King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

Math 102
Exam I
Term 091
Tuesday 3/11/2009

EXAM COVER

Number of versions: 4
Number of questions: 20
Number of Answers: 5 per question

This exam was prepared using mcqs
For questions send an email to Dr. Ibrahim Al-Lehyani (iallehyani@kaau.edu.sa)

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Department of Mathematics and Statistics

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Net Time Allowed: 120 minutes

MASTER VERSION

1. Using four rectangles and left endpoints, the area under the graph of $f(x) = x^2 - 2x$ from $x = 2$ to $x = 6$ is approximately equal to

(a) 26

(b) 23

(c) 35

(d) 38

(e) 40

2. $\int (\sqrt[4]{y} + y)^2 \, dy =$

(a) $\frac{2}{3}y^{3/2} + \frac{8}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(b) $\frac{2}{3}y^{3/2} + \frac{4}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(c) $\frac{4}{5}y^{5/4} + \frac{2}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(d) $\frac{1}{2}y^2 + \frac{1}{3}y^3 + C$

(e) $\frac{(\sqrt[4]{y} + y)^3}{3} + C$

3. $\displaystyle\int_{e}^{e^3} \frac{1}{x\ln x}\,dx =$

(a) $\ln 3$

(b) $\ln 2$

(c) $1 - \ln 3$

(d) $-\ln 3$

(e) $2 - \ln 2$

4. $\displaystyle\int_{0}^{2\sqrt{2}} (3 - 2\sqrt{8 - x^2})\,dx =$

(a) $6\sqrt{2} - 4\pi$

(b) $6\sqrt{2} - 2\pi$

(c) $6\sqrt{2} - 8\pi$

(d) $3\sqrt{2} - 2\pi$

(e) $2\sqrt{2}$

5. The volume of the solid generated by rotating the region bounded by the curves

$$x^2 + y^2 = 1 \text{ and } y = |x|$$

about the x-axis is equal to

(a) $\frac{2\sqrt{2}}{3}\pi$

(b) $\frac{2}{3}\pi$

(c) $4\sqrt{2}\pi$

(d) $\sqrt{3}\pi$

(e) $\frac{2}{\sqrt{3}}\pi$

6. The area of the region enclosed by the graphs of

$$2y^2 = x + 4 \text{ and } x = y^2$$

is equal to

(a) $\frac{32}{3}$

(b) $\sqrt{3}$

(c) $4\sqrt{2}$

(d) $\frac{1}{2}$

(e) 1

7. If $G(x) = \int_{\sin x}^{\cos(3x)} \frac{1}{\sqrt{1+4t^2}}\, dt$, then $G'\left(\frac{\pi}{2}\right) =$

(a) 3

(b) $\frac{16}{5}$

(c) $\frac{-14}{5}$

(d) $\frac{3}{5}$

(e) 2

8. $\int_6^4 f(x)dx + \int_4^{-1} f(x)dx - \int_6^{-3} f(x)dx =$

(a) $\int_{-3}^{-1} f(x)dx$

(b) $\int_{-1}^{-3} f(x)dx$

(c) $\int_4^{-3} f(x)dx$

(d) $\int_{-1}^{6} f(x)dx$

(e) $\int_4^{-1} f(x)dx$

9. $\int_1^4 \frac{d}{dx}\left(\frac{\ln x}{\sqrt{x}}\right) dx =$

(a) $\ln 2$

(b) $-1 + \ln 2$

(c) $\ln 4$

(d) $2 + \ln 4$

(e) cannot be evaluated

10. $\int (\tan^2 t - \cot^2 t) dt =$

(a) $\tan t + \cot t + C$

(b) $\sec t + \csc t + C$

(c) $\frac{1}{3}\tan^2 t - \frac{1}{3}\cot^3 t + C$

(d) $t + C$

(e) $t + \tan t + \sec t + C$

11. If R_n is the Riemann sum for

$$f(x) = 3 + \frac{2}{9}x^2, \quad 0 \le x \le 3,$$

with n subintervals and taking sample points to be the right endpoints, then $R_n =$

(a) $9 + \left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(b) $3 + \frac{2}{9}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(c) $9 + \frac{1}{27}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(d) $1 + \frac{2}{3}\left(1 + \frac{2}{n}\right)\left(2 + \frac{1}{3n}\right)$

(e) $3 + \frac{1}{6}\left(1 - \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

12. $\int_0^1 \frac{10x + 15}{\sqrt{2x^2 + 6x + 1}} dx =$

(a) 10

(b) 5

(c) 20

(d) $\frac{5}{2}$

(e) $\frac{15}{2}$

13. If the velocity of a particle moving in a straight line is given by

$$v(t) = \frac{1}{2} - \cos t, \quad t \geq 0$$

then the distance traveled during the time inteval $\left[0, \frac{\pi}{2}\right]$ is

(a) $\sqrt{3} - 1 - \frac{\pi}{12}$

(b) $\frac{\pi}{4} - 1$

(c) $\sqrt{3} - 1 + \frac{\pi}{12}$

(d) $2 - \frac{\pi}{6}$

(e) $\sqrt{3} + 1 + \frac{\pi}{12}$

14. $\displaystyle\int_0^1 \frac{\tan^{-1} x}{1 + x^2}\, dx =$

(a) $\frac{\pi^2}{32}$

(b) $\frac{\pi^2}{16}$

(c) $2\pi^2$

(d) $\frac{\pi}{8}$

(e) $\frac{3\pi}{2}$

15. $\int x\sqrt{2x-1}\,dx =$

(a) $\frac{1}{10}(2x-1)^{5/2} + \frac{1}{6}(2x-1)^{3/2} + C$

(b) $\frac{2}{5}(2x-1)^{5/2} + \frac{1}{3}(2x-1)^{3/2} + C$

(c) $\frac{2}{3}(2x-1)^{3/2} + 2(2x-1)^{1/2} + C$

(d) $\frac{\sqrt{2x-1}}{x} + C$

(e) $\frac{1}{10}\left(\frac{x+1}{2}\right)^{5/2} + \frac{2}{3}\left(\frac{x+1}{2}\right)^{1/2} + C$

