

Name: _____

MATH 213 – Fall 2007

FIRST EXAM

This exam contains 10 problems, worth a total of 100 points.
For the first 6 problems I will give no partial credit, just fill your answers out in the table below.
For the last 4 problems write out complete solutions and circle or box your answers.
The use of books, calculators, cell phones, computers, notes, cheat sheets, and all similar aids is strictly prohibited.

SHOW YOUR WORK.

Problem	Your answer	Points
1	(A) (B) (C) (D) (E)	10
2	(A) (B) (C) (D) (E)	10
3	(A) (B) (C) (D) (E)	10
4	(A) (B) (C) (D) (E)	10
5	(A) (B) (C) (D) (E)	10
6	(A) (B) (C) (D) (E)	10
TOTAL		

Problem	Points	Score
1-6	60	
7	10	
8	10	
9	10	
10	10	
TOTAL	100	

This page is for scratch work.

Problem 1. (10 pts) Let $A(3, 2, 1)$, $B(1, -1, 1)$, $C(-2, 5, 6)$. $\vec{BA} \cdot \vec{BC}$ is equal to:

- A. 12
- B. -12
- C. 19
- D. -19
- E. None of the above

Problem 2. (10 pts) With A , B , C as above. $\vec{AC} \times \vec{AB}$ is equal to:

- A. $\langle 15, 10, 21 \rangle$
- B. $\langle 15, -10, 21 \rangle$
- C. $\langle -15, 10, -21 \rangle$
- D. $\langle -15, -10, -21 \rangle$
- E. None of the above

Problem 3. (10 pts) The line L parametrized by $\vec{r}(t) = \langle 3t + 1, 1 - 3t, 3t + 1 \rangle$ intersects the plane which contains $(0, 0, 4)$ and is perpendicular to the vector $\langle -1, 1, 1 \rangle$ at the point

- A. $\vec{r}(-2)$
- B. $\vec{r}(-1)$
- C. $\vec{r}(0)$
- D. $\vec{r}(1)$
- E. None of the above

Problem 4. (10 pts) Consider the line L in Problem 3 above and consider the planes $x + 2y + z - 3 = 0$ and $x + 2y + z - 5 = 0$.

- A. The line L intersects one of the planes exactly in one point.
- B. The line L intersects both planes.
- C. The line L does not intersect the two planes.
- D. The line L lies in one of the two planes.
- E. None of the above

Problem 5. (10 pts) Find the area of the parallelogram spanned by the vectors $\langle 1, 0, -1 \rangle$ and $\langle -2, 2, 0 \rangle$.

A. $3\sqrt{2}$

B. $2\sqrt{2}$

C. $2\sqrt{3}$

D. $3\sqrt{3}$

E. None of the above

Problem 6. (10 pts) C is a circle on a horizontal plane at height 2, of radius 2, centered on the z -axis. It's equation is

A. $x^2 + y^2 = 4$

B. $x^2 + y^2 + z^2 = 4, z = 2$

C. $2x + 2z = 2$

D. $x^2 + z^2 = 2, x = 2$

E. None of the above

Problem 7. (10 pts) Parametrize the line through $P(1, 2, 0)$ and $Q(1, 3, -1)$.

Problem 8. (10 pts) Find the equation of the plane that contains the lines $L_1 : x = 2t + 1, y = 3t + 2, z = 4t + 3$ and $L_2 : x = s + 2, y = 2s + 4, z = -4s - 1$.

Problem 9. (10 pts) Find the acute angle between between the planes $x + y = 1$ and $y + z = 1$.

Problem 10. (10 pts) Find the point where the line L_1 of Problem 8 meets the plane $x + y - 2z = -3$.