MA 16200 Exam I, September 2017

Name _____

10–digit PUID number _____

Recitation Instructor _____

Recitation Section Number and Time _____

Instructions: **MARK TEST NUMBER 26 ON YOUR SCANTRON**

1. Do not open this booklet until you are instructed to.
2. Fill in all the information requested above and on the scantron sheet. On the scantron sheet fill in the little circles for your name, section number and PUID.
3. This booklet contains 12 problems, each worth 8 points. You will get 4 points for correctly supplying information above and on the scantron.
4. For each problem mark your answer on the scantron sheet and also **circle it in this booklet**.
5. Work only on the pages of this booklet.
6. Books, notes, calculators or any electronic device are not allowed during this test and they should not even be in sight in the exam room. You may not look at anybody else's test, and you may not communicate with anybody else, except, if you have a question, with your instructor.
7. You are not allowed to leave during the first 20 and the last 10 minutes of the exam.
8. When time is called at the end of the exam, put down your writing instruments and remain seated. The TAs will collect the scantrons and the booklets.

1. The base of a solid is the region in the xy plane above the x axis but inside the circle $x^2 + y^2 = 1$. The cross sections of the solid perpendicular to the y axis are squares with one side on the xy plane. Find the volume of the solid.

   A. $5/3$
   B. $8/3$
   C. $3\pi/2$
   D. $2\pi/3$
   E. 3π

2. For what values of b are the vectors $< -6, b, 2 >$ and $< b, b^2, b >$ orthogonal?

   A. 0, 1 and -1
   B. 0, 3 and -3
   C. 0, 2 and -2
   D. 0, $2\sqrt{2}$ and $-2\sqrt{2}$
   E. 0, 1 and 2

3. A basket is filled with 10 kg of dirt. We lift it at speed 1 m/s to a height of 4 m, but as we do so, the basket leaks 1 kg of dirt every second. How much work did this heavy lifting require? (Use the approximate value $g = 10$ m/s^2.)

   A. 80 J

   B. 620 J

   C. 480 J

   D. 180 J

   E. 320 J

4. A sled is pulled 100 m along a horizontal path by a force of 30 N acting at an angle of 30 degrees above the horizontal. The work done by the force is:

   A. 1500 J

   B. 150 J

   C. $1500\sqrt{2}$ J

   D. $150\sqrt{3}$ J

   E. $1500\sqrt{3}$ J

5. The volume of the parallelepiped determined by the vectors $\mathbf{i} + \mathbf{2j} + \mathbf{2k}$, $2\mathbf{i} + \mathbf{j} + \mathbf{k}$, and $\mathbf{i} + \mathbf{3k}$ is

   A. 7

   B. 9

   C. -4

   D. 11

   E. 12

6. The area of the region bounded by the curves $x = y^2$ and $x = 3y - 2y^2$ is:

   A. 9/10

   B. 1

   C. 1/2

   D. 2/3

   E. 3/5

7. A region in the xy plane is above the segment [0,1] of the x axis. From above it is bounded by the curve $y = 1 + 2x$, from below by the curve $y = \sqrt{1+x^2}$. Which integral represents the volume generated when the region is rotated about the y axis?

   A. $\displaystyle\int_0^1 \pi x^2(1 + 2x - \sqrt{1+x^2})\,dx$

   B. $\displaystyle\int_0^1 \pi(1 + 2x - \sqrt{1+x^2})^2\,dx$

   C. $\displaystyle\int_0^1 2\pi x(1 + 2x - \sqrt{1+x^2})^2\,dx$

   D. $\displaystyle\int_0^1 \pi x(\sqrt{1+x^2} - 1 - 2x)\,dx$

   E. $\displaystyle\int_0^1 2\pi x(1 + 2x - \sqrt{1+x^2})\,dx$

8. The area of the triangle with vertices at the points $(1, 1, 1)$, $(2, -2, 2)$ and $(0, 0, 0)$ is:

   A. 32

   B. $4\sqrt{2}$

   C. $4\sqrt{3}$

   D. 4

   E. 9

9. If it takes 3 J work to stretch a spring by 0.2 m beyond its natural length, how much work is required to stretch it an additional 0.2 m?