16. Which one of the following is **TRUE**: If f is an odd and continuous function on $[-a, a]$, then

(a) $\int_{-a}^{a} [f(x)]^3 dx = 0$

(b) $\int_{-a}^{a} [f(x)]^2 dx = 0$

(c) $\int_{-a}^{a} xf(x) dx = 0$

(d) $\int_{-a}^{a} \cos x \cdot f(x) dx = 2\int_{0}^{a} \cos x \cdot f(x) dx$

(e) $\int_{-a}^{a} [\sin x + f(x)] dx = 2\int_{0}^{a} [\sin x + f(x)] dx$

17. The area of the region lying between the curves $y = x^2$ and $y = -x + 2$ and between the lines $x = 0$ and $x = 2$ is equal to

(a) 3

(b) 2

(c) $\frac{5}{2}$

(d) $\frac{7}{3}$

(e) $\frac{3}{5}$

18. The volume of the solid generated by rotating the region bounded by the curves

$$y = x \text{ and } y = \sqrt{x}$$

about the line $x = 2$ is given by

(a) $\int_0^1 \pi[(2 - y^2)^2 - (2 - y)^2]dy$

(b) $\int_0^1 \pi[(2 - \sqrt{x})^2 - (2 - x)^2]dx$

(c) $\int_0^1 \pi[(y + 2)^2 - (y^2 + 2)^2]dy$

(d) $\int_0^1 \pi[(\sqrt{x} + 2)^2 - (x + 2)^2]dx$

(e) $\int_0^1 \pi(y^2 - y - 2)dy$

19. If $\int_0^1 f(3x-5)dx = 4$, then $\int_{-5}^{-2} f(x)dx =$

(a) 12

(b) 4

(c) 3

(d) $\frac{1}{4}$

(e) $\frac{4}{3}$

20. $\lim_{n\to+\infty} \sum_{i=1}^{n} \left[2 + \left(1 + \frac{4i}{n}\right)^7\right] \frac{5}{n} =$

(a) $\int_0^5 \left[2 + \left(1 + \frac{4}{5}x\right)^7\right] dx$

(b) $\int_0^5 \left[2 + (1+4x)^7\right] dx$

(c) $\int_2^7 \left[2 + (1+4x)^7\right] dx$

(d) $\int_2^7 \left[2 + \left(1 + \frac{4}{5}x\right)^7\right] dx$

(e) $\int_0^5 \left(1 + \frac{4}{5}x\right)^7 dx$

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CODE 001 **Math 102** CODE 001

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1. The area of the region enclosed by the graphs of

$$2y^2 = x + 4 \text{ and } x = y^2$$

is equal to

(a) $\sqrt{3}$

(b) $\frac{1}{2}$

(c) $\frac{32}{3}$

(d) $4\sqrt{2}$

(e) 1

2. The volume of the solid generated by rotating the region bounded by the curves

$$x^2 + y^2 = 1 \text{ and } y = |x|$$

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(e) $\frac{2}{3}\pi$

3. $\int_6^4 f(x)dx + \int_4^{-1} f(x)dx - \int_6^{-3} f(x)dx =$

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(d) $\int_4^{-1} f(x)dx$

(e) $\int_{-1}^{6} f(x)dx$

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(a) $\frac{-14}{5}$

(b) $\frac{3}{5}$

(c) 3

(d) 2

(e) $\frac{16}{5}$

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(c) $\frac{2}{3}y^{3/2} + \frac{4}{9}y^{9/4} + \frac{1}{3}y^3 + C$

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9. Which one of the following is **TRUE**: If f is an odd and continuous function on $[-a, a]$, then

(a) $\int_{-a}^{a} [f(x)]^2 dx = 0$

(b) $\int_{-a}^{a} [f(x)]^3 dx = 0$

(c) $\int_{-a}^{a} x f(x) dx = 0$

(d) $\int_{-a}^{a} \cos x \cdot f(x) dx = 2 \int_{0}^{a} \cos x \cdot f(x) dx$

(e) $\int_{-a}^{a} [\sin x + f(x)] dx = 2 \int_{0}^{a} [\sin x + f(x)] dx$

10. $\int_{0}^{1} \frac{\tan^{-1} x}{1 + x^2} dx =$

(a) $\frac{3\pi}{2}$

(b) $\frac{\pi}{8}$

(c) $\frac{\pi^2}{32}$

(d) $\frac{\pi^2}{16}$

(e) $2\pi^2$

11. If R_n is the Riemann sum for

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with n subintervals and taking sample points to be the right endpoints, then $R_n =$

(a) $9 + \frac{1}{27}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(b) $9 + \left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(c) $3 + \frac{1}{6}\left(1 - \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(d) $1 + \frac{2}{3}\left(1 + \frac{2}{n}\right)\left(2 + \frac{1}{3n}\right)$

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

(b) $\dfrac{2}{5}(2x-1)^{5/2} + \dfrac{1}{3}(2x-1)^{3/2} + C$

(c) $\dfrac{1}{10}\left(\dfrac{x+1}{2}\right)^{5/2} + \dfrac{2}{3}\left(\dfrac{x+1}{2}\right)^{1/2} + C$

