Name: **Exam 3 (Version A)**

Instructions: This exam is closed book, closed note, and an individual effort. Electronic devices other than approved calculators are not allowed on your person (e.g., no cell phones or calculators with CAS). Remove any smartwatches and non-religious head-wear. Cheating of any kind will not be tolerated and will result in a grade of zero.**You must clear the memory on your calculator before beginning the exam.** Answer each question. **You need not show all work to receive full credit.** You have **1 hour 15 minutes** to finish the exam and submit it to Blackboard. Answer all questions to the best of your ability. This portion of the exam has 26 possible points. You will be graded out of 25 points. Every question is worth 1 point.

TOTAL:

1. If $F(x)$ is the antiderivative of $f(x)$ continuous on $[a, b]$ then $\int_a^b f(x)\,dx =$ _____.

   (a) $F(x) + C$

   (b) $F(x)$

   (c) $F(b) - F(a)$

   (d) $F(f(b)) - F(f(a))$

2. If $h(n)$ is the rate of height of a building in New York in feet per window and n is the number of windows, interpret $\int_0^{100} h(n)\,dn = 600$.

   (a) The building is 600ft tall when there are 100 windows.

   (b) The building is growing 600ft per window after 100 windows.

   (c) There are 600 windows when the building is 100 ft tall.

   (d) The number of windows is growing by 600 for every additional foot after 100ft is built.

3. The Right-hand sum is always an overestimate and the Left-hand sum is always an underestimate.

   (a) True

   (b) False

   (c) I just want to get this question wrong

4. For $k \neq 0$ constant, $\int k\,dx = 0$.

   (a) Could not be more True.

   (b) Something seems fishy... False.

   (c) I have no clue and don't feel like guessing.

5. If $f(x)$ and $g(x)$ are continuous on $[a, b]$, $\int_a^b f(x)\,dx = 2$, and $\int_b^a g(x)\,dx = 7$, determine $\int_a^b (f(x) + g(x))\,dx$.

   (a) 9

   (b) -5

   (c) 5

   (d) 14

6. Consumer surplus is the amount gained by a consumer by buying at retail rather than the maximum they are willing to pay.

   (a) Put me down for True

   (b) Everything is wrong! False

   (c) 21

7. Explain the difference between an indefinite integral and a definite integral.

   (a) Definite integrals have bounds and give an exact number but may vary by a constant.

   (b) Indefinite integrals have bounds and give an exact number but may vary by a constant.

   (c) Indefinite integrals are a generalization of the antiderivative of a function.

   (d) Definite integrals are a generalization of the antiderivative of a function.

8. Which is an example of an indefinite integral?

   (a) $\int f(g(h(j(k(x))))\,dx$

   (b) $\int_1^2 x\,ds$

   (c) $\int_{-\infty}^{\infty} 2\,dx$

   (d) $\int_0^{9281039} i(8)\pi\,di$

   (e) None of the above are indefinite.

9. State the Power Rule for an indefinite integral.

   (a) $= \int x^n \, dx = (n-1)x^{n-1} + C$

   (b) $\int x^n \, dx = \dfrac{x^{n+1}}{n+1}$

   (c) $\int n^x \, dx = \dfrac{n^x}{\ln(n)} + C$

   (d) $\int n^x \, dx = \ln(n) n^x$

   (e) None of the above are true.

10. $\int u'(x) \cdot f(u(x)) \, dx = \int f(u) \, du$ _____

    (a) Yup; That's the one! True

    (b) Woah! That's just gotta be wrong. False

    (c) Is this another language?

11. $\int f(x) \, dx = \dfrac{LHS + RHS}{2}$.

    (a) Makes sense to me. True

    (b) Lol good try! False

    (c) What is LHS? Long Headed Snake?

12. $\int e^x + \dfrac{2}{x} - \dfrac{12}{2\sqrt[3]{x}} \, dx =$

    (a) $e^x - x^{-2} - 9x^{2/3} + C$

    (b) $\ln|x| + e^x - 9x^{2/3} + C$

    (c) $e^x + \ln|x| - 18x^{1/3} + C$

    (d) $e^x - x^{-2} - 18x^{1/3} + C$

13. $\int_{\frac{-4}{11}}^{\frac{4}{11}} dx =$

    (a) 1

    (b) $\dfrac{-8}{11}$

    (c) $\dfrac{8}{11}$

    (d) 0

14. $\displaystyle\int_0^{\sqrt{2}} \frac{8x}{(1-x^2)^4}\,dx =$

(a) If you choose this one you get half credit on this question.