   A. 4 J

   B. 6 J

   C. 9 J

   D. 12 J

   E. 15 J

10. The angle between $\mathbf{a} =< 1, 0 >$ and $\mathbf{b} =< 1, \sqrt{3} >$ is:

   A. $-\pi/6$

   B. $\pi/4$

   C. $\pi/2$

   D. $\pi/3$

   E. $\pi/6$

11. The center and the radius of the sphere represented by

$$x^2 + y^2 + z^2 + 8x - 6y + 2z + 17 = 0$$

are:

A. $(4, 3, 1)$ and 3

B. $(4, -3, 1)$ and 3

C. $(8, -6, 2)$ and 5

D. $(-4, 3, -1)$ and 3

E. $(4, -3, 1)$ and $\sqrt{17}$

12. $\displaystyle\int_1^8 \sqrt[3]{x} \ln x \, dx =$

A. $12 \ln 8 - \dfrac{135}{16}$

B. $16 \ln 8 - 8$

C. $\dfrac{27 \ln 2}{8} - 4$

D. $\dfrac{27 \ln 8}{8} - \dfrac{152}{18}$

E. $16 \ln 2 - \dfrac{72}{15}$

MA 16200 – Fall 2017

Exam 1

GREEN Test – Version 26

1	B
2	C
3	E
4	E
5	B
6	C
7	E
8	ABCDE
9	C
10	D
11	D
12	A

MA 16200 Exam I, September 2017

Name _____

10–digit PUID number _____

Recitation Instructor _____

Recitation Section Number and Time _____

Instructions: **MARK TEST NUMBER 49 ON YOUR SCANTRON**

1. Do not open this booklet until you are instructed to.
2. Fill in all the information requested above and on the scantron sheet. On the scantron sheet fill in the little circles for your name, section number and PUID.
3. This booklet contains 12 problems, each worth 8 points. You will get 4 points for correctly supplying information above and on the scantron.
4. For each problem mark your answer on the scantron sheet and also **circle it in this booklet**.
5. Work only on the pages of this booklet.
6. Books, notes, calculators or any electronic device are not allowed during this test and they should not even be in sight in the exam room. You may not look at anybody else's test, and you may not communicate with anybody else, except, if you have a question, with your instructor.
7. You are not allowed to leave during the first 20 and the last 10 minutes of the exam.
8. When time is called at the end of the exam, put down your writing instruments and remain seated. The TAs will collect the scantrons and the booklets.

1. The volume of the parallelepiped determined by the vectors $\mathbf{i} + \mathbf{2j} + \mathbf{2k}$, $2\mathbf{i} + \mathbf{j} + \mathbf{k}$, and $\mathbf{i} + \mathbf{3k}$ is

   A. 7

   B. 9

   C. -4

   D. 11

   E. 12

2. The area of the region bounded by the curves $x = y^2$ and $x = 3y - 2y^2$ is:

   A. 9/10

   B. 1

   C. 1/2

   D. 2/3

   E. 3/5

3. A region in the xy plane is above the segment [0,1] of the x axis. From above it is bounded by the curve $y = 1 + 2x$, from below by the curve $y = \sqrt{1+x^2}$. Which integral represents the volume generated when the region is rotated about the y axis?

   A. $\displaystyle\int_0^1 \pi x^2(1 + 2x - \sqrt{1+x^2})\,dx$

   B. $\displaystyle\int_0^1 \pi(1 + 2x - \sqrt{1+x^2})^2\,dx$

   C. $\displaystyle\int_0^1 2\pi x(1 + 2x - \sqrt{1+x^2})^2\,dx$

   D. $\displaystyle\int_0^1 \pi x(\sqrt{1+x^2} - 1 - 2x)\,dx$

   E. $\displaystyle\int_0^1 2\pi x(1 + 2x - \sqrt{1+x^2})\,dx$

4. The area of the triangle with vertices at the points $(1, 1, 1)$, $(2, -2, 2)$ and $(0, 0, 0)$ is:

   A. 32

   B. $4\sqrt{2}$

   C. $4\sqrt{3}$

   D. 4

   E. 9

5. If it takes 3 J work to stretch a spring by 0.2 m beyond its natural length, how much work is required to stretch it an additional 0.2 m?

   A. 4 J

   B. 6 J

   C. 9 J

   D. 12 J

   E. 15 J

6. The angle between $\mathbf{a} =< 1, 0 >$ and $\mathbf{b} =< 1, \sqrt{3} >$ is:

   A. $-\pi/6$

   B. $\pi/4$

   C. $\pi/2$

   D. $\pi/3$

   E. $\pi/6$

7. A basket is filled with 10 kg of dirt. We lift it at speed 1 m/s to a height of 4 m, but as we do so, the basket leaks 1 kg of dirt every second. How much work did this heavy lifting require? (Use the approximate value $g = 10$ m/s^2.)