(d) $\dfrac{1}{10}(2x-1)^{5/2} + \dfrac{1}{6}(2x-1)^{3/2} + C$

(e) $\dfrac{2}{3}(2x-1)^{3/2} + 2(2x-1)^{1/2} + C$

14. $\int(\tan^2 t - \cot^2 t)dt =$

(a) $t + C$

(b) $\sec t + \csc t + C$

(c) $t + \tan t + \sec t + C$

(d) $\tan t + \cot t + C$

(e) $\dfrac{1}{3}\tan^2 t - \dfrac{1}{3}\cot^3 t + C$

15. $\int_1^4 \frac{d}{dx}\left(\frac{\ln x}{\sqrt{x}}\right) dx =$

(a) $2+\ln 4$

(b) $\ln 4$

(c) cannot be evaluated

(d) $\ln 2$

(e) $-1+\ln 2$

16. If the velocity of a particle moving in a straight line is given by

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then the distance traveled during the time inteval $\left[0,\frac{\pi}{2}\right]$ is

(a) $\sqrt{3}-1+\frac{\pi}{12}$

(b) $\frac{\pi}{4}-1$

(c) $2-\frac{\pi}{6}$

(d) $\sqrt{3}-1-\frac{\pi}{12}$

(e) $\sqrt{3}+1+\frac{\pi}{12}$

17. The area of the region lying between the curves $y = x^2$ and $y = -x + 2$ and between the lines $x = 0$ and $x = 2$ is equal to

(a) 2

(b) $\frac{5}{2}$

(c) 3

(d) $\frac{3}{5}$

(e) $\frac{7}{3}$

18. The volume of the solid generated by rotating the region bounded by the curves

$$y = x \text{ and } y = \sqrt{x}$$

about the line $x = 2$ is given by

(a) $\int_0^1 \pi[(\sqrt{x} + 2)^2 - (x + 2)^2]dx$

(b) $\int_0^1 \pi[(y + 2)^2 - (y^2 + 2)^2]dy$

(c) $\int_0^1 \pi(y^2 - y - 2)dy$

(d) $\int_0^1 \pi[(2 - y^2)^2 - (2 - y)^2]dy$

(e) $\int_0^1 \pi[(2 - \sqrt{x})^2 - (2 - x)^2]dx$

19. $\lim_{n \to +\infty} \sum_{i=1}^{n} \left[2 + \left(1 + \frac{4i}{n} \right)^7 \right] \frac{5}{n} =$

(a) $\int_0^5 \left[2 + \left(1 + \frac{4}{5}x \right)^7 \right] dx$

(b) $\int_0^5 \left[2 + (1 + 4x)^7 \right] dx$

(c) $\int_0^5 \left(1 + \frac{4}{5}x \right)^7 dx$

(d) $\int_2^7 \left[2 + (1 + 4x)^7 \right] dx$

(e) $\int_2^7 \left[2 + \left(1 + \frac{4}{5}x \right)^7 \right] dx$

20. If $\int_0^1 f(3x - 5)dx = 4$, then $\int_{-5}^{-2} f(x)dx =$

(a) 12

(b) $\frac{1}{4}$

(c) 3

(d) $\frac{4}{3}$

(e) 4

Name ....

ID .... Sec ....

1	a	b	c	d	e	f
2	a	b	c	d	e	f
3	a	b	c	d	e	f
4	a	b	c	d	e	f
5	a	b	c	d	e	f
6	a	b	c	d	e	f
7	a	b	c	d	e	f
8	a	b	c	d	e	f
9	a	b	c	d	e	f
10	a	b	c	d	e	f
11	a	b	c	d	e	f
12	a	b	c	d	e	f
13	a	b	c	d	e	f
14	a	b	c	d	e	f
15	a	b	c	d	e	f
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18	a	b	c	d	e	f
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21	a	b	c	d	e	f
22	a	b	c	d	e	f
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24	a	b	c	d	e	f
25	a	b	c	d	e	f
26	a	b	c	d	e	f
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29	a	b	c	d	e	f
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31	a	b	c	d	e	f
32	a	b	c	d	e	f
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35	a	b	c	d	e	f

36	a	b	c	d	e	f
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41	a	b	c	d	e	f
42	a	b	c	d	e	f
43	a	b	c	d	e	f
44	a	b	c	d	e	f
45	a	b	c	d	e	f
46	a	b	c	d	e	f
47	a	b	c	d	e	f
48	a	b	c	d	e	f
49	a	b	c	d	e	f
50	a	b	c	d	e	f
51	a	b	c	d	e	f
52	a	b	c	d	e	f
53	a	b	c	d	e	f
54	a	b	c	d	e	f
55	a	b	c	d	e	f
56	a	b	c	d	e	f
57	a	b	c	d	e	f
58	a	b	c	d	e	f
59	a	b	c	d	e	f
60	a	b	c	d	e	f
61	a	b	c	d	e	f
62	a	b	c	d	e	f
63	a	b	c	d	e	f
64	a	b	c	d	e	f
65	a	b	c	d	e	f
66	a	b	c	d	e	f
67	a	b	c	d	e	f
68	a	b	c	d	e	f
69	a	b	c	d	e	f
70	a	b	c	d	e	f

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CODE 002 **Math 102** **CODE 002**

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1. $\int_e^{e^3} \frac{1}{x \ln x}\, dx =$

(a) $\ln 3$

(b) $\ln 2$

(c) $-\ln 3$

(d) $1 - \ln 3$

(e) $2 - \ln 2$

2. The area of the region enclosed by the graphs of

$2y^2 = x + 4$ and $x = y^2$

is equal to

(a) 1

(b) $4\sqrt{2}$

(c) $\sqrt{3}$

(d) $\frac{32}{3}$

(e) $\frac{1}{2}$

3. If $G(x) = \int_{\sin x}^{\cos(3x)} \frac{1}{\sqrt{1+4t^2}}\, dt$, then $G'\left(\frac{\pi}{2}\right) =$

(a) $\frac{3}{5}$

(b) 3

(c) $\frac{-14}{5}$

(d) $\frac{16}{5}$

(e) 2

4. The volume of the solid generated by rotating the region bounded by the curves

$$x^2 + y^2 = 1 \text{ and } y = |x|$$

about the x-axis is equal to

(a) $\sqrt{3}\pi$

(b) $\frac{2\sqrt{2}}{3}\pi$

(c) $\frac{2}{3}\pi$

(d) $4\sqrt{2}\pi$

(e) $\frac{2}{\sqrt{3}}\pi$

5. $\int (\sqrt[4]{y} + y)^2 \, dy =$

(a) $\frac{4}{5}y^{5/4} + \frac{2}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(b) $\frac{(\sqrt[4]{y} + y)^3}{3} + C$