(b) Does not exist.

(c) $\dfrac{-8}{3}$

(d) $\dfrac{\ln|\sqrt{2}|^3 - \ln|0|^3}{-3}$

15. $\displaystyle\int_7^8 x(x-7)^8\,dx =$

(a) If you choose this one you get half credit on this question.

(b) $\dfrac{1}{9}$

(c) 1

(d) $.8\overline{1}$

16. $\displaystyle\int e^{t+e^t}\,dt =$

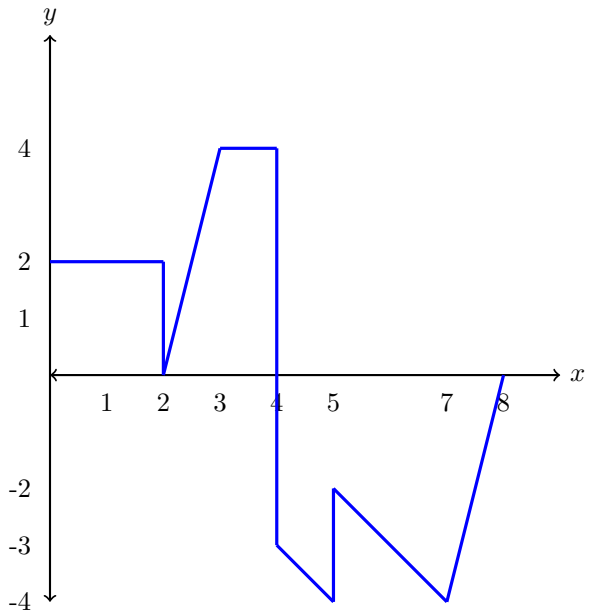
(a) $\dfrac{e^{t+e^t}}{1+e^t} + C$

(b) $e^{e^t} + C$

(c) $\dfrac{e^{e^t}}{e^t} + C$

(d) $e^t + C$

Use the graph below of $f(x)$ to answer 17-21:



17. $\int_4^5 f(x)\,dx$

(a) 7/2

(b) -3

(c) 7

(d) -7/2

18. $\int_5^7 f(x)\,dx$

(a) -6

(b) 8

(c) 6

(d) 3

19. $\int_0^4 f(x)\,dx$

(a) 2

(b) -5

(c) 10

(d) -2

20. $\int_0^8 f(x)\,dx$

(a) -8

(b) 8

(c) 3/2

(d) -3/2

21. $\int_0^8 |f(x)|\,dx$

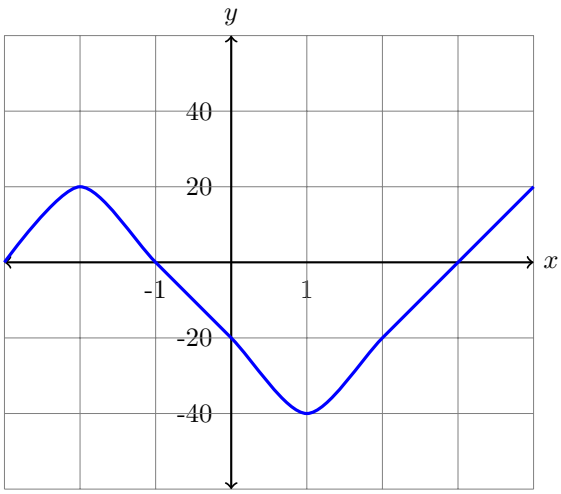
(a) 16

(b) 3/2

(c) 43/2

(d) 20

For 22- 26 use the graph of $f(x)$ below to estimate the questions (Hint: Use the grids of the graph)



22. $\int_{-3}^{-1} f(x)\,dx$

(a) 20

(b) -10

(c) 400

(d) -200

23. $\int_{-1}^{-2} f(x)\,dx$

(a) -200

(b) 200

(c) 10

(d) -10

24. $\int_{1}^{3} f(x)\,dx$

(a) -40

(b) 800

(c) 20

(d) 40

25. $\int_{-3}^{4} f(x)\,dx$

(a) -50

(b) 50

(c) -1000

(d) 1000

26. $\int_{-3}^{4} |f(x)|\,dx$

(a) 1000

(b) 50

(c) 2200

(d) 110

(1) C A B B B A C A E A B B C C D B D A C D C A D A A D