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

Math 101
Exam I (PART 1)
063
Tuesday 17/7/2007

## EXAM COVER

Number of versions: 4
Number of questions: 7
Number of Answers: 5 per question

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

**Math 101**
**Exam I (PART 1)**
**063**
**Tuesday 17/7/2007**
**Net Time Allowed: (For both parts) 70 minutes**

# MASTER VERSION

1. $\displaystyle\lim_{x \to -1^+} \frac{x^3 - 1}{x^2 - 1} =$

    (a) $\infty$

    (b) $-\infty$

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

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

    (e) $0$

2. $\displaystyle\lim_{x \to 4^+} \frac{4 - x}{\sqrt{x} - 2} =$

    (a) $-4$

    (b) $4$

    (c) $0$

    (d) $\infty$

    (e) does not exist

3. The value of the constant '$k$' that makes

$$g(x) = \begin{cases} x^3 + 2x + k + 3 & \text{if } x \le 0 \\ \sqrt{x}\sin\dfrac{3}{x} & \text{if } x > 0 \end{cases}$$

continuous on $(-\infty, \infty)$ is

(a) $-3$

(b) $3$

(c) $0$

(d) $1$

(e) $-1$

4. $\displaystyle\lim_{x \to 2} \arctan\left(\frac{x^2 - 4}{2\sqrt{3}x^2 - 4\sqrt{3}x}\right) =$

Note:

| $x$ | $0$ | $\pi/6$ | $\pi/4$ | $\pi/3$ |
|-----|-----|---------|---------|---------|
| $\tan x$ | $0$ | $1/\sqrt{3}$ | $1$ | $\sqrt{3}$ |

(a) $\dfrac{\pi}{6}$

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

(c) $0$

(d) $\pi$

(e) does not exist

5. $\lim\limits_{x \to -\infty} \dfrac{\sqrt{3x^2 + 6}}{5 - 2x} =$

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

(b) $-\dfrac{\sqrt{3}}{2}$

(c) $\infty$

(d) $-\infty$

(e) $0$

6. The vertical and horizontal asymptotes of the graph of the function $f(x) = \dfrac{x^2 - 9}{x^2 + 2x - 3}$ are

(a) $x = 1, y = 1$

(b) $x = 1, x = -3, y = 1$

(c) $x = -3, y = -1$

(d) $x = 1, y = -1$

(e) $x = 1, y = -3$

7. The tangent line to the graph of a function $f(x)$ at $x = -1$ is $4x+y = 0$. Thus the value of the limit $\lim\limits_{x \to -1} \dfrac{f(x) - f(-1)}{x + 1}$ is

(a) $-4$

(b) $4$

(c) $1$

(d) $\infty$

(e) $0$

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

| CODE 001 | **Math 101** | CODE 001 |

**Exam I (PART 1)**
**063**
**Tuesday 17/7/2007**
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Name: _____

ID: _____ Sec: _____ .

## Check that this part has <u>7</u> 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. The vertical and horizontal asymptotes of the graph of the function $f(x) = \dfrac{x^2 - 9}{x^2 + 2x - 3}$ are

(a) $x = 1, x = -3, y = 1$

(b) $x = 1, y = -3$

(c) $x = 1, y = 1$

(d) $x = 1, y = -1$

(e) $x = -3, y = -1$

2. $\displaystyle\lim_{x \to -1^+} \dfrac{x^3 - 1}{x^2 - 1} =$

(a) $\infty$

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

(c) $0$

(d) $\dfrac{3}{2}$

(e) $-\infty$

3. $\lim\limits_{x \to 4^+} \dfrac{4 - x}{\sqrt{x} - 2} =$

   (a) $\infty$

   (b) 0

   (c) $-4$

   (d) does not exist

   (e) 4

4. The value of the constant '$k$' that makes

$$g(x) = \begin{cases} x^3 + 2x + k + 3 & \text{if } x \leq 0 \\ \sqrt{x}\sin\dfrac{3}{x} & \text{if } x > 0 \end{cases}$$

   continuous on $(-\infty, \infty)$ is

   (a) 0

   (b) 3

   (c) $-1$

   (d) $-3$

   (e) 1

5. The tangent line to the graph of a function $f(x)$ at $x = -1$ is $4x+y = 0$. Thus the value of the limit $\displaystyle\lim_{x \to -1} \frac{f(x) - f(-1)}{x + 1}$ is