(c) $\frac{2}{3}y^{3/2} + \frac{4}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(d) $\frac{1}{2}y^2 + \frac{1}{3}y^3 + C$

(e) $\frac{2}{3}y^{3/2} + \frac{8}{9}y^{9/4} + \frac{1}{3}y^3 + C$

6. Using four rectangles and left endpoints, the area under the graph of $f(x) = x^2 - 2x$ from $x = 2$ to $x = 6$ is approximately equal to

(a) 35

(b) 26

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(d) 38

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7. $\int_6^4 f(x)dx + \int_4^{-1} f(x)dx - \int_6^{-3} f(x)dx =$

(a) $\int_{-1}^{-3} f(x)dx$

(b) $\int_4^{-1} f(x)dx$

(c) $\int_{-3}^{-1} f(x)dx$

(d) $\int_{-1}^{6} f(x)dx$

(e) $\int_4^{-3} f(x)dx$

8. $\int_0^{2\sqrt{2}} (3 - 2\sqrt{8 - x^2})\, dx =$

(a) $6\sqrt{2} - 2\pi$

(b) $2\sqrt{2}$

(c) $3\sqrt{2} - 2\pi$

(d) $6\sqrt{2} - 8\pi$

(e) $6\sqrt{2} - 4\pi$

9. $\int_0^1 \frac{\tan^{-1} x}{1+x^2}\, dx =$

(a) $\frac{\pi^2}{16}$

(b) $\frac{3\pi}{2}$

(c) $\frac{\pi}{8}$

(d) $\frac{\pi^2}{32}$

(e) $2\pi^2$

10. $\int x\sqrt{2x-1}\, dx =$

(a) $\frac{\sqrt{2x-1}}{x} + C$

(b) $\frac{1}{10}(2x-1)^{5/2} + \frac{1}{6}(2x-1)^{3/2} + C$

(c) $\frac{2}{5}(2x-1)^{5/2} + \frac{1}{3}(2x-1)^{3/2} + C$

(d) $\frac{2}{3}(2x-1)^{3/2} + 2(2x-1)^{1/2} + C$

(e) $\frac{1}{10}\left(\frac{x+1}{2}\right)^{5/2} + \frac{2}{3}\left(\frac{x+1}{2}\right)^{1/2} + C$

11. $\int_1^4 \frac{d}{dx}\left(\frac{\ln x}{\sqrt{x}}\right) dx =$

(a) $\ln 2$

(b) $\ln 4$

(c) cannot be evaluated

(d) $2 + \ln 4$

(e) $-1 + \ln 2$

12. $\int (\tan^2 t - \cot^2 t) dt =$

(a) $\tan t + \cot t + C$

(b) $\sec t + \csc t + C$

(c) $t + C$

(d) $\frac{1}{3}\tan^2 t - \frac{1}{3}\cot^3 t + C$

(e) $t + \tan t + \sec t + C$

13. If the velocity of a particle moving in a straight line is given by

$$v(t) = \frac{1}{2} - \cos t, \quad t \geq 0$$

then the distance traveled during the time inteval $\left[0, \frac{\pi}{2}\right]$ is

(a) $\sqrt{3} - 1 + \frac{\pi}{12}$

(b) $\sqrt{3} - 1 - \frac{\pi}{12}$

(c) $2 - \frac{\pi}{6}$

(d) $\sqrt{3} + 1 + \frac{\pi}{12}$

(e) $\frac{\pi}{4} - 1$

14. $\int_0^1 \frac{10x + 15}{\sqrt{2x^2 + 6x + 1}} dx =$

(a) 10

(b) 20

(c) 5

(d) $\frac{15}{2}$

(e) $\frac{5}{2}$

15. If R_n is the Riemann sum for

$$f(x) = 3 + \frac{2}{9}x^2, \quad 0 \le x \le 3,$$

with n subintervals and taking sample points to be the right endpoints, then $R_n =$

(a) $3 + \frac{2}{9}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(b) $1 + \frac{2}{3}\left(1 + \frac{2}{n}\right)\left(2 + \frac{1}{3n}\right)$

(c) $9 + \frac{1}{27}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(d) $9 + \left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(e) $3 + \frac{1}{6}\left(1 - \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

16. Which one of the following is **TRUE**: If f is an odd and continuous function on $[-a, a]$, then

(a) $\int_{-a}^{a} x f(x) dx = 0$

(b) $\int_{-a}^{a} \cos x \cdot f(x) dx = 2\int_{0}^{a} \cos x \cdot f(x) dx$

(c) $\int_{-a}^{a} [f(x)]^2 dx = 0$

(d) $\int_{-a}^{a} [f(x)]^3 dx = 0$

(e) $\int_{-a}^{a} [\sin x + f(x)] dx = 2\int_{0}^{a} [\sin x + f(x)] dx$

17. $\lim_{n\to+\infty} \sum_{i=1}^{n} \left[2 + \left(1 + \frac{4i}{n}\right)^7\right] \frac{5}{n} =$

