NUMBER SENSE TIPS (SEPTEMER 2020)

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1. 984371 ÷ 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 $1 + 3 + 5 + \ldots + k = 36^2$, 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. $\frac{8!+7!}{5x7!}$ = _____.

$$\frac{8!+7!}{5x7!} = \left(\frac{1}{5}\right)\left(\frac{8!+7!}{7!}\right) = \left(\frac{1}{5}\right)\left(\frac{8!}{7!}+\frac{7!}{7!}\right) = \left(\frac{1}{5}\right)(9) = \frac{9}{5}$$

Be aware of the following variation.

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

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

5 . $\left(11^2+12^2+13^2\right)\div 5$ 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.