Test Number: 1915

MA 15800 Exam 3 Spring 2025

Student Name: _____ Section Number: _____

1. Fill out your name and section number (see table below) in the space provided above. On the scantron, fill in your name, section number (see table below), test number (see above), and your student ID number (with two leading zeros). Sign your name.
2. You can write in this exam booklet. Turn in both your scantron and your exam booklet when you are done. Note: grades are determined only by your scantron answer sheet.
3. Only a TI-30Xa scientific calculator is allowed. No other electronic devices are allowed. No books or notes are allowed.
4. The exam questions are self-explanatory. Please do not ask the proctor to explain or interpret any of the exam questions.
5. There are 15 questions. You will have 60 minutes to complete the exam. Good luck!

Section	Class Meeting Time	Instructor
001	4:30 pm	Conner Partaker
003	3:30 pm	Conner Partaker
300	8:30 am	Jill Shalabi
400	7:30 am	Susitha Karunaratne
999	distance learning	Jill Shalabi

Factoring Formulas

$x^3 - y^3 = (x - y)(x^2 + xy + y^2)$

$x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

Sphere

$V = \frac{4}{3}\pi r^3$ $S = 4\pi r^2$

Compound Interest

$A = P\left(1 + \frac{r}{n}\right)^{nt}$ $A = Pe^{rt}$

Closed Right Circular Cylinder

$V = \pi r^2 h$ $S = 2\pi rh + 2\pi r^2$

Closed Right Circular Cone

$V = \frac{1}{3}\pi r^2 h$ $S = \pi r\sqrt{r^2 + h^2} + \pi r^2$

Pythagorean Identity

$sin^2\,\theta + cos^2\,\theta = 1$

Problem 1

(6.67 points)

Find the reference angle θ_R for $\theta = -179^\circ$.

1. (A) $\theta_R = 89^\circ$

   (B) $\theta_R = 79^\circ$

   (C) $\theta_R = -1^\circ$

   (D) $\theta_R = 179^\circ$

   (E) $\theta_R = 1^\circ$

   (F) $\theta_R = 181^\circ$

Problem 2

(6.67 points)

In which quadrant(s) does the terminal side of θ lie if $\cot(\theta) > 0$ and $\sec(\theta) < 0$?

2. (A) Quadrant II

   (B) Quadrant I

   (C) Quadrants II and IV

   (D) Quadrant IV

   (E) Quadrants I and III

   (F) Quadrant III

Problem 3

(6.67 points)

Assume f is a one-to-one function. If $f(-3) = 19$, find $f^{-1}(19)$.

3. (A) -3

   (B) $f^{-1}(19)$ is undefined.

   (C) $\frac{1}{19}$

   (D) $-\frac{1}{3}$

   (E) -19

   (F) 3

Problem 4

(6.67 points)

Given $f(x) = \left(\frac{1}{8}\right)^x$, evaluate $f(-2)$.

4. (A) $-\frac{1}{4}$

   (B) $\frac{1}{4}$

   (C) 64

   (D) $\frac{1}{64}$

   (E) $f(-2)$ is undefined.

   (F) $-\frac{1}{64}$

Problem 5

(6.67 points)

Write the given logarithm in expanded form: $\ln(xyz)$

5. (A) $-\ln(x)-\ln(y)-\ln(z)$

   (B) $\ln(x)+\ln(y)+\ln(z)$

   (C) $\ln(x+y+z)$

   (D) $\ln(x)\ln(y)\ln(z)$

   (E) $\ln(x)-\ln(y)-\ln(z)$

   (F) $\ln(-x-y-z)$

Problem 6

(6.67 points)

If the point $(x,y)=(0,-1)$ is the point of intersection of the terminal side of angle θ and the unit circle, which of the following could be the measure of θ?

6. (A) $\frac{5\pi}{6}$

   (B) $\frac{\pi}{4}$

   (C) $\frac{\pi}{2}$

   (D) $-\frac{\pi}{2}$

   (E) $-\pi$

   (F) 0

Problem 7

(6.67 points)

Evaluate $\log(-2)$ to 4 decimal places.

7. (A) -0.0100

(B) -0.3010

(C) 0.3010

(D) 0.1353

(E) 0.0100

(F) $\log(-2)$ is undefined.

Problem 8

(6.67 points)

Solve the equation: $\log_9\left(x^2\right) = \log_9(x)$

8. (A) There is no solution.

(B) $x = 0$

(C) $x = 1$

(D) $x = 1$ and $x = 9$

(E) $x = -1$ and $x = 0$

(F) $x = 0$ and $x = 1$

Problem 9

(6.67 points)

Which of the following angles are coterminal with $\theta = \frac{3\pi}{4}$?

1. $-\frac{13\pi}{4}$
2. $\frac{13\pi}{4}$
3. $-\frac{11\pi}{4}$

9. (A) 1, 2, and 3

(B) 1 and 3 only

(C) 3 only

(D) 1 only

(E) 1 and 2 only

(F) 2 only

Problem 10

(6.67 points)

Combine into a single logarithm: $\log(x) + \log(y) - 4\log(z)$

10. (A) $\log\left(\frac{xy}{z^4}\right)$

(B) $\log\left(\frac{1}{4xyz}\right)$

(C) $\log(4xyz)$

(D) $\log\left(\frac{xy}{z}\right)^4$

(E) $\log\left(\frac{xy}{4z}\right)$

(F) The logs cannot be combined.

Problem 11

(6.67 points)

Solve the following equation for x (round to two decimal places): $2\ln(x) = 5$

11. (A) 12.18

(B) 0.92

(C) 11.98

(D) 0.40

(E) 74.21

(F) 20.09

Problem 12

(6.67 points)

Given $f(x) = x + 7$ determine the range of $f^{-1}(x)$.

12. (A) $[-7,0]$

(B) $(-\infty,0)$

(C) $(0,\infty)$

(D) $(-\infty,\infty)$

(E) $[7,\infty)$

(F) $[0,7]$

Problem 13

(6.67 points)

If $\$5000$ is invested in an account with an annual interest rate of 4% compounded continuously, determine the amount in the account after 10 years.

13. (A) \$5,400.00

(B) \$5,200.00

(C) \$8,370.79

(D) \$7,459.12

(E) \$272,990.75

(F) \$3,351.60

Problem 14

(6.67 points)

If $\sin(\theta) = \frac{1}{4}$ and the terminal side of θ lies in Quadrant III, find $\cos(\theta)$.

14. (A) $-\frac{\sqrt{15}}{4}$

(B) $-\frac{1}{\sqrt{15}}$

(C) $\frac{1}{\sqrt{15}}$

(D) $\frac{4}{\sqrt{15}}$

(E) $\frac{\sqrt{15}}{4}$

(F) $-\frac{4}{\sqrt{15}}$

Problem 15

(6.67 points)

Evaluate $\log_5(125)$.

15. (A) e^5

(B) 3

(C) It is undefined.

(D) 5

(E) 10^3

(F) e^3