(a) $\int_2^7 \left[2 + \left(1 + \frac{4}{5}x\right)^7\right] dx$

(b) $\int_0^5 \left[2 + (1 + 4x)^7\right] dx$

(c) $\int_2^7 \left[2 + (1 + 4x)^7\right] dx$

(d) $\int_0^5 \left(1 + \frac{4}{5}x\right)^7 dx$

(e) $\int_0^5 \left[2 + \left(1 + \frac{4}{5}x\right)^7\right] dx$

18. The area of the region lying between the curves $y = x^2$ and $y = -x + 2$ and between the lines $x = 0$ and $x = 2$ is equal to

(a) 3

(b) 2

(c) $\frac{3}{5}$

(d) $\frac{7}{3}$

(e) $\frac{5}{2}$

19. The volume of the solid generated by rotating the region bounded by the curves

$$y = x \text{ and } y = \sqrt{x}$$

about the line $x = 2$ is given by

(a) $\int_0^1 \pi[(y+2)^2 - (y^2+2)^2]dy$

(b) $\int_0^1 \pi[(2-\sqrt{x})^2 - (2-x)^2]dx$

(c) $\int_0^1 \pi[(2-y^2)^2 - (2-y)^2]dy$

(d) $\int_0^1 \pi(y^2 - y - 2)dy$

(e) $\int_0^1 \pi[(\sqrt{x}+2)^2 - (x+2)^2]dx$

20. If $\int_0^1 f(3x-5)dx = 4$, then $\int_{-5}^{-2} f(x)dx =$

(a) 4

(b) $\frac{4}{3}$

(c) $\frac{1}{4}$

(d) 12

(e) 3

Name ....

ID .... Sec ....

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46	a	b	c	d	e	f
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61	a	b	c	d	e	f
62	a	b	c	d	e	f
63	a	b	c	d	e	f
64	a	b	c	d	e	f
65	a	b	c	d	e	f
66	a	b	c	d	e	f
67	a	b	c	d	e	f
68	a	b	c	d	e	f
69	a	b	c	d	e	f
70	a	b	c	d	e	f

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

CODE 003 **Math 102** **CODE 003**

Exam I

Term 091

Tuesday 3/11/2009

Net Time Allowed: 120 minutes

Name: ______________________________

ID: ________________ Sec: ________________.

Check that this exam has 20 questions.

Important Instructions:

1. All types of calculators, pagers or mobile phones are NOT allowed during the examination.
2. Use HB 2.5 pencils only.
3. Use a good eraser. DO NOT use the erasers attached to the pencil.
4. Write your name, ID number and Section number on the examination paper and in the upper left corner of the answer sheet.
5. When bubbling your ID number and Section number, be sure that the bubbles match with the numbers that you write.
6. The Test Code Number is already bubbled in your answer sheet. Make sure that it is the same as that printed on your question paper.
7. When bubbling, make sure that the bubbled space is fully covered.
8. When erasing a bubble, make sure that you do not leave any trace of penciling.

1. $\int (\sqrt[4]{y} + y)^2 \, dy =$

(a) $\frac{1}{2}y^2 + \frac{1}{3}y^3 + C$

(b) $\frac{2}{3}y^{3/2} + \frac{8}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(c) $\frac{2}{3}y^{3/2} + \frac{4}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(d) $\frac{4}{5}y^{5/4} + \frac{2}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(e) $\frac{(\sqrt[4]{y} + y)^3}{3} + C$

2. The volume of the solid generated by rotating the region bounded by the curves

$$x^2 + y^2 = 1 \text{ and } y = |x|$$

about the x-axis is equal to

(a) $4\sqrt{2}\pi$

(b) $\sqrt{3}\pi$

(c) $\frac{2\sqrt{2}}{3}\pi$

(d) $\frac{2}{3}\pi$

(e) $\frac{2}{\sqrt{3}}\pi$

3. $\displaystyle\int_{e}^{e^3} \frac{1}{x\ln x}\, dx =$

(a) $1 - \ln 3$

(b) $-\ln 3$

(c) $2 - \ln 2$

(d) $\ln 2$

(e) $\ln 3$

4. $\displaystyle\int_{0}^{2\sqrt{2}} (3 - 2\sqrt{8 - x^2})\, dx =$

(a) $6\sqrt{2} - 8\pi$

(b) $2\sqrt{2}$

(c) $6\sqrt{2} - 2\pi$

(d) $3\sqrt{2} - 2\pi$

(e) $6\sqrt{2} - 4\pi$

5. The area of the region enclosed by the graphs of

$$2y^2 = x + 4 \text{ and } x = y^2$$

is equal to

(a) $\frac{32}{3}$

(b) $\frac{1}{2}$

(c) $4\sqrt{2}$

(d) $\sqrt{3}$

(e) 1

6. $\int_6^4 f(x)dx + \int_4^{-1} f(x)dx - \int_6^{-3} f(x)dx =$

(a) $\int_{-1}^{-3} f(x)dx$

(b) $\int_4^{-3} f(x)dx$

(c) $\int_{-3}^{-1} f(x)dx$

(d) $\int_4^{-1} f(x)dx$

(e) $\int_{-1}^{6} f(x)dx$

7. Using four rectangles and left endpoints, the area under the graph of $f(x) = x^2 - 2x$ from $x = 2$ to $x = 6$ is approximately equal to

