

Show all work neatly for credit. Circle/Box your answers if appropriate. Use additional sheets of paper if needed and staple all pages together. Do not approximate/round unless asked to do so.

- 1) Decide whether each statement is True or False. Write your answer in the blank.

_____ (a) $\int (g(x) - f(x))dx = \int g(x)dx - \int f(x)dx$

_____ (b) $\int 8f(x)dx = 8\int f(x)dx$

_____ (c) $\int f(x)g(x)dx = \int f(x)dx \int g(x)dx$

_____ (d) $\int_a^b f(x)dx = -\int_b^a f(u)du$ (no typo)

- 2) Find $f(x)$ if $f'(x) = 1 + \cos x$ and $f(0) = 4$

- 3) If $f(x)$ is continuous for $0 \leq x \leq 6$,

use $\int_0^3 f(x)dx = 4$, $\int_3^6 f(x)dx = 4$, and $\int_2^6 f(x)dx = 5$, to find the value of $\int_0^2 f(x)dx$.

4) Use the limit of the Riemann Sum with right endpoints to evaluate the definite integral:

Yes, this is the long way from sect 5.2, no credit for other methods! Riemann Sum: $\lim_{n \rightarrow \infty} \sum_{i=1}^n f(x_i) \Delta x$

$$\int_0^2 (x - x^2) dx$$

5) Find the integrals:

a) $\int (\sin x - x^{\frac{2}{3}} + \sec x \tan x) dx$

b) $\int \cos^4 x \sin x dx$

c) $\int \sin^2 x^2 dx + \int \cos^2 x^2 dx$

d) $\int \cos^4 x dx$

6) Find the integrals:

a) $\int \frac{5x+2}{\sqrt{7+4x+5x^2}} dx$

b) $\int x\sqrt{x-1} dx$

c) $\int_{-2}^2 \frac{88x}{1+2x^2+\pi x^{88}} dx$

7) a) If $h(x) = \int_{\sin x}^{\cos \pi} \cos(t^2) dt$, find the derivative $h'(x)$

b) Find : $\frac{d}{dx} \int_0^1 \cos(x^2) dx$

8) Find the minimum distance from the point (3,0) to $y = \sqrt{x}$.

- 9) If you are finding the root(zero) for $f(x) = x^3 - 3x + 4$ using Newton's method,
- a) would $x_1 = 1$ or $x_1 = -1$ be appropriate? Why or why not?
 - b) what would be a good initial approximation (integer value) for x_1 ? How did you find that value?
 - c) find the root accurate to 4 decimal places

- 10) Find the area bounded by the given curves. Sketch the region and a representative rectangle.
 $y^2 = x, \quad x - 2y = 3$