Chapter 04_Assignment

Ex 1:

Find the most general anti-derivative of the function

a/ $f(x) = 6x^2 - 2x + 3$

b/ $f(x) = \sqrt[4]{x} + \dfrac{1}{x^2}$

c/ $f(x) = \dfrac{x^2 + x + 2}{x}$

d/ $f(x) = 2x\left(x^2 + 1\right)$

Chapter 04_Assignment

Ex 2:

Find the anti-derivative of that satisfies the given condition

a/ $f\left(x\right)=5x^4-2x^5, F\left(0\right)=4$

b/ $f\left(x\right)=4-\dfrac{2x}{x^2+1}, F\left(0\right)=1$

Chapter 04_Assignment

Ex 3:

Find $f(x)$ for $f'(x)=\sqrt{2x+1}$ and $f(0)=1$

Chapter 04_Assignment

Ex 4:

A particle is moving with the given data. Find the position of the particle

a/ $v(t) = \sin t - \cos t, s(0) = 0$

b/ $v(t) = 10\sin t + 3\cos t, s(\pi) = 0$

c/ $v(t) = 10 + 3t - 3t^2, s(2) = 10$

Chapter 04_Assignment

Ex 5:

Estimate the area under the graph of $y = f(x)$ using 6 rectangles and **left endpoints.**

a/ $f(x) = x + \dfrac{1}{x}, x \in [1, 4]$

b/ $f(x) = x^2 - 2, x \in [-1, 2]$

c/ $f(x) = 3 - \dfrac{1}{2}x,\ 2 \le x \le 14$

Chapter 04_Assignment

Ex 6:

Estimate the area under the graph of $y = f(x)$ using 6 rectangles and **right endpoints.**

a/ $f(x) = x + \dfrac{1}{x}, x \in [1,4]$

b/ $f(x) = x^2 - 2, x \in [-1,2]$

c/ $f(x) = x^2 - 2x,\ 0 \le x \le 3$

Chapter 04_Assignment

Ex 7:

Estimate the area under the graph of $y = f(x)$ using **midpoints.**

a/ $f(x) = x + \dfrac{1}{x},\ x \in [1,4],\ n = 6$

b/ $f(x) = x^2 - 2,\ x \in [-1,2],\ n = 6$

c/ $f(x) = \sqrt{x} - 2,\ 1 \le x \le 6,\ n = 5$

Chapter 04_Assignment

Ex 8:

The function f is continuous on the closed interval $[2,10]$ and has values given in the table below.

x	2	6	7	10
$f(x)$	5	15	17	11

Using the subintervals $[2,6],[6,7]$, and $[7,10]$, what is the trapezoidal approximation of $\int_{2}^{10} f(x)dx$?

Chapter 04_Assignment

Ex 9:

Use the **Trapezoidal Rule** to approximate the given integral with the specified value of n

a/ $\int_0^3 \sqrt{x}\,dx,\ n = 4$

b/ $\int_1^3 \frac{\sin x}{x}\,dx,\ n = 6$

Chapter 04_Assignment

Ex 10:

Use the **Simpson's Rule** to approximate the given integral with the specified value of n

a/ $\int_0^3 \sqrt{x}\,dx,\ n = 4$

b/ $\int_1^3 \frac{\sin x}{x}\,dx,\ n = 6$

Chapter 04_Assignment

Ex 11:

Use the Midpoint Rule the given value of n to approximation the integral. Round the answer to four decimal places.

$$1. \int_0^8 \sin\sqrt{x}\,dx,\ \ n=4$$

$$2. \int_0^2 \frac{x}{x+1}\,dx,\ \ n=5$$

$$3. \int_0^{\pi/2} \cos^4 x\,dx,\ \ n=4$$

$$4. \int_1^4 \sqrt{x^3+1}\,dx,\ \ n=6$$

Chapter 04_Assignment

Ex 12:

Let $f(x)=\begin{cases}-x-1, -3\le x\le 0\\ -\sqrt{1-x^2}, 0\le x\le 1\end{cases}$. Evaluate $\int_{-3}^{1} f(x)dx$

Chapter 04_Assignment

Ex 13:

Find the derivative of the function

a/ $g(x)=\int_0^x \sqrt{1+t^2}\,dt$

b/ $g(x)=\int_1^{x^4} \frac{1}{\cos t}\,dt$

c/ $g(x)=\int_1^{\sqrt{x}} \frac{\sin u}{u}\,du$

d/ $g(x)=\int_{2x}^{x^2+x+2} \frac{e^t}{t}\,dt$

e/ $g(x)=\int_{\sin x}^{\cos x} \left(1+v^2\right)^{10}\,dv$

Ex 14:

Find $g'(0)$ if

a/ $g(x)=\int_{0}^{x^2} e^{2t+1}dt$

b/ $g(x)=\int_{2x-1}^{x^3} u\sqrt{u+1}du$

Chapter 04_Assignment

Ex 15:

Suppose the acceleration function and initial velocity are

$$a(t) = t + 3\left(m / s^2\right), v(0) = 5(m / s).$$

Find the velocity at time t and the distance traveled when $0 \le t \le 5$

Ex 16:

A particle moves along a line with velocity function $v(t)=t^2-t,$ where is measured in meters per second. Find the displacement and the distance traveled by the particle during the time interval $t\in[0,2]$.

Ex 17:

Find the average value of the function on the given interval

a/ $f\left(x\right)=x^2,\ \left[-1,1\right]$

b/ $f\left(x\right)=\dfrac{1}{x},\ \left[1,5\right]$

c/ $f\left(x\right)=x\sqrt{x},\ \left[1,4\right]$

d/ $f\left(x\right)=x\ln x,\ \left[1,e^2\right]$