MATH 162 – SPRING 2010 – FIRST EXAM – FEBRUARY 9, 2010
VERSION 01
MARK TEST NUMBER 01 ON YOUR SCANTRON

STUDENT NAME————————————————————————

STUDENT ID——————————————————————————

RECITATION INSTRUCTOR————————————————————

INSTRUCTOR—————————————————————————

RECITATION TIME————————————————————————

INSTRUCTIONS

1. Fill in all the information requested above and the version number of the test on your scantron sheet.

2. This booklet contains 12 problems, each worth 8 points. There are four free points. The maximum score is 100 points.

3. For each problem mark your answer on the scantron sheet and also circle it is this booklet.

4. Work only on the pages of this booklet.

5. Books, notes and calculators are not allowed.

6. At the end turn in your exam and scantron sheet to your recitation instructor.

1) Find the center and radius of the sphere $x^2 + y^2 + z^2 - 4x - 2y + 2z = 2$.

A) Center $(2, -1, 1)$, radius 2

B) Center $(2, 1, -1)$, radius $\sqrt{8}$

C) Center $(-2, 1, -1)$, radius $\sqrt{6}$

D) Center $(2, 1, -1)$, radius $\sqrt{6}$

E) It is not a sphere

2) Find a vector of length 5 and direction opposite that of $2\vec{i} - 2\vec{j} + \vec{k}$.

A) $-\frac{10}{3}\vec{i} + \frac{10}{3}\vec{j} - \frac{5}{3}\vec{k}$

B) $-\frac{2}{5}\vec{i} + \frac{2}{5}\vec{j} - \frac{2}{5}\vec{k}$

C) $\frac{10}{3}\vec{i} - \frac{10}{3}\vec{j} + \frac{5}{3}\vec{k}$

D) $-3\vec{i} + 3\vec{j} - \sqrt{7}\vec{k}$

E) $3\vec{i} - 3\vec{j} + \sqrt{7}\vec{k}$

3) Let $\vec{a} = \langle 2, 5, 1 \rangle$ and $\vec{b} = \langle -1, 2, -2 \rangle$. Find $\text{proj}_{\vec{a}} \vec{b}$.

A) $\langle \frac{1}{3}, \frac{5}{6}, \frac{1}{6} \rangle$

B) $\langle -\frac{1}{5}, \frac{2}{5}, -\frac{2}{5} \rangle$

C) $\langle \frac{2}{5}, 1, \frac{1}{5} \rangle$

D) $\langle -\frac{1}{6}, , \frac{1}{3}, -\frac{1}{3} \rangle$

E) $\langle \frac{2}{3}, \frac{5}{3}, \frac{1}{3} \rangle$

4) Find the area of the triangle with vertices $A(1, 2, 1)$, $B(2, -1, 3)$ and $C(-2, 1, -1)$.

A) $\frac{1}{2}\sqrt{160}$

B) $\frac{1}{2}\sqrt{159}$

C) $\frac{1}{2}\sqrt{190}$

D) $\frac{1}{2}\sqrt{175}$

E) $\frac{1}{2}\sqrt{180}$

5) Find $|\vec{u} \times \vec{v}|$ and determine whether $\vec{u} \times \vec{v}$ is directed into or out of the page.

A) $32\sqrt{3}$; out of the page

B) 16; out of the page

C) 16; into the page

D) $16\sqrt{3}$; out of the page

E) $16\sqrt{3}$; into of the page

6) Find the area of the region bounded by $y = 1 - x^2$ and $y = x^2 - 1$.

A) $\frac{4}{3}$

B) $\frac{3}{4}$

C) $\frac{2}{3}$

D) $\frac{5}{2}$

E) $\frac{8}{3}$

7) Find the volume of the solid obtained by rotating the region bounded by $y = \sqrt{x}$, $x = 0$ and $y = 1$ about the y-axis.

A) $\frac{\pi}{5}$

B) $\frac{\pi}{3}$

C) $\frac{2\pi}{3}$

D) $\frac{5\pi}{2}$

8) Find the volume of the solid obtained by rotating the region bounded by $y = x - x^2$ and $y = 0$ about the axis $x = 1$.

A) $\frac{\pi}{6}$

B) $\frac{2\pi}{3}$

C) $\frac{\pi}{5}$

D) $\frac{3\pi}{2}$

E) $\frac{3\pi}{8}$

9) Suppose a force of 10 lbs is required to hold a spring 2 feet beyond its natural length. How much work is required to stretch it an additional foot?

A) $\frac{15}{8}$ ft-lb

B) $\frac{15}{6}$ ft-lb

C) $\frac{5}{3}$ ft-lb

D) $\frac{25}{2}$ ft-lb

E) $\frac{25}{3}$ ft-lb

10) Let T_1 and T_2 be two cylindrical tanks holding water. Both tanks have the same volume, but the height of the tank T_2 is half the height of the tank T_1. Let W_1 be the work required to empty tank T_1 and let W_2 be the work required to empty tank T_2. The following is true

A) $W_1 = W_2$

B) $W_1 = 2W_2$

C) $W_1 = \frac{1}{2}W_2$

D) $W_1 = 4W_2$

E) $W_1 = 9W_2$.

11) Compute
$$\int_1^2 x \ln x \ dx$$

A) $2\ln 2 - \frac{3}{4}$

B) $3\ln 2$

C) $2\ln 3 - 1$

D) $4\ln 3 - 2$

E) $3\ln 5 - 2$

12) Compute
$$\int_0^{\pi/2} \sin 3x \cos x \ dx$$

A) $\frac{1}{2}$

B) $2/3$

C) $\frac{\pi}{4}$

D) $\frac{\pi}{3}$

E) 2