(a) 35

(b) 38

(c) 23

(d) 26

(e) 40

8. If $G(x) = \int_{\sin x}^{\cos(3x)} \frac{1}{\sqrt{1+4t^2}}\, dt$, then $G'\left(\frac{\pi}{2}\right) =$

(a) 3

(b) $\frac{16}{5}$

(c) $\frac{3}{5}$

(d) $\frac{-14}{5}$

(e) 2

9. $\int_1^4 \frac{d}{dx}\left(\frac{\ln x}{\sqrt{x}}\right) dx =$

(a) $\ln 2$

(b) cannot be evaluated

(c) $-1 + \ln 2$

(d) $\ln 4$

(e) $2 + \ln 4$

10. Which one of the following is **TRUE**: If f is an odd and continuous function on $[-a, a]$, then

(a) $\int_{-a}^{a} \cos x \cdot f(x)dx = 2\int_0^a \cos x \cdot f(x)dx$

(b) $\int_{-a}^{a} [\sin x + f(x)]dx = 2\int_0^a [\sin x + f(x)]dx$

(c) $\int_{-a}^{a} [f(x)]^3 dx = 0$

(d) $\int_{-a}^{a} [f(x)]^2 dx = 0$

(e) $\int_{-a}^{a} xf(x)dx = 0$

11. $\int_0^1 \frac{\tan^{-1} x}{1+x^2}\, dx =$

(a) $\frac{\pi^2}{32}$

(b) $\frac{\pi}{8}$

(c) $2\pi^2$

(d) $\frac{\pi^2}{16}$

(e) $\frac{3\pi}{2}$

12. If the velocity of a particle moving in a straight line is given by

$$v(t) = \frac{1}{2} - \cos t, \quad t \geq 0$$

then the distance traveled during the time inteval $\left[0, \frac{\pi}{2}\right]$ is

(a) $\sqrt{3} - 1 - \frac{\pi}{12}$

(b) $\frac{\pi}{4} - 1$

(c) $\sqrt{3} - 1 + \frac{\pi}{12}$

(d) $2 - \frac{\pi}{6}$

(e) $\sqrt{3} + 1 + \frac{\pi}{12}$

13. If R_n is the Riemann sum for

$$f(x) = 3 + \frac{2}{9}x^2, \quad 0 \le x \le 3,$$

with n subintervals and taking sample points to be the right endpoints, then $R_n =$

(a) $1 + \frac{2}{3}\left(1 + \frac{2}{n}\right)\left(2 + \frac{1}{3n}\right)$

(b) $9 + \frac{1}{27}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(c) $3 + \frac{2}{9}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(d) $3 + \frac{1}{6}\left(1 - \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(e) $9 + \left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

14. $\int (\tan^2 t - \cot^2 t)dt =$

(a) $\tan t + \cot t + C$

(b) $\frac{1}{3}\tan^2 t - \frac{1}{3}\cot^3 t + C$

(c) $t + C$

(d) $t + \tan t + \sec t + C$

(e) $\sec t + \csc t + C$

15. $\int x\sqrt{2x-1}\,dx =$

(a) $\frac{2}{3}(2x-1)^{3/2} + 2(2x-1)^{1/2} + C$

(b) $\frac{2}{5}(2x-1)^{5/2} + \frac{1}{3}(2x-1)^{3/2} + C$

(c) $\frac{1}{10}(2x-1)^{5/2} + \frac{1}{6}(2x-1)^{3/2} + C$

(d) $\frac{\sqrt{2x-1}}{x} + C$

(e) $\frac{1}{10}\left(\frac{x+1}{2}\right)^{5/2} + \frac{2}{3}\left(\frac{x+1}{2}\right)^{1/2} + C$

16. $\int_0^1 \frac{10x+15}{\sqrt{2x^2+6x+1}}dx =$

(a) 10

(b) 20

(c) $\frac{5}{2}$

(d) 5

(e) $\frac{15}{2}$

17. The volume of the solid generated by rotating the region bounded by the curves

$$y = x \text{ and } y = \sqrt{x}$$

about the line $x = 2$ is given by

(a) $\int_0^1 \pi[(2 - y^2)^2 - (2 - y)^2]dy$

(b) $\int_0^1 \pi(y^2 - y - 2)dy$

(c) $\int_0^1 \pi[(2 - \sqrt{x})^2 - (2 - x)^2]dx$

(d) $\int_0^1 \pi[(y + 2)^2 - (y^2 + 2)^2]dy$

(e) $\int_0^1 \pi[(\sqrt{x} + 2)^2 - (x + 2)^2]dx$

18. The area of the region lying between the curves $y = x^2$ and $y = -x + 2$ and between the lines $x = 0$ and $x = 2$ is equal to

(a) $\frac{5}{2}$

(b) $\frac{3}{5}$

(c) 2

(d) $\frac{7}{3}$

(e) 3

19. If $\int_0^1 f(3x-5)dx = 4$, then $\int_{-5}^{-2} f(x)dx =$

(a) 4

(b) $\frac{1}{4}$

(c) $\frac{4}{3}$

(d) 3

(e) 12

20. $\lim_{n\to+\infty} \sum_{i=1}^{n} \left[2+\left(1+\frac{4i}{n}\right)^7\right]\frac{5}{n} =$

(a) $\int_0^5 \left(1+\frac{4}{5}x\right)^7 dx$

(b) $\int_2^7 \left[2+(1+4x)^7\right] dx$

(c) $\int_0^5 \left[2+(1+4x)^7\right] dx$

(d) $\int_0^5 \left[2+\left(1+\frac{4}{5}x\right)^7\right] dx$

(e) $\int_2^7 \left[2+\left(1+\frac{4}{5}x\right)^7\right] dx$

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69	a	b	c	d	e	f
70	a	b	c	d	e	f

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

CODE 004 | **Math 102** | CODE 004

Exam I

Term 091

Tuesday 3/11/2009

Net Time Allowed: 120 minutes

Name: ______________________________

ID: ____________________ Sec: ____________________.

Check that this exam has 20 questions.

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7. When bubbling, make sure that the bubbled space is fully covered.
8. When erasing a bubble, make sure that you do not leave any trace of penciling.

