Arithmancy.

$\{a, a+1, \dots b\}$.

discrete uniform distribution and probability of each integer value is $\frac{1}{b}$ because each outcome occurs equally likely.

When $a=1$, $b=n$ the probability of each outcome is $p(a) = \frac{1}{n}$

Expected value can be derived by

$E[X] = \sum_x xp(x)$ and for this problem.

$$E[X] = \sum_x xp(x) = 1 \cdot \frac{1}{n} + 2 \cdot \frac{1}{n} + 3 \cdot \frac{1}{n} + \dots + n \cdot \frac{1}{n}$$

factor out by $\frac{1}{n}$ $= \frac{1}{n}\underbrace{(1+2+3+\dots+n)}$.

this part is a another summation series of natural number from 1 to n.

$\sum_{k=1}^{n} k = \frac{1}{2}n(n+1)$ therefore continue.

$$= \frac{1}{n} \cdot \frac{1}{2}n(n+1)$$

$$= \frac{1}{2} \cdot (n+1) = \frac{n+1}{2}$$