

$$2) \sum_{i=0}^n 1 = 1 + 1 + 1 + \dots + 1$$

$0 \quad 1 \quad 2 \quad \dots \quad n \leftarrow i$

$$= (n+1) \cdot 1 = n+1$$

$$b) \sum_{j=1}^{2011} (-1)^j = (-1)^1 + (-1)^2 + \dots + (-1)^{2009} + (-1)^{2010} + (-1)^{2011}$$

$$= \underbrace{(-1+1)}_0 + \dots + \underbrace{(-1+1)}_0 - 1$$

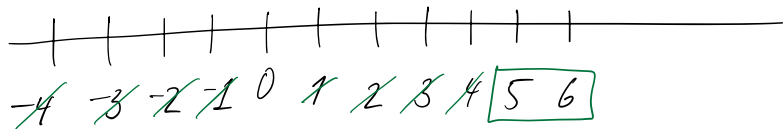
$$= -1$$

$$c) \sum_{k=-n}^n (k+1) = (-n+1) + (-n+2) + \dots + (-1) + 0 + 1 + \dots + (n-2) + (n-1) + n + (n+1)$$

$$= (-\cancel{n+1}) + (-\cancel{n+2}) + \dots + (-\cancel{1}) + 0 +$$

$$(\cancel{n+1}) + n + (\cancel{n-1}) + (\cancel{n-2}) + \dots + \cancel{1} = n + n+1 = 2n+1$$

Example: $n=5$



$$d) \sum_{m=0}^3 (m^2 - 6m + 9) = \sum_{m=0}^3 (m-3)^2 = 9 + 4 + 1 + 0 = 14$$

$$e) \sum_{l=1}^5 4l \cdot (l^2 - 1) = 4 \cdot 0 + 8 \cdot 3 + 12 \cdot 8 + 16 \cdot 15 + 20 \cdot 24 = 24 + 96 + 240 + 480 = 840$$

$$f) \sum_{i=0}^4 \left(2^i + \left(\frac{1}{2}\right)^i \right) = 2 + \left(2 + \frac{1}{2}\right) + \left(4 + \frac{1}{4}\right) + \left(8 + \frac{1}{8}\right) + \left(16 + \frac{1}{16}\right)$$

$$\frac{527}{16} = 32 + \frac{15}{16} = \frac{16 \cdot 32 + 15}{16}$$

$$g) \sum_{k=1}^5 \frac{k+2}{k} = 3 + \frac{4}{2} + \frac{5}{3} + \frac{6}{4} + \frac{7}{5}$$

$$= \frac{287}{30}$$

$$\begin{aligned}
 h) \quad \sum_{k=1}^6 \frac{1}{3^k} &= \frac{1}{3} + \frac{1}{3^2} + \frac{1}{3^3} + \frac{1}{3^4} + \frac{1}{3^5} + \frac{1}{3^6} \\
 &= \frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \frac{1}{81} + \frac{1}{243} + \frac{1}{729} \\
 &= \frac{243 + 81 + 27 + 9 + 3 + 1}{729} \\
 &= \frac{364}{729}
 \end{aligned}$$

$$\begin{aligned}
 i) \quad \sum_{j=-2}^2 \frac{2^{j+3}}{j^2+1} &= \frac{2}{5} + \frac{4}{2} + 8 + \frac{16}{2} + \frac{32}{5} \\
 &= \frac{34}{5} + 18 = \frac{124}{5}
 \end{aligned}$$