   A. 80 J

   B. 620 J

   C. 480 J

   D. 180 J

   E. 320 J

8. A sled is pulled 100 m along a horizontal path by a force of 30 N acting at an angle of 30 degrees above the horizontal. The work done by the force is:

   A. 1500 J

   B. 150 J

   C. $1500\sqrt{2}$ J

   D. $150\sqrt{3}$ J

   E. $1500\sqrt{3}$ J

9. The center and the radius of the sphere represented by

$$x^2 + y^2 + z^2 + 8x - 6y + 2z + 17 = 0$$

are:

A. $(4, 3, 1)$ and 3

B. $(4, -3, 1)$ and 3

C. $(8, -6, 2)$ and 5

D. $(-4, 3, -1)$ and 3

E. $(4, -3, 1)$ and $\sqrt{17}$

10. $\displaystyle\int_1^8 \sqrt[3]{x} \ln x \, dx =$

A. $12 \ln 8 - \dfrac{135}{16}$

B. $16 \ln 8 - 8$

C. $\dfrac{27 \ln 2}{8} - 4$

D. $\dfrac{27 \ln 8}{8} - \dfrac{152}{18}$

E. $16 \ln 2 - \dfrac{72}{15}$

11. The base of a solid is the region in the xy plane above the x axis but inside the circle $x^2 + y^2 = 1$. The cross sections of the solid perpendicular to the y axis are squares with one side on the xy plane. Find the volume of the solid.

    A. $5/3$
    B. $8/3$
    C. $3\pi/2$
    D. $2\pi/3$
    E. 3π

12. For what values of b are the vectors $< -6, b, 2 >$ and $< b, b^2, b >$ orthogonal?

    A. 0, 1 and -1
    B. 0, 3 and -3
    C. 0, 2 and -2
    D. 0, $2\sqrt{2}$ and $-2\sqrt{2}$
    E. 0, 1 and 2

MA 16200 – Fall 2017

Exam 1

GREEN Test – Version 49

1	B
2	C
3	E
4	ABCDE
5	C
6	D
7	E
8	E
9	D
10	A
11	B
12	C

MA 16200 Exam I, September 2017

Name _____

10–digit PUID number _____

Recitation Instructor _____

Recitation Section Number and Time _____

Instructions: **MARK TEST NUMBER 50 ON YOUR SCANTRON**

1. Do not open this booklet until you are instructed to.
2. Fill in all the information requested above and on the scantron sheet. On the scantron sheet fill in the little circles for your name, section number and PUID.
3. This booklet contains 12 problems, each worth 8 points. You will get 4 points for correctly supplying information above and on the scantron.
4. For each problem mark your answer on the scantron sheet and also **circle it in this booklet**.
5. Work only on the pages of this booklet.
6. Books, notes, calculators or any electronic device are not allowed during this test and they should not even be in sight in the exam room. You may not look at anybody else's test, and you may not communicate with anybody else, except, if you have a question, with your instructor.
7. You are not allowed to leave during the first 20 and the last 10 minutes of the exam.
8. When time is called at the end of the exam, put down your writing instruments and remain seated. The TAs will collect the scantrons and the booklets.

1. If it takes 3 J work to stretch a spring by 0.2 m beyond its natural length, how much work is required to stretch it an additional 0.2 m?

   A. 4 J

   B. 6 J

   C. 9 J

   D. 12 J

   E. 15 J

2. The angle between $\mathbf{a} =< 1, 0 >$ and $\mathbf{b} =< 1, \sqrt{3} >$ is:

   A. $-\pi/6$

   B. $\pi/4$

   C. $\pi/2$

   D. $\pi/3$

   E. $\pi/6$

3. The center and the radius of the sphere represented by

$$x^2 + y^2 + z^2 + 8x - 6y + 2z + 17 = 0$$

are:

A. $(4, 3, 1)$ and 3

B. $(4, -3, 1)$ and 3

C. $(8, -6, 2)$ and 5

D. $(-4, 3, -1)$ and 3

E. $(4, -3, 1)$ and $\sqrt{17}$

4. $\displaystyle\int_1^8 \sqrt[3]{x} \ln x \, dx =$

A. $12 \ln 8 - \dfrac{135}{16}$

B. $16 \ln 8 - 8$

C. $\dfrac{27 \ln 2}{8} - 4$

D. $\dfrac{27 \ln 8}{8} - \dfrac{152}{18}$

E. $16 \ln 2 - \dfrac{72}{15}$

5. The volume of the parallelepiped determined by the vectors $\mathbf{i} + \mathbf{2j} + \mathbf{2k}$, $2\mathbf{i} + \mathbf{j} + \mathbf{k}$, and $\mathbf{i} + \mathbf{3k}$ is

