1. $\Delta x = \dfrac{2}{n}$ and $x_i = i\Delta x$

$$\begin{aligned}
A &= \lim_{n\to\infty} \sum_{i=1}^{n} f(c_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} i^2 \left(\Delta x\right)^2 \Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \frac{8}{n^3}\, i^2 \\
&= \lim_{n\to\infty} \left[\frac{8}{n^3}\, \frac{2n^3+3n^2+n}{6}\right] \\
&= \left(\frac{8}{6}\right) 2 \\
&= \frac{8}{3}
\end{aligned}$$

2. $\Delta x = \dfrac{2}{n}$ and $x_i = 1 + i\Delta x$

$$\begin{aligned}
A &= \lim_{n\to\infty} \sum_{i=1}^{n} f(c_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} (1+i\Delta x)^2 \Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left(1 + 2i\Delta x + i^2(\Delta x)^2\right) \Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} (\Delta x + 2i(\Delta x)^2 + i^2(\Delta x)^3) \\
&= \lim_{n\to\infty} \left[2 + \frac{8}{n^2}\, \frac{n^2+n}{2} + \frac{8}{n^3}\, \frac{2n^3+3n^2+n}{6}\right] \\
&= \frac{26}{3}
\end{aligned}$$

3. $\Delta x = \dfrac{3}{n}$ and $x_i = 1 + i\Delta x$

$$
\begin{aligned}
A &= \lim_{n\to\infty} \sum_{i=1}^{n} f(c_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[2(1+i\Delta x)\right]\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[2\Delta x + 2i(\Delta x)^2\right] \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left(\frac{6}{n} + \frac{18}{n^2}\, i\right) \\
&= \lim_{n\to\infty} \left[6 + \frac{18}{n^2}\,\frac{n^2+n}{2}\right] \\
&= 15
\end{aligned}
$$

4. $\Delta x = \dfrac{1}{n}$ and $x_i = 1 + i\Delta x$

$$
\begin{aligned}
A &= \lim_{n\to\infty} \sum_{i=1}^{n} f(c_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[4 - (1+i\Delta x)^2\right]\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[4 - (1 + 2i\Delta x + i^2(\Delta x)^2)\right]\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[3\Delta x - 2i(\Delta x)^2 - i^2(\Delta x)^3\right] \\
&= \lim_{n\to\infty} \left[3 - \frac{2}{n^2}\,\frac{n^2+n}{2} - \frac{1}{n^3}\,\frac{2n^3+3n^2+n}{6}\right] \\
&= \frac{5}{3}
\end{aligned}
$$

5. $\Delta x = \dfrac{3}{n}$ and $x_i = 1 + i\Delta x$

$$\begin{aligned}
A &= \lim_{n\to\infty} \sum_{i=1}^{n} f(c_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[(1+i\Delta x)^2 + 3(1+i\Delta x) - 2\right]\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[1 + 2i\Delta x + i^2(\Delta x)^2 + 3 + 3i\Delta x - 2\right]\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[2\Delta x + 5i(\Delta x)^2 + i^2(\Delta x)^3\right] \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[\frac{6}{n} + \frac{45}{n^2}\, i + \frac{27}{n^3}\, i^2\right] \\
&= \lim_{n\to\infty} \left[\frac{6}{n} + \frac{45}{n^2}\, \frac{n^2+n}{2} + \frac{27}{n^3}\, \frac{2n^3+3n^2+n}{6}\right] \\
&= \frac{75}{2}
\end{aligned}$$

6. $\Delta x = \dfrac{5}{n}$ and $x_i = -3 + i\Delta x$

$$\begin{aligned}
A &= \lim_{n\to\infty} \sum_{i=1}^{n} f(c_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[2(i\Delta x - 3)^2 - 4(i\Delta x - 3) + 5\right]\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[2(i^2(\Delta x)^2 - 6i\Delta x + 9) - 4i\Delta x + 12 + 5\right]\Delta x \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[2(i^2(\Delta x)^2 - 12i\Delta x + 18 - 4i\Delta x + 17\right] \\
&= \lim_{n\to\infty} \sum_{i=1}^{n} \left[2(i^2(\Delta x)^3 - 16i(\Delta x)^2 + 35\Delta x\right] \\
&= \lim_{n\to\infty} \left[\frac{250}{n^3}\, \frac{2n^3+3n^2+n}{6} - \frac{400}{n^2}\, \frac{n^2+n}{2} + 175\right] \\
&= \frac{175}{3}
\end{aligned}$$