121 § 8.2 #s 1-3, 5-53 every 4th

① A series is the sum of a sequence.

② In summation notation, the Greek letter Σ indicates a sum.

③ The mean is the sum of n numbers, divided by n.

#s 5 - 18 Find the sum of each series.

⑤ $\sum_{i=1}^{5} i^2 = 1^2 + 2^2 + 3^2 + 4^2 + 5^2$

$= 1 + 4 + 9 + 16 + 25$

$= \boxed{55}$

⑨ $\sum_{n=0}^{4} n! = 0! + 1! + 2! + 3! + 4!$

$= 1 + 1 + 2 + 3 \cdot 2 + 4 \cdot 3 \cdot 2$

$= \boxed{34}$

⑬ $\sum_{j=1}^{7} (2j + 5) = 2(1) + 5 + 2(2) + 5 + 2(3) + 5 +$

$2(4) + 5 + 2(5) + 5 + 2(6) + 5 + 2(7) + 5$

$= (7)(5) + 2 + 4 + 6 + 8 + 10 + 12 + 14$

$= 35 + 56 = \boxed{91}$

⑰ $\sum_{i=0}^{5} i(i-1)(i-2) = 0(-1)(-2) + 1(0)(-1) + 2(1)(0)$

$+ 3(2)(1) + 4(3)(2) + 5(4)(3) =$

$6 + 24 + 60 = \boxed{90}$

12) §8.2 #s 21-53 by 4's

#s 19-30 write in Σ-notation. Use i as index starting with $i=1$.

(21) $-1+3-5+7-9$

Increase by 2's: $2i$

Alternate sign: $(-1)^i$, since $i=1$ is negative term

Make $i=1$ correspond to 1: $2(1)-1=1$, $2(2)-1=3$ $\Big\}$ $2i-1$

$(-1)^i(2i-1)$

Start @ 1. There are 5 terms.

$$\sum_{i=1}^{5}(-1)^i(2i-1)$$ ✓ check

(25) $1-\frac{1}{2}+\frac{1}{4}-\frac{1}{8}+\frac{1}{16}-\cdots$

Alternate signs. 1st sign is positive:

$(-1)^{i-1}\left(\frac{1}{2}\right)^{i-1}$ does it, I think

$$\sum_{i=1}^{\infty}(-1)^{i-1}\left(\frac{1}{2}\right)^{i-1} \quad \text{OR} \quad \sum_{i=1}^{\infty}\left(-\frac{1}{2}\right)^{i-1}$$

(29) $a+ar+ar^2+\cdots+ar^{10}$

$$\sum_{i=1}^{11} ar^{i-1}$$ is geometric.

121 § 8.2 #s 33-53 by 4's

#s 31-36 True / False

(33) $\sum_{x=1}^{5}(2x-1) = \sum_{y=3}^{7}(2y-1)$ **FALSE**

#s 37-44 Re-write, using the indicated j.

(37) $\sum_{i=1}^{32}(-1)^i = \sum_{j=0}$

$-1+1-1+1$

$\sum_{j=0}^{31}(-1)^{i+1}$ OR $\sum_{j=0}^{31}(-1)^{i-1}$

(41) $\sum_{x=2}^{10}\frac{10!}{x!(10-x)!} = \sum_{j=0}$

$= \frac{10!}{2!\,8!} + \frac{10!}{3!\,7!} + \cdots$

$\sum_{j=0}^{8}\frac{10!}{(x+2)!\,(10-(x+2))!}$

$10-x-2 = 8-x$

$\sum_{j=0}^{8}\frac{10!}{(x+2)!\,(8-x)!}$

#s 45-50 Write out all the terms.

(45) $\sum_{i=0}^{5} 0.5r^i = 0.5 + 0.5r + 0.5r^2 + 0.5r^3 + 0.5r^4$

(49) $\sum_{i=0}^{2}\frac{2}{i!(2-i)!}a^{2-i}b^i = \frac{2a^2}{0!\,2!} + \frac{2ab}{1!\,(2-1)!} + \frac{2ab^2}{2!\,(2-2)!}$

$= a^2 + 2ab + b^2 = (a+b)^2$

121 § 8.2 #s 53?

Find the mean

(53) $-6, 0, 3, 4, 3, 92$

$$\bar{x} = \frac{\sum_{k=1}^{n} x_k}{n} = \frac{-6+0+3+4+3+92}{6} = \frac{96}{6} = \frac{48}{3} = \boxed{16}$$

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