

MATH 112, MIDTERM, SPRING 2023

INSTRUCTOR: TUAN PHAM

Name

Instructions:

- This is a closed-book exam, 60 minutes long.
- The Maple Learn cheat sheet is allowed. A 4" x 6" handwritten single-sided note card is allowed. A scientific calculator is allowed. Graphing/programmable/transmittable calculators are not allowed.
- The cheat sheet and the note card have to be turned in together with the exam.
- For Problems 1-5, fill in the bubbles on this front page. To each problem, only one answer is correct.
- For Problems 6-8, make sure to show all necessary steps. Mysterious answers will receive little or no credit.

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Problem	Possible points	Earned points
1-5	10	
6	5	
7	5	
8	5	
Total	25	

Problem 1. (2 points) Which of the following is equal to $10^{\log(2x)}$?

- A. x
- B. $2x$
- C. $5x$
- D. $10x$

Problem 2. (2 points) The expression

$$\ln x - \frac{1}{2} \ln y + 2$$

can be combined into a single logarithm as

- A. $\ln\left(\frac{e^2x}{\sqrt{y}}\right)$
- B. $\ln\left(\frac{x}{\sqrt{y}} + 2\right)$
- C. $\ln\left(x - \frac{y}{2} + 2\right)$
- D. $\ln\left(x - \frac{y}{2} + e^2\right)$

Problem 3. (2 points) Which of the following is the best approximation of the measure of the angle $128^\circ 3' 17''$ in radians?

- A. 2.2357
- B. 2.2422
- C. 2.2349
- D. 7339.43

Problem 4. (2 points) Choose the expression that is equal to $\cos(x - 7\pi)$.

- A. $\cos x$
- B. $-\cos x$
- C. $\sin x$
- D. $-\sin x$

Problem 5. (2 points) If $\frac{\pi}{2} < x < \pi$ then $\tan x$ is

- A. positive
- B. negative

Problem 6. (5 points) Solve the equation

$$x \log x = 2x$$

Problem 7. (5 points) Use suitable trigonometric identities and the table of familiar angles to find $\sec(-495^\circ)$.

Problem 8. (5 points) Solve the inequality

$$\left(\frac{1}{2}\right)^{x-1} > \frac{1}{4}$$