March 25, 2024 **REVIEW Quiz – Integrals** MTH 243 (Perović)

Max Score: **20 pts** **Name:** _____

GRADING:

- Completing this quiz is OPTIONAL, however it is *strongly* recommended.
- By completing this quiz, you will be able to earn up to 5% extra credit toward the second exam!
- The *deadline is sharp* so please make sure you do not miss it!!!

INSTRUCTIONS: Please read the following instructions **carefully**.

- You are allowed to use *any* "single variable calculus" textbook that you have access to (printed copy or online copy).
- For your convenience, here is a link to Paul's Online Notes for various Calculus courses.
- You should work on completing this quiz on *your own*, that is, you should *NOT* work with fellow students, roommates, friends, tutors, online chatting buddies, etc.
- You are NOT allowed to look for answers to these specific question on any of the online forums/platforms or apps.
- It is ok to use a calculator to *check* your work, BUT you should be able to these problems on the exam without a calculator!
- **Neatness and organization of your answers/submission matter!**
  - Your answers should be submitted as a *single pdf file*.
  - The uploaded pdf file should be titled `YOURLASTNAME-mth243-review-quiz2.pdf`.
  - Your answers should be *legible and with no scribbles*.
  - Your answers should be written on *the quiz itself* **OR** if writing on a separate paper, then each new problem should start on a separate page in your pdf submission.

  Failing to follow submission instructions will result in your final score being reduced.
- **All work must be shown for full credit!**
- Reviewing this material is essential to your understanding of integration of multivariable functions and related concepts. *Whether you complete this quiz or not, does not change the fact that you are responsible for this material!*

DEADLINE (sharp): **11:59pm on Monday, March 25, 2024, via Brightspace.**

1. Find the following *indefinite* integrals.

(a) $\int 7\,t\,e^{8-5t^2}\,dt$

$\int 7\,t\,e^{8-5t^2}\,dt\;=$

(b) $\int (2x+5)\,e^{3x-7}\,dx$

$\int (2x+5)\,e^{3x-7}\,dx =$

Turn over

2. Find the following *definite* integrals.

(a) $\displaystyle\int_1^3 5\,x\,\sqrt{2x^2+7}\,dx$

$\displaystyle\int_1^3 5\,x\,\sqrt{2x^2+7}\,dx\;=$

(b) $\displaystyle\int_{-\pi}^{\pi} \sin(3y)\,dy$

$\displaystyle\int_{-\pi}^{\pi} \sin(3y)\,dy\;=$

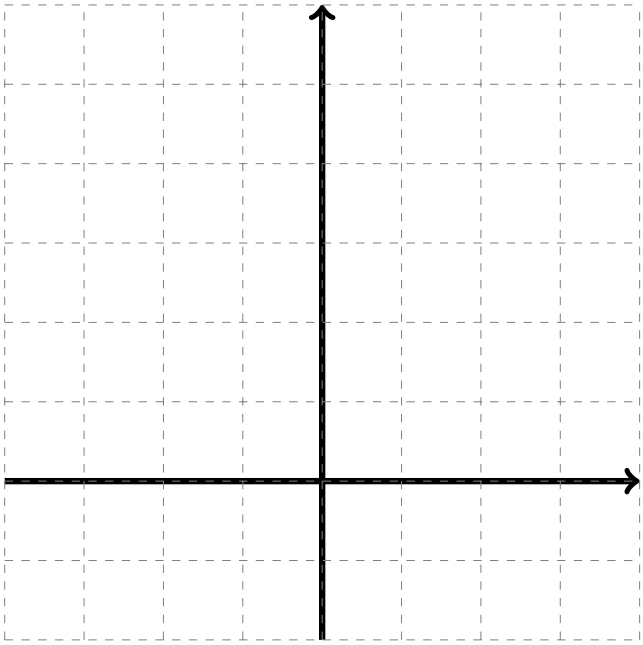
3. Let $\displaystyle\int_0^3 f(x)\,dx = 8$. What is the *average value of* $f(x)$ on the interval $0 \le x \le 3$?

Answer :

Turn over

4. Consider the function $f(x) = x^2$.

(a) *Sketch* the graph of $f(x)$ and make sure to label axes and increments clearly.



(b) Calculate the *LEFT Riemann sum* of $f(x)$ on the interval $-2 \leq x \leq 2$ with TWO subintervals. *Make sure to include the expression for the sum leading to you answer.*

Answer :

(c) Calculate the *RIGHT Riemann sum* of $f(x)$ on the interval $-2 \leq x \leq 2$ with TWO subintervals. *Make sure to include the expression for the sum leading to you answer.*

Answer :

Turn over ⟶

(d) Calculate the *LEFT Riemann sum* of $f(x)$ on the interval $-2 \leq x \leq 2$ with FOUR subintervals. *Make sure to include the expression for the sum leading to you answer.*

Answer :

(e) Calculate the *RIGHT Riemann sum* of $f(x)$ on the interval $-2 \leq x \leq 2$ with FOUR subintervals. *Make sure to include the expression for the sum leading to you answer.*

Answer :