   A. 7

   B. 9

   C. -4

   D. 11

   E. 12

6. The area of the region bounded by the curves $x = y^2$ and $x = 3y - 2y^2$ is:

   A. 9/10

   B. 1

   C. 1/2

   D. 2/3

   E. 3/5

7. A region in the xy plane is above the segment [0,1] of the x axis. From above it is bounded by the curve $y = 1 + 2x$, from below by the curve $y = \sqrt{1+x^2}$. Which integral represents the volume generated when the region is rotated about the y axis?

   A. $\displaystyle\int_0^1 \pi x^2(1 + 2x - \sqrt{1+x^2})\,dx$

   B. $\displaystyle\int_0^1 \pi(1 + 2x - \sqrt{1+x^2})^2\,dx$

   C. $\displaystyle\int_0^1 2\pi x(1 + 2x - \sqrt{1+x^2})^2\,dx$

   D. $\displaystyle\int_0^1 \pi x(\sqrt{1+x^2} - 1 - 2x)\,dx$

   E. $\displaystyle\int_0^1 2\pi x(1 + 2x - \sqrt{1+x^2})\,dx$

8. The area of the triangle with vertices at the points $(1, 1, 1)$, $(2, -2, 2)$ and $(0, 0, 0)$ is:

   A. 32

   B. $4\sqrt{2}$

   C. $4\sqrt{3}$

   D. 4

   E. 9

9. The base of a solid is the region in the xy plane above the x axis but inside the circle $x^2 + y^2 = 1$. The cross sections of the solid perpendicular to the y axis are squares with one side on the xy plane. Find the volume of the solid.

   A. $5/3$
   B. $8/3$
   C. $3\pi/2$
   D. $2\pi/3$
   E. 3π

10. For what values of b are the vectors $< -6, b, 2 >$ and $< b, b^2, b >$ orthogonal?

   A. 0, 1 and -1
   B. 0, 3 and -3
   C. 0, 2 and -2
   D. 0, $2\sqrt{2}$ and $-2\sqrt{2}$
   E. 0, 1 and 2

11. A basket is filled with 10 kg of dirt. We lift it at speed 1 m/s to a height of 4 m, but as we do so, the basket leaks 1 kg of dirt every second. How much work did this heavy lifting require? (Use the approximate value $g = 10$ m/s^2.)

    A. 80 J

    B. 620 J

    C. 480 J

    D. 180 J

    E. 320 J

12. A sled is pulled 100 m along a horizontal path by a force of 30 N acting at an angle of 30 degrees above the horizontal. The work done by the force is:

    A. 1500 J

    B. 150 J

    C. $1500\sqrt{2}$ J

    D. $150\sqrt{3}$ J

    E. $1500\sqrt{3}$ J

MA 16200 – Fall 2017

Exam 1

GREEN Test – Version 50

1	C
2	D
3	D
4	A
5	B
6	C
7	E
8	ABCDE
9	B
10	C
11	E
12	E

MA 16200 Exam I, September 2017

Name _____

10–digit PUID number _____

Recitation Instructor _____

Recitation Section Number and Time _____

Instructions: **MARK TEST NUMBER 84 ON YOUR SCANTRON**

1. Do not open this booklet until you are instructed to.
2. Fill in all the information requested above and on the scantron sheet. On the scantron sheet fill in the little circles for your name, section number and PUID.
3. This booklet contains 12 problems, each worth 8 points. You will get 4 points for correctly supplying information above and on the scantron.
4. For each problem mark your answer on the scantron sheet and also **circle it in this booklet**.
5. Work only on the pages of this booklet.
6. Books, notes, calculators or any electronic device are not allowed during this test and they should not even be in sight in the exam room. You may not look at anybody else's test, and you may not communicate with anybody else, except, if you have a question, with your instructor.
7. You are not allowed to leave during the first 20 and the last 10 minutes of the exam.
8. When time is called at the end of the exam, put down your writing instruments and remain seated. The TAs will collect the scantrons and the booklets.

