Test Number: 2265

MA 15800 Exam 1 Spring 2025

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: 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)

Given $f(x) = 3x + 1$, evaluate $f(4)$.

1. (A) 1

   (B) $f(4)$ does not exist.

   (C) 13

   (D) 0

   (E) $12x + 4$

   (F) 4

Problem 2

(6.67 points)

Completely factor the expression: $2x^2 - 6x + 4$

2. (A) $(x - 2)(x - 1)$

   (B) $(2x - 2)(x - 2)$

   (C) $2\,(x - 2)(x - 1)$

   (D) $(x + 2)(x + 1)$

   (E) $(2x + 2)(x + 2)$

   (F) $2\,(x + 2)(x + 1)$

Problem 3

(6.67 points)

Given $f(x) = 3x^2 + 2x$, find and simplify $f(t+1)$.

3. (A) $3t^2 + 2t + 5$

   (B) $t + 1$

   (C) $5t + 5$

   (D) $3t^2 + 2t$

   (E) t

   (F) $3t^2 + 8t + 5$

Problem 4

(6.67 points)

Find the domain of the function $f(x) = \dfrac{x+7}{\sqrt{-3x}}$.

4. (A) $(-\infty,-7) \cup (-7,\infty)$

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

   (C) $(0,\infty)$

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

   (E) $(-\infty,-7) \cup (-7,0) \cup (0,\infty)$

   (F) $(-\infty,0) \cup (0,\infty)$

Problem 5

(6.67 points)

Factor and simplify the expression: $(x-13)(7x+10)^5+(x-13)^2(7x+10)^4$

5. (A) The expression is not factorable.

   (B) $x^4(x-13)(7x+10)$

   (C) $(x-13)^2(7x+10)^5(8x-3)$

   (D) $(x-13)(7x+10)^4(8x+23)$

   (E) $(x-13)(7x+10)^4(8x-3)$

   (F) $(x-13)(7x+10)^4$

Problem 6

(6.67 points)

Given $f(x)=7x-3$ and $g(x)=x^3$, find $(f\circ g)(2)$.

6. (A) 11

   (B) 100

   (C) 88

   (D) 53

   (E) 8

   (F) 1331

Problem 7

(6.67 points)

Given $f(x)=10x^2+8x-1$ and $g(x)=\dfrac{1}{x}$, evaluate $3f(2)+6g(1)$.

7. (A) 99

   (B) 171

   (C) 56

   (D) 42

   (E) -111

   (F) 165

Problem 8

(6.67 points)

Rationalize the numerator and simplify.

$$\frac{\sqrt{5-x}-\sqrt{5}}{x}$$

8. (A) $\dfrac{x-10}{\sqrt{5+x}+\sqrt{5}}$

(B) $-\dfrac{1}{\sqrt{5-x}-\sqrt{5}}$

(C) $\dfrac{x-10}{\sqrt{5+x}-\sqrt{5}}$

(D) $\dfrac{1}{\sqrt{5-x}-\sqrt{5}}$

(E) $\dfrac{1}{\sqrt{5-x}+\sqrt{5}}$

(F) $-\dfrac{1}{\sqrt{5-x}+\sqrt{5}}$

Problem 9

(6.67 points)

Given $f(x)=\begin{cases}3x+7 & x<0\\ x^2-10 & 0\le x\le 2\\ \sqrt{3} & 2<x\le 3\\ x^3 & x>3\end{cases}$

Evaluate $f(0)+f(2)$.

9. (A) $\sqrt{3}-10$

(B) 7

(C) -3

(D) $\sqrt{3}+7$

(E) -16

(F) $\sqrt{3}-6$

Problem 10

(6.67 points)

Describe how the graph of the given function is a transformation of the graph of the original function f:

$y = f(x-4)+9$

10. (A) The graph of f is reflected about the $x-$ axis, shifted 4 units to the left and 9 units down.

(B) The graph of f is shifted 4 units to the right and 9 units up.

(C) The graph of f is shifted 4 units to the left and 9 units down.

(D) The graph of f is shifted 4 units to the left and 9 units up.

(E) The graph of f is reflected about the $y-$ axis, shifted 4 units to the right and 9 units down.

(F) The graph of f is shifted 4 units to the right and 9 units down.

Problem 11

(6.67 points)

Given $f(x) = \begin{cases} \sqrt{x-1} & x < 0 \\ x & 0 \le x < 4 \\ x^2 - 9 & x > 4 \end{cases}$

Find the domain of $f(x)$.

11. (A) $[-1,1]$

(B) $(-\infty,0) \cup (0,4) \cup (4,\infty)$

(C) $[0,\infty)$

(D) $(-\infty,4) \cup (4,\infty)$

(E) $[1,\infty)$

(F) $(-\infty,\infty)$

Problem 12

(6.67 points)

Simplify the expression: $\dfrac{\frac{1}{x+1}}{1+\frac{1}{x}}$

12. (A) 1

(B) x

(C) $\dfrac{2}{x(x+1)}$

(D) $\dfrac{x}{(x+1)^2}$

(E) $(x+1)^2$

(F) $\dfrac{1}{x}$

Problem 13

(6.67 points)

Given $f(x) = 8x - 1$ and $g(x) = \dfrac{3}{x^2}$, find $(g \circ f)(x)$.

13. (A) $\dfrac{x^4}{3}$

(B) $64x - 9$

(C) $\dfrac{3(8x-1)}{x^2}$

(D) $\dfrac{3}{(8x-1)^2}$

(E) $\dfrac{24}{x^2} - 1$

(F) $\dfrac{8x+2}{x^2}$

Problem 14

(6.67 points)

simplify the expression: $\sqrt[3]{\frac{64x^6z^7}{y^6}}$

14. (A) $\frac{8x^2z^3\sqrt[3]{z}}{y^3}$

(B) $\frac{4x^3z^3\sqrt[3]{z}}{y^3}$

(C) $\frac{4x^2z^2}{y^2}$

(D) $\frac{4x^2z^2\sqrt[3]{z}}{y^2}$

(E) The expression cannot be simplified.

(F) $\frac{8x^2z^2}{y^2}$

Problem 15

(6.67 points)

Given $f(x) = x^2 - 3x + 2$, solve $f(x) = 0$.

15. (A) $x = 1$ and $x = 2$

(B) There is no solution.

(C) $x = -2$

(D) $x = -2$ and $x = 1$

(E) $x = 2$

(F) $x = -2$ and $x = -1$