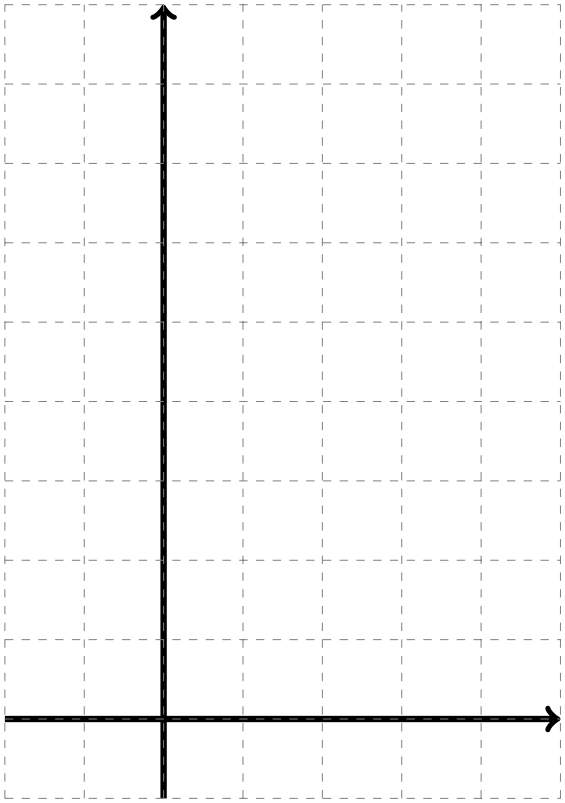
(f) Calculate the *MIDPOINT Riemann sum* of $f(x)$ on the interval $-2 \leq x \leq 2$ with FOUR subintervals. *Make sure to include the expression for the sum leading to you answer.*

Answer :

Turn over ⟶

5. Consider the functions $f(x) = x^2$ and $g(x) = x^3$.

(a) **Sketch the region** bounded by the graphs of $f(x)$ and $g(x)$ on the interval $0 \leq x \leq 2$. *Make sure to clearly label axes, increments, and which graph is which.*



(b) **Set up** the integral(s) that can be used to determine the *area of the region* from part (a).

Answer :

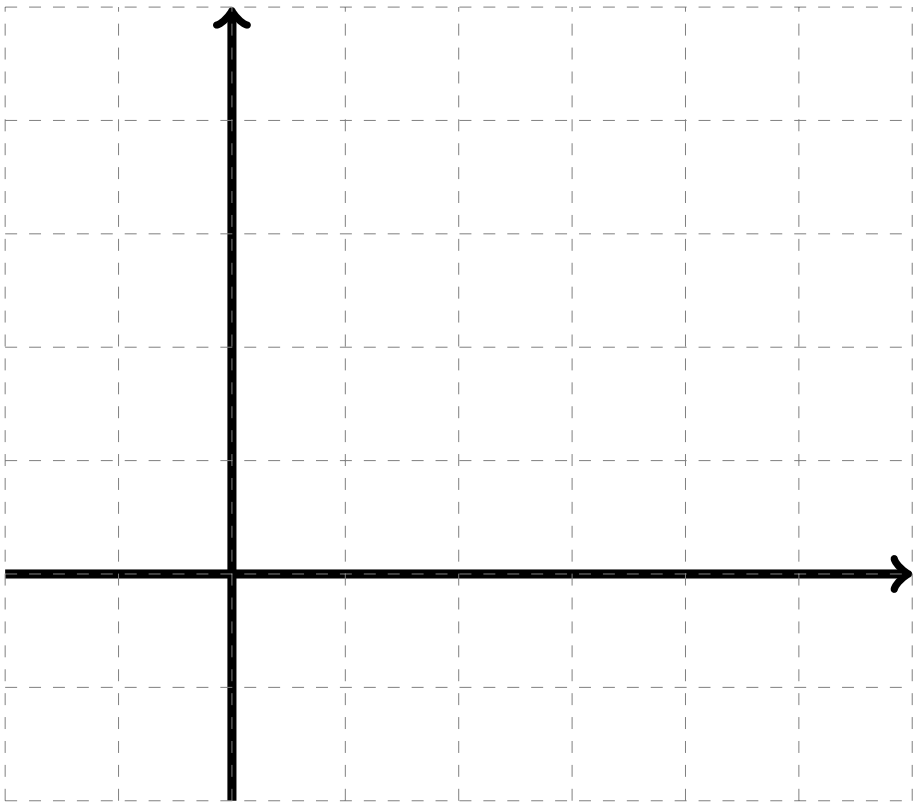
(c) **Determine** the area of the region from part (a) by evaluating the appropriate integral(s) from part (b).

Area =

Turn over →

6. Consider the *relations*

(a) **Sketch the region** *in the first quadrant* $(x \geq 0, y \geq 0)$ bounded by the graphs of equations $y = -x + 3$ and $x = -(y-1)^2 + 4$. *Make sure to clearly label axes, increments, and which graph is which.*



(b) **Set up (but do not evaluate)** the integral(s) that can be used to determine the *area of the region* from part (a).

Answer :

Turn over

7. Suppose that f and g are integrable on any finite interval and that

$$\int_1^2 f(x)\,dx = -4\,, \qquad \int_1^5 f(x)\,dx = 6\,, \qquad \int_1^5 g(x)\,dx = 8\,.$$

Find the following quantities:

(a) $\displaystyle\int_2^2 g(x)\,dx =$

(b) $\displaystyle\int_5^1 g(x)\,dx =$

(c) $\displaystyle\int_1^2 3f(x)\,dx =$

(d) $\displaystyle\int_1^5 \big[f(x) - g(x)\big]\,dx =$

(e) $\displaystyle\int_1^5 \big[4f(x) - g(x)\big]\,dx =$

(f) $\displaystyle\int_2^5 f(x)\,dx =$

END