Test Number: 1466

MA 15800 Exam 3 Fall 2024

Student Name: _____ Section Number: _____

1. Fill out your name and section number 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: you will be graded only based on 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	Time	Instructor		Section	Time	Instructor
101	1:30	Cian Nolan		109	12:30	Jax Mader
102	12:30	Cian Nolan		110	11:30	Jax Mader
103	8:30	Martin Hsu		500	11:30	Jakayla Robbins
104	7:30	Martin Hsu		600	10:30	Susitha Karunaratne
105	12:30	Conner Partaker		700	7:30	Tim Delworth
106	11:30	Conner Partaker		800	8:30	Jill Shalabi
107	1:30	Zijin Liu		Y01*	Distance Learning	Jill Shalabi
108	12:30	Zijin Liu		*Students in section Y01 should enter 999 as the section number on the scantron		

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 $\theta = -91^o$.

1. (A) $\theta_R = -89^o$

   (B) $\theta_R = 361^o$

   (C) $\theta_R = 89^o$

   (D) $\theta_R = -1^o$

   (E) $\theta_R = 1^o$

   (F) $\theta_R = 91^o$

Problem 2

(6.67 points)

Write in log form: $17 = 5^t$

2. (A) $\log_5(t) = 17$

   (B) $\log_t(17) = 5$

   (C) $\log_{17}(5) = t$

   (D) $\log_{17}(t) = 5$

   (E) $\log_t(5) = 17$

   (F) $\log_5(17) = t$

Problem 3

(6.67 points)

Find the amplitude and the period of the graph of $y = -2\cos\left(\frac{x}{3}\right)$.

3. (A) amplitude $= -2$ and period $= 6\pi$

   (B) amplitude $= 2$ and period $= \frac{\pi}{3}$

   (C) amplitude $= -2$ and period $= \frac{\pi}{3}$

   (D) amplitude $= 2$ and period $= 6\pi$

   (E) amplitude $= 2$ and period $= \frac{1}{3}$

   (F) amplitude $= -2$ and period $= \frac{2\pi}{3}$

Problem 4

(6.67 points)

Evaluate the expression: $\log_8 8 + \frac{\log_8(64)}{3\log_8(2)}$

4. (A) 8

   (B) 2

   (C) 3

   (D) 1

   (E) The expression is undefined.

   (F) 9

Problem 5

(6.67 points)

Find the exact value of $\csc\left(\frac{7\pi}{6}\right)$.

5. (A) $\frac{2}{\sqrt{3}}$

(B) $-\frac{2}{\sqrt{3}}$

(C) $-\frac{1}{2}$

(D) 2

(E) $\frac{1}{2}$

(F) -2

Problem 6

(6.67 points)

Given $\sin\theta = \frac{3}{7}$ and $\cos\theta < 0$, find the value of $\cot\theta$.

6. (A) $-\frac{3}{7}$

(B) $-\frac{3}{2\sqrt{10}}$

(C) 0

(D) $\frac{7}{3}$

(E) It is undefined.

(F) $-\frac{2\sqrt{10}}{3}$

Problem 7

(6.67 points)

Write in exponential form: $\log(2) = x$

7. (A) $10^2 = x$

   (B) $1^x = 2$

   (C) $x^{10} = 2$

   (D) $2^{10} = x$

   (E) $x^2 = 10$

   (F) $10^x = 2$

Problem 8

(6.67 points)

Find the exact value: $\sin\left(\frac{10\pi}{3}\right)\cos\left(-\frac{3\pi}{4}\right)$

8. (A) 1

   (B) -1

   (C) 0

   (D) $\frac{1}{2}$

   (E) $\frac{\sqrt{3}}{2}$

   (F) $\frac{\sqrt{6}}{4}$

Problem 9

(6.67 points)

Determine $\tan(t)$ if the terminal side of t intersects the unit circle at the point $(1,0)$.

9. (A) -1

(B) 1

(C) 0

(D) 2

(E) $\frac{1}{\sqrt{3}}$

(F) It is undefined.

Problem 10

(6.67 points)

Evaluate $\tan^{-1}(-1)$.

10. (A) $\frac{3\pi}{2}$

(B) π and $\frac{3\pi}{2}$

(C) $-\frac{\pi}{4}$ and $\frac{3\pi}{4}$

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

(E) $\frac{3\pi}{4}$ and $\frac{7\pi}{4}$

(F) $-\frac{\pi}{4}$

Problem 11

(6.67 points)

Solve the following equation: $3^x = -27$

11. (A) $x = -3$

(B) $x = 3$

(C) There is no solution.

(D) $x = -9$

(E) $x = -\frac{1}{3}$

(F) $x = \frac{1}{3}$

Problem 12

(6.67 points)

Express the following as a single logarithm: $3 - 5\ln x + 9\ln y + \ln 2x$

12. (A) $\ln\left(10\mathrm{e}^3 x^6 y^9\right)$

(B) $\ln\left(\frac{6y^9}{x^4}\right)$

(C) $\ln\left(\frac{2\mathrm{e}^3 y^9}{x^4}\right)$

(D) $\ln\left(10\mathrm{e}^3 x^6\right)$

(E) $\ln\left(2\mathrm{e}^3 x^6 y^9\right)$

(F) $\ln\left(\frac{6y^9}{x^4}\right)$

Problem 13

(6.67 points)

Solve the equation: $\log_9\left(x^2-12\right)=\log_9(x)$

13. (A) $x=4$

(B) $x=-4$ and $x=3$

(C) $x=-3$ and $x=4$

(D) There is no solution.

(E) $x=13$

(F) $x=-4$

Problem 14

(6.67 points)

Which angles are coterminal with $\theta=120^\circ$?

14. (A) -120° and 60°

(B) 60°, 240° and 300°

(C) 30° and 240°

(D) -240°, 60° and 840°

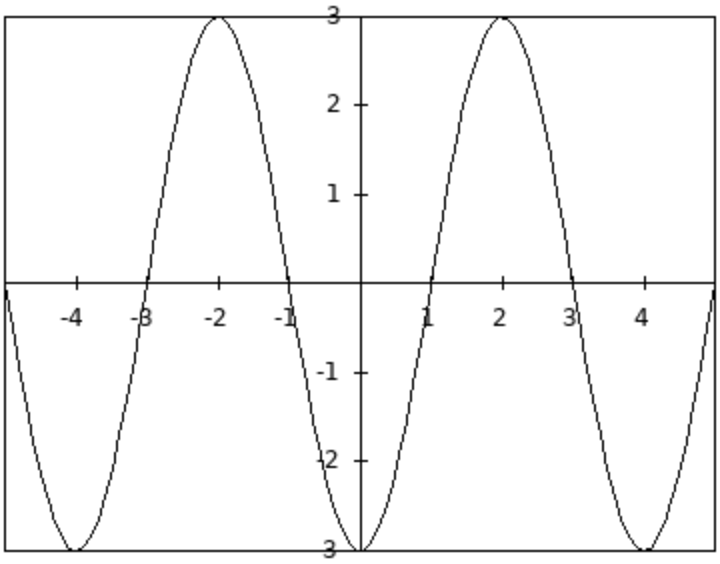
(E) 0° and 360°

(F) -240° and 480°

Problem 15

(6.67 points)

Which equation could be represented by the graph shown?



15. (A) $y = 6\cos(2\pi x)$

(B) $y = 3\cos(2\pi x)$

(C) $y = 6\cos\left(\frac{\pi x}{2}\right)$

(D) $y = 3\cos(2x)$

(E) $y = -3\cos\left(\frac{\pi x}{2}\right)$

(F) $y = -3\cos(2x)$