _____.

$$\frac{8!+7!}{5 \times 7!} = \left(\frac{1}{5}\right)\left(\frac{8!+7!}{7!}\right) = \left(\frac{1}{5}\right)\left(\frac{8!}{7!} + \frac{7!}{7!}\right) = \left(\frac{1}{5}\right)(9) = \frac{9}{5}$$

Be aware of the following variation.

$$\frac{11! - 8!}{9!} = \text{_____}$$

$$\frac{11! - 8!}{9!} = \frac{11!}{9!} - \frac{8!}{9!} = (11)(10) - 1/9 = 110 - 1/9 = 109 \frac{8}{9}$$

5 . $(11^2 + 12^2 + 13^2) \div 5$ has a remainder of _____.

Step #1 : Find the remainder when each base is divided by 5 and square each result before adding.

$$1^2 + 2^2 + 3^2 = 14$$

Step #2 : Find the remainder when 14 is divided by 5.

Answer is 4.