1. $\int (\sqrt[4]{y} + y)^2 \, dy =$

(a) $\frac{1}{2}y^2 + \frac{1}{3}y^3 + C$

(b) $\frac{4}{5}y^{5/4} + \frac{2}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(c) $\frac{2}{3}y^{3/2} + \frac{4}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(d) $\frac{2}{3}y^{3/2} + \frac{8}{9}y^{9/4} + \frac{1}{3}y^3 + C$

(e) $\frac{(\sqrt[4]{y} + y)^3}{3} + C$

2. The area of the region enclosed by the graphs of

$$2y^2 = x + 4 \text{ and } x = y^2$$

is equal to

(a) $4\sqrt{2}$

(b) $\frac{1}{2}$

(c) $\frac{32}{3}$

(d) $\sqrt{3}$

(e) 1

3. $\int_0^{2\sqrt{2}} (3 - 2\sqrt{8 - x^2})\, dx =$

(a) $6\sqrt{2} - 4\pi$

(b) $2\sqrt{2}$

(c) $3\sqrt{2} - 2\pi$

(d) $6\sqrt{2} - 8\pi$

(e) $6\sqrt{2} - 2\pi$

4. $\int_6^4 f(x)dx + \int_4^{-1} f(x)dx - \int_6^{-3} f(x)dx =$

(a) $\int_4^{-3} f(x)dx$

(b) $\int_{-1}^{-3} f(x)dx$

(c) $\int_4^{-1} f(x)dx$

(d) $\int_{-3}^{-1} f(x)dx$

(e) $\int_{-1}^{6} f(x)dx$

5. $\displaystyle\int_e^{e^3} \frac{1}{x\ln x}\,dx =$

(a) $\ln 3$

(b) $2 - \ln 2$

(c) $\ln 2$

(d) $1 - \ln 3$

(e) $-\ln 3$

6. The volume of the solid generated by rotating the region bounded by the curves

$$x^2 + y^2 = 1 \text{ and } y = |x|$$

about the x-axis is equal to

(a) $\dfrac{2}{3}\pi$

(b) $4\sqrt{2}\pi$

(c) $\dfrac{2\sqrt{2}}{3}\pi$

(d) $\sqrt{3}\pi$

(e) $\dfrac{2}{\sqrt{3}}\pi$

7. Using four rectangles and left endpoints, the area under the graph of $f(x) = x^2 - 2x$ from $x = 2$ to $x = 6$ is approximately equal to

(a) 35

(b) 23

(c) 40

(d) 26

(e) 38

8. If $G(x) = \int_{\sin x}^{\cos(3x)} \frac{1}{\sqrt{1+4t^2}}\, dt$, then $G'\left(\frac{\pi}{2}\right) =$

(a) $\frac{-14}{5}$

(b) 3

(c) 2

(d) $\frac{16}{5}$

(e) $\frac{3}{5}$

9. $\displaystyle\int_0^1 \frac{10x+15}{\sqrt{2x^2+6x+1}}dx =$

(a) 5

(b) $\dfrac{15}{2}$

(c) 20

(d) $\dfrac{5}{2}$

(e) 10

10. $\displaystyle\int(\tan^2 t - \cot^2 t)dt =$

(a) $t + \tan t + \sec t + C$

(b) $\tan t + \cot t + C$

(c) $\dfrac{1}{3}\tan^2 t - \dfrac{1}{3}\cot^3 t + C$

(d) $\sec t + \csc t + C$

(e) $t + C$

11. $\displaystyle\int_0^1 \frac{\tan^{-1} x}{1+x^2}\,dx =$

(a) $\dfrac{3\pi}{2}$

(b) $\dfrac{\pi^2}{16}$

(c) $\dfrac{\pi}{8}$

(d) $\dfrac{\pi^2}{32}$

(e) $2\pi^2$

12. If the velocity of a particle moving in a straight line is given by

$$v(t) = \frac{1}{2} - \cos t, \quad t \geq 0$$

then the distance traveled during the time inteval $\left[0, \dfrac{\pi}{2}\right]$ is

(a) $\sqrt{3} - 1 - \dfrac{\pi}{12}$

(b) $\sqrt{3} + 1 + \dfrac{\pi}{12}$

(c) $2 - \dfrac{\pi}{6}$

(d) $\dfrac{\pi}{4} - 1$

(e) $\sqrt{3} - 1 + \dfrac{\pi}{12}$

13. $\int_1^4 \frac{d}{dx}\left(\frac{\ln x}{\sqrt{x}}\right) dx =$

(a) $-1 + \ln 2$

(b) $\ln 2$

(c) $\ln 4$

(d) $2 + \ln 4$

(e) cannot be evaluated

14. Which one of the following is **TRUE**: If f is an odd and continuous function on $[-a, a]$, then

(a) $\int_{-a}^{a} x f(x) dx = 0$

(b) $\int_{-a}^{a} [\sin x + f(x)] dx = 2\int_0^a [\sin x + f(x)] dx$

(c) $\int_{-a}^{a} [f(x)]^2 dx = 0$

(d) $\int_{-a}^{a} \cos x \cdot f(x) dx = 2\int_0^a \cos x \cdot f(x) dx$

(e) $\int_{-a}^{a} [f(x)]^3 dx = 0$

15. If R_n is the Riemann sum for

$$f(x) = 3 + \frac{2}{9}x^2, \quad 0 \le x \le 3,$$

with n subintervals and taking sample points to be the right endpoints, then $R_n =$

(a) $9 + \frac{1}{27}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(b) $9 + \left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(c) $3 + \frac{1}{6}\left(1 - \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(d) $3 + \frac{2}{9}\left(1 + \frac{1}{n}\right)\left(2 + \frac{1}{n}\right)$

