MA 123 Fall 2023
Elementary Calculus

Exam 4
12/13/23

Name: Grader

Student ID #: 9_____ **Sec:** _____

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Do not remove the answer page — you will turn in the entire exam. You have two hours to complete this exam. No books or notes may be used. You may use an ACT-approved calculator during the exam, but NO calculator with a Computer Algebra System (CAS), networking, or camera is permitted. Absolutely no cell phones during the exam is allowed.

The exam consists of 3 short answer questions and 18 multiple choice questions. Answer the short answer questions on the back of this page, and record your answers to the multiple choice questions on this page. For each multiple choice question, you will need to fill in the circle corresponding to the correct answer. For example, if (a) is correct, you must shade

(a) (b) (c) (d) (e)

It is your responsibility to make it CLEAR which response has been chosen. **You will not get credit unless the correct answer has been clearly marked on this page.**

GOOD LUCK!

3. (a) (b) (c) (d) **(e)**

4. (a) (b) (c) **(d)** (e)

5. (a) (b) (c) (d) **(e)**

6. **(a)** (b) (c) (d) (e)

7. (a) **(b)** (c) (d) (e)

8. (a) **(b)** (c) (d) (e)

9. (a) **(b)** (c) (d) (e)

10. (a) (b) **(c)** (d) (e)

11. **(a)** (b) (c) (d) (e)

12. (a) (b) **(c)** (d) (e)

13. (a) **(b)** (c) (d) (e)

14. (a) (b) (c) (d) **(e)**

15. (a) (b) **(c)** (d) (e)

16. **(a)** (b) (c) (d) (e)

17. (a) (b) (c) **(d)** (e)

18. **(a)** (b) (c) (d) (e)

19. (a) (b) **(c)** (d) (e)

20. (a) (b) (c) (d) **(e)**

Short Answer Questions

Each question is an opportunity to earn 5 points. Points are earned on the clarity and correctness of your work, not merely on having a correct answer somewhere.

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1. Let x and y be two positive numbers such that $x^2 \cdot y = 100$. Determine the minimum possible sum $S = x + y$. **You must correctly perform a number line test to earn full credit.**

Minimum sum = $3 \cdot 5^{2/3} \approx 8.772053$

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2. Evaluate $\int_1^2 \frac{8x^7}{x^8+5}\,dx$. **You must show work to receive credit.**

$$\int_1^2 \frac{8x^7}{x^8+5}\,dx = \ln(261) - \ln(6) = \ln\left(\frac{261}{6}\right) \approx 3.772761$$