1. A region in the xy plane is above the segment [0,1] of the x axis. From above it is bounded by the curve $y = 1 + 2x$, from below by the curve $y = \sqrt{1+x^2}$. Which integral represents the volume generated when the region is rotated about the y axis?

   A. $\displaystyle\int_0^1 \pi x^2(1 + 2x - \sqrt{1+x^2})\,dx$

   B. $\displaystyle\int_0^1 \pi(1 + 2x - \sqrt{1+x^2})^2\,dx$

   C. $\displaystyle\int_0^1 2\pi x(1 + 2x - \sqrt{1+x^2})^2\,dx$

   D. $\displaystyle\int_0^1 \pi x(\sqrt{1+x^2} - 1 - 2x)\,dx$

   E. $\displaystyle\int_0^1 2\pi x(1 + 2x - \sqrt{1+x^2})\,dx$

2. The area of the triangle with vertices at the points $(1, 1, 1)$, $(2, -2, 2)$ and $(0, 0, 0)$ is:

   A. 32

   B. $4\sqrt{2}$

   C. $4\sqrt{3}$

   D. 4

   E. 9

3. If it takes 3 J work to stretch a spring by 0.2 m beyond its natural length, how much work is required to stretch it an additional 0.2 m?

   A. 4 J

   B. 6 J

   C. 9 J

   D. 12 J

   E. 15 J

4. The angle between $\mathbf{a} =< 1, 0 >$ and $\mathbf{b} =< 1, \sqrt{3} >$ is:

   A. $-\pi/6$

   B. $\pi/4$

   C. $\pi/2$

   D. $\pi/3$

   E. $\pi/6$

5. The base of a solid is the region in the xy plane above the x axis but inside the circle $x^2 + y^2 = 1$. The cross sections of the solid perpendicular to the y axis are squares with one side on the xy plane. Find the volume of the solid.

   A. $5/3$
   B. $8/3$
   C. $3\pi/2$
   D. $2\pi/3$
   E. 3π

6. For what values of b are the vectors $< -6, b, 2 >$ and $< b, b^2, b >$ orthogonal?

   A. 0, 1 and -1
   B. 0, 3 and -3
   C. 0, 2 and -2
   D. 0, $2\sqrt{2}$ and $-2\sqrt{2}$
   E. 0, 1 and 2

7. A basket is filled with 10 kg of dirt. We lift it at speed 1 m/s to a height of 4 m, but as we do so, the basket leaks 1 kg of dirt every second. How much work did this heavy lifting require? (Use the approximate value $g = 10$ m/s^2.)

   A. 80 J

   B. 620 J

   C. 480 J

   D. 180 J

   E. 320 J

8. A sled is pulled 100 m along a horizontal path by a force of 30 N acting at an angle of 30 degrees above the horizontal. The work done by the force is:

   A. 1500 J

   B. 150 J

   C. $1500\sqrt{2}$ J

   D. $150\sqrt{3}$ J

   E. $1500\sqrt{3}$ J

9. The center and the radius of the sphere represented by

$$x^2 + y^2 + z^2 + 8x - 6y + 2z + 17 = 0$$

are:

A. $(4, 3, 1)$ and 3

B. $(4, -3, 1)$ and 3

C. $(8, -6, 2)$ and 5

D. $(-4, 3, -1)$ and 3

E. $(4, -3, 1)$ and $\sqrt{17}$

10. $\displaystyle\int_1^8 \sqrt[3]{x} \ln x \, dx =$

A. $12 \ln 8 - \dfrac{135}{16}$

B. $16 \ln 8 - 8$

C. $\dfrac{27 \ln 2}{8} - 4$

D. $\dfrac{27 \ln 8}{8} - \dfrac{152}{18}$

E. $16 \ln 2 - \dfrac{72}{15}$

11. The volume of the parallelepiped determined by the vectors $\mathbf{i} + \mathbf{2j} + \mathbf{2k}$, $2\mathbf{i} + \mathbf{j} + \mathbf{k}$, and $\mathbf{i} + \mathbf{3k}$ is

    A. 7

    B. 9

    C. -4

    D. 11

    E. 12

12. The area of the region bounded by the curves $x = y^2$ and $x = 3y - 2y^2$ is:

    A. 9/10

    B. 1

    C. 1/2

    D. 2/3

    E. 3/5

MA 16200 – Fall 2017

Exam 1

GREEN Test – Version 84

1	E
2	ABCDE
3	C
4	D
5	B
6	C
7	E
8	E
9	D
10	A
11	B
12	C