(e) $1 + \frac{2}{3}\left(1 + \frac{2}{n}\right)\left(2 + \frac{1}{3n}\right)$

16. $\int x\sqrt{2x-1}\,dx =$

(a) $\frac{2}{3}(2x-1)^{3/2} + 2(2x-1)^{1/2} + C$

(b) $\frac{1}{10}\left(\frac{x+1}{2}\right)^{5/2} + \frac{2}{3}\left(\frac{x+1}{2}\right)^{1/2} + C$

(c) $\frac{2}{5}(2x-1)^{5/2} + \frac{1}{3}(2x-1)^{3/2} + C$

(d) $\frac{\sqrt{2x-1}}{x} + C$

(e) $\frac{1}{10}(2x-1)^{5/2} + \frac{1}{6}(2x-1)^{3/2} + C$

17. $\lim_{n\to+\infty} \sum_{i=1}^{n} \left[2 + \left(1 + \frac{4i}{n}\right)^7\right] \frac{5}{n} =$

(a) $\int_0^5 \left[2 + \left(1 + \frac{4}{5}x\right)^7\right] dx$

(b) $\int_0^5 \left[2 + (1 + 4x)^7\right] dx$

(c) $\int_2^7 \left[2 + (1 + 4x)^7\right] dx$

(d) $\int_0^5 \left(1 + \frac{4}{5}x\right)^7 dx$

(e) $\int_2^7 \left[2 + \left(1 + \frac{4}{5}x\right)^7\right] dx$

18. The area of the region lying between the curves $y = x^2$ and $y = -x + 2$ and between the lines $x = 0$ and $x = 2$ is equal to

(a) $\frac{3}{5}$

(b) 2

(c) $\frac{5}{2}$

(d) 3

(e) $\frac{7}{3}$

19. The volume of the solid generated by rotating the region bounded by the curves

$$y = x \text{ and } y = \sqrt{x}$$

about the line $x = 2$ is given by

(a) $\int_0^1 \pi[(2 - \sqrt{x})^2 - (2 - x)^2]dx$

(b) $\int_0^1 \pi[(\sqrt{x} + 2)^2 - (x + 2)^2]dx$

(c) $\int_0^1 \pi[(y + 2)^2 - (y^2 + 2)^2]dy$

(d) $\int_0^1 \pi[(2 - y^2)^2 - (2 - y)^2]dy$

(e) $\int_0^1 \pi(y^2 - y - 2)dy$

20. If $\int_0^1 f(3x - 5)dx = 4$, then $\int_{-5}^{-2} f(x)dx =$

(a) 4

(b) $\frac{1}{4}$

(c) $\frac{4}{3}$

(d) 3

(e) 12

Name ....

ID .... Sec ....

1	a	b	c	d	e	f
2	a	b	c	d	e	f
3	a	b	c	d	e	f
4	a	b	c	d	e	f
5	a	b	c	d	e	f
6	a	b	c	d	e	f
7	a	b	c	d	e	f
8	a	b	c	d	e	f
9	a	b	c	d	e	f
10	a	b	c	d	e	f
11	a	b	c	d	e	f
12	a	b	c	d	e	f
13	a	b	c	d	e	f
14	a	b	c	d	e	f
15	a	b	c	d	e	f
16	a	b	c	d	e	f
17	a	b	c	d	e	f
18	a	b	c	d	e	f
19	a	b	c	d	e	f
20	a	b	c	d	e	f
21	a	b	c	d	e	f
22	a	b	c	d	e	f
23	a	b	c	d	e	f
24	a	b	c	d	e	f
25	a	b	c	d	e	f
26	a	b	c	d	e	f
27	a	b	c	d	e	f
28	a	b	c	d	e	f
29	a	b	c	d	e	f
30	a	b	c	d	e	f
31	a	b	c	d	e	f
32	a	b	c	d	e	f
33	a	b	c	d	e	f
34	a	b	c	d	e	f
35	a	b	c	d	e	f

36	a	b	c	d	e	f
37	a	b	c	d	e	f
38	a	b	c	d	e	f
39	a	b	c	d	e	f
40	a	b	c	d	e	f
41	a	b	c	d	e	f
42	a	b	c	d	e	f
43	a	b	c	d	e	f
44	a	b	c	d	e	f
45	a	b	c	d	e	f
46	a	b	c	d	e	f
47	a	b	c	d	e	f
48	a	b	c	d	e	f
49	a	b	c	d	e	f
50	a	b	c	d	e	f
51	a	b	c	d	e	f
52	a	b	c	d	e	f
53	a	b	c	d	e	f
54	a	b	c	d	e	f
55	a	b	c	d	e	f
56	a	b	c	d	e	f
57	a	b	c	d	e	f
58	a	b	c	d	e	f
59	a	b	c	d	e	f
60	a	b	c	d	e	f
61	a	b	c	d	e	f
62	a	b	c	d	e	f
63	a	b	c	d	e	f
64	a	b	c	d	e	f
65	a	b	c	d	e	f
66	a	b	c	d	e	f
67	a	b	c	d	e	f
68	a	b	c	d	e	f
69	a	b	c	d	e	f
70	a	b	c	d	e	f

Q	MM	V1	V2	V3	V4
1	a	c	a	b	d
2	a	a	d	c	c
3	a	a	b	e	a
4	a	c	b	e	d
5	a	e	e	a	a
6	a	d	b	c	c
7	a	b	c	d	d
8	a	d	e	a	b
9	a	b	d	a	e
10	a	c	b	c	b
11	a	b	a	a	d
12	a	c	a	a	a
13	a	d	b	e	b
14	a	d	a	a	e
15	a	d	d	c	b
16	a	d	d	a	e
17	a	c	e	a	a
18	a	d	a	e	d
19	a	a	c	e	d
20	a	a	d	d	e

Answer Counts

V	a	b	c	d	e
1	3	6	4	5	2
2	5	5	3	2	5
3	1	3	5	6	5
4	4	5	2	3	6