Worksheet: Riemann Sums and Sigma Notation

Q1: Represent the area under the curve of the function $f(x) = x^2 + 2$ on interval $[0, 2]$ in sigma notation using right Riemann sums with n subintervals.

A $\frac{8}{n^3}\sum_{i=0}^{n-1} i^2 + 2$

B $\frac{8}{n^3}\sum_{i=1}^{n} i^2 + 2$

C $\frac{4}{n}\sum_{i=0}^{n-1}(\frac{2}{n^2})i^2 + 1$

D $\frac{4}{n}\sum_{i=1}^{n}(\frac{2}{n^2})i^2 + 1$

E $\frac{8}{n^3}\sum_{i=1}^{n} i^2$

Q2: Find the lower Riemann sum approximation for $f(x) = 5 - x^2$ on $[1, 2]$, given that $n = 4$ subintervals.

A 1.95

B 2.28

C 2.01

D 4.05

E 3.03

Q3: Compute the right Riemann sum for $f(x) = \cos(2\pi x)$ on $\left[0, \frac{1}{2}\right]$, given that there are four subintervals of equal width.

A 0.125

B 2

C 0.5

D 0

E 0.25

Q4: Compute the left Riemann sum for $f(x) = \frac{1}{x^2 + 2}$ on $[-3, 3]$, given that there are six subintervals of equal width. Approximate your answer to nearest two decimal places.

A 2.18

B 2.65

C 1.59

D 1.99

E 1.09

Q5: Compute the right Riemann sum for $f(x) = \dfrac{1}{x(x-2)}$ on $[3, 5]$, given that there are four subintervals of equal width. Approximate your answer to the nearest three decimal places.

A 0.236

B 0.421

C 0.368

D 0.318

E 0.295

Q6: Represent the area under the curve of the function $f(x) = \dfrac{1}{x-2}$ in the interval $[3, 5]$ in sigma notation using a right Riemann sum with n subintervals.

A $\dfrac{2}{n}\sum_{i=1}^{n} \dfrac{1}{i-n}$

B $\sum_{i=1}^{n} \dfrac{i}{i-n}$

C $\sum_{i=0}^{n-1} \dfrac{i}{i-n}$

D $\sum_{i=1}^{n} \dfrac{2}{2i+n}$

E $\sum_{i=0}^{n-1} \dfrac{1}{i-n}$

Q7: Represent the area under the curve of the function $f(x) = x^2 + 2x + 1$ on the interval $[0, 3]$ in sigma notation using a right Riemann sum with n subintervals.

A $\frac{3}{n^3}\sum_{i=0}^{n-1}(9i^3 + 6ni^2 + n^2 i)$

B $\frac{3}{n^3}\sum_{i=0}^{n-1}(9i^2 + 6ni + n^2)$

C $\frac{3}{n^3}\sum_{i=1}^{n}(9i^2 + 6ni + n^2)$

D $\frac{3}{n^3}\sum_{i=1}^{n}(9i^3 + 6ni^2 + n^2 i)$

E $\frac{3}{n^2}\sum_{i=1}^{n}9i^2$

Q8: Represent the area under the curve of the function $f(x) = x^3$ on the interval $[0, 2]$ in sigma notation using a right Riemann sum with n subintervals.

A $\frac{16}{n^4}\sum_{i=0}^{n-1}i^3$

B $\frac{16}{n^4}\sum_{i=0}^{n-1}i^4$

C $\frac{16}{n^4}\sum_{i=1}^{n}i^3$

D $\frac{16}{n^4}\sum_{i=1}^{n}i^4$

E $\frac{8}{n^3}\sum_{i=0}^{n-1}i^3$

Q9: Represent the area under the curve of the function $f(x) = x^2 + 4$ in the interval $[-2, 2]$ in sigma notation using a right Riemann sum with n subintervals.

A $\frac{64}{n^3} \sum_{i=1}^{n} (n + 2i^2 - 2i)$

B $\frac{64}{n^3} \sum_{i=1}^{n} (n^2 + 2i^2)$

C $\frac{64}{n^3} \sum_{i=1}^{n} (2i^2 - 2ni)$

D $\frac{64}{n^3} \sum_{i=0}^{n-1} (n^2 + 2i^2 - 2ni)$

E $\frac{64}{n^3} \sum_{i=1}^{n} (n^2 + 2i^2 - 2ni)$

Q10: Represent the area under the curve of the function $f(x) = x^2 - 1$ on the interval $[0, 3]$ in sigma notation using a right Riemann sum with n subintervals.

A $\frac{3}{n^3} \sum_{i=0}^{n-1} (9i^2 - n^2)$

B $\frac{27}{n^3} \sum_{i=0}^{n-1} i^2$

C $\frac{27}{n^3} \sum_{i=1}^{n} i^2$

D $\frac{3}{n^3} \sum_{i=1}^{n} (9i^2 - n^2)$

E $\frac{3}{n^3} \sum_{i=1}^{n} (9i^3 - n^2 i)$