Practice Exam 1

Name: _____ Section and/or TA: _____

Last Four Digits of Student ID: _____

Do not remove this answer page — you will return the whole exam. You will be allowed two hours to complete this test. No books or notes may be used except for a one-page sheet of formulas and facts. You may use a graphing calculator during the exam, but NO calculator with a Computer Algebra System (CAS) or a QWERTY keyboard is permitted. Absolutely no cell phone use during the exam is allowed.

The exam consists of 10 multiple choice questions and 4 free response questions. Record your answers to the multiple choice questions on this page by filling in the circle corresponding to the correct answer.

Show all work to receive full credit on the free response problems. Unsupported answers on free response problems will receive *no credit*.

Multiple Choice Questions

1	A	B	C	D	E	**6**	A	B	C	D	E
2	A	B	C	D	E	**7**	A	B	C	D	E
3	A	B	C	D	E	**8**	A	B	C	D	E
4	A	B	C	D	E	**9**	A	B	C	D	E
5	A	B	C	D	E	**10**	A	B	C	D	E

SCORE

Multiple Choice	11	12	13	14	Total Score
50	10	10	15	15	100

Multiple Choice Questions

1. If $\mathbf{v} = \langle -2, 2, 1 \rangle$ and $\mathbf{w} = \langle 1, 1, 2 \rangle$ and $\mathbf{p} = \langle 3, 3, -3 \rangle$ then $2\mathbf{v} - \mathbf{w} + \mathbf{p} =$
   A. $\langle 3, 7, 2 \rangle$
   B. $\langle -8, 0, 3 \rangle$
   C. $\langle -2, 6, -3 \rangle$
   D. $\langle 0, 8, -8 \rangle$
   E. $\langle 2, 6, 0 \rangle$

2. What is the distance of the point $(2, -3, 1)$ from the plane $x + 2y + 2z + 5 = 0$?
   A. 1
   B. $17/3$
   C. $4/3$
   D. 3
   E. $5/\sqrt{14}$

3. If $A = (1, 1), B = (3, 5)$ and $C = (-2, 3)$,what is the area of the parallelogram with adjacent sides $\overline{AB}$ and $\overline{AC}$?
   A. 14
   B. 22
   C. 16
   D. 6
   E. 11

4. Find the equation of a plane perpendicular to the line $\mathbf{r}(t) = \langle 1+2t, 2-3t, 3+5t \rangle$ and passing through the point $(2,3,1)$.

   A. $x + 2y + 3z = 11$

   B. $2x - 3y + 5z = -11$

   C. $x + 2y + 3z = 11$

   D. $2x - 3y + 5z = 11$

   E. $2x - 3y + 5z = 0$

5. Which of the following best describes the graph of the equation $y = x^2 - z^2$?

   A. Parabola

   B. Hyperbola

   C. Cylinder

   D. Hyperbolic paraboloid

   E. Elliptic paraboloid

6. The function $\mathbf{r}(t) = 2\sin(t)\mathbf{i} + 3\mathbf{j} + 4\cos(t)\mathbf{k}$ traces out:

   A. Ellipse in the plane $y = 3$ with center $(0,3,0)$

   B. Ellipse in the plane $x + y = 6$ with center(0,3,0)

   C. Ellipse in the plane $x = 3$ with center $(0,3,0)$

   D. Ellipse in the plane $y = 3$ with center $(2,1,3)$

   E. Circle in the plane $y = 3$ with center $(0,3,0)$

7. Which of the following integrals correctly computes the arc length of the curve $\mathbf{r}(t) = \langle 1+t, t^2, 1-t\rangle$ between $t=0$ and $t=1$?

   A. $\displaystyle\int_0^1 \sqrt{2+t}\,dt$

   B. $\displaystyle\int_0^1 \sqrt{2+4t^2}\,dt$

   C. $\displaystyle\int_0^1 2t\,dt$

   D. $\displaystyle\int_0^1 (2+t^2)\,dt$

   E. $\displaystyle\int_0^1 \sqrt{2+5t^2}\,dt$

8. Find the velocity and speed if $\mathbf{r}(t) = \langle 3t, \cos(2t), \sin(2t)\rangle$

   A. $\mathbf{r}'(t) = \langle 3, 2\sin(2t), -2\cos(2t)\rangle$ and $|\mathbf{r}'(t)| = \sqrt{13}$

   B. $\mathbf{r}'(t) = \langle 3, 2\sin(2t), 2\cos(2t)\rangle$ and $|\mathbf{r}'(t)| = \sqrt{13}$

   C. $\mathbf{r}'(t) = \langle 3, -2\sin(2t), 2\cos(2t)\rangle$ and $|\mathbf{r}'(t)| = 13$

   D. $\mathbf{r}'(t) = \langle 3, -\sin(2t), \cos(2t)\rangle$ and $|\mathbf{r}'(t)| = \sqrt{10}$

   E. $\mathbf{r}'(t) = \langle 3, -2\sin(2t), 2\cos(2t)\rangle$ **and** $|\mathbf{r}'(t)| = \sqrt{13}$

9. Consider the two lines given by

$$\mathbf{r}(t) = \langle 2+3t, 1-t, 1+t\rangle$$
$$\mathbf{r}(s) = \langle 2s, 2+s, 1+3s\rangle$$

   Which one of the following statements is correct?

   A. These lines are parallel

   B. These lines meet at $(2,1,1)$

   C. These lines are skew

   D. These lines meet at $(0,2,1)$.

   E. None of the above are correct.

10. Which of the following *is* a well-defined operation on vectors?

    A. $\mathbf{a}\cdot(\mathbf{b}\cdot\mathbf{c})$

    B. $\mathbf{a}\times(\mathbf{b}\times\mathbf{c})$

    C. $\mathbf{a}+(\mathbf{a}\cdot\mathbf{c})$

    D. $\mathbf{a}\times(\mathbf{b}-(\mathbf{c}\cdot\mathbf{d}))$

    E. $(\mathbf{a}\cdot\mathbf{b})\times(\mathbf{a}\cdot\mathbf{c})$

For practice free-response questions, please see our archive of previous Math 213 exams.