(a) $\infty$

(b) $-4$

(c) $1$

(d) $0$

(e) $4$

6. $\displaystyle\lim_{x \to 2} \arctan\left(\frac{x^2 - 4}{2\sqrt{3}x^2 - 4\sqrt{3}x}\right) =$

Note:

| $x$ | $0$ | $\pi/6$ | $\pi/4$ | $\pi/3$ |
|---|---|---|---|---|
| $\tan x$ | $0$ | $1/\sqrt{3}$ | $1$ | $\sqrt{3}$ |

(a) $0$

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

(c) does not exist

(d) $\pi$

(e) $\dfrac{\pi}{6}$

7. $\lim\limits_{x\to-\infty} \dfrac{\sqrt{3x^2+6}}{5-2x} =$

(a) $-\dfrac{\sqrt{3}}{2}$

(b) $0$

(c) $-\infty$

(d) $\dfrac{\sqrt{3}}{2}$

(e) $\infty$

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| CODE 002 | **Math 101** | CODE 002 |

**Exam I (PART 1)**
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1. The value of the constant '$k$' that makes

$$g(x) = \begin{cases} x^3 + 2x + k + 3 & \text{if } x \leq 0 \\ \sqrt{x}\sin\dfrac{3}{x} & \text{if } x > 0 \end{cases}$$

continuous on $(-\infty, \infty)$ is

(a) 1

(b) 0

(c) −1

(d) −3

(e) 3

2. $\displaystyle\lim_{x \to -1^+} \frac{x^3 - 1}{x^2 - 1} =$

(a) $\infty$

(b) $-\infty$

(c) $\dfrac{1}{2}$

(d) 0

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

3.  $\displaystyle \lim_{x \to 2} \arctan\left( \frac{x^2 - 4}{2\sqrt{3}x^2 - 4\sqrt{3}x} \right) =$

Note:

| $x$ | 0 | $\pi/6$ | $\pi/4$ | $\pi/3$ |
|---|---|---|---|---|
| $\tan x$ | 0 | $1/\sqrt{3}$ | 1 | $\sqrt{3}$ |

(a)  $\pi$

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

(c)  0

(d)  $\dfrac{\pi}{6}$

(e)  does not exist

4.  $\displaystyle \lim_{x \to 4^+} \frac{4 - x}{\sqrt{x} - 2} =$

(a)  $-4$

(b)  0

(c)  4

(d)  does not exist

(e)  $\infty$

5. The tangent line to the graph of a function $f(x)$ at $x = -1$ is $4x + y = 0$. Thus the value of the limit $\lim\limits_{x \to -1} \dfrac{f(x) - f(-1)}{x + 1}$ is

(a) $\infty$

(b) 0

(c) 1

(d) $-4$

(e) 4

6. The vertical and horizontal asymptotes of the graph of the function $f(x) = \dfrac{x^2 - 9}{x^2 + 2x - 3}$ are

(a) $x = 1, x = -3, y = 1$

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(c) $x = 1, y = -3$

(d) $x = 1, y = -1$

(e) $x = 1, y = 1$

7.  $\lim\limits_{x \to -\infty} \dfrac{\sqrt{3x^2 + 6}}{5 - 2x} =$

(a)  $-\dfrac{\sqrt{3}}{2}$

(b)  $\dfrac{\sqrt{3}}{2}$

(c)  $-\infty$

(d)  $\infty$

(e)  $0$

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| CODE 003 | **Math 101** | CODE 003 |

**Exam I (PART 1)**
**063**
**Tuesday 17/7/2007**
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Name: _____

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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. $\displaystyle\lim_{x \to 4^+} \frac{4 - x}{\sqrt{x} - 2} =$

   (a) 4

   (b) $-4$

   (c) 0

   (d) $\infty$

   (e) does not exist

2. The vertical and horizontal asymptotes of the graph of the function $f(x) = \dfrac{x^2 - 9}{x^2 + 2x - 3}$ are

   (a) $x = 1, y = -1$

   (b) $x = 1, y = -3$

   (c) $x = -3, y = -1$

   (d) $x = 1, x = -3, y = 1$

   (e) $x = 1, y = 1$

3. $\lim\limits_{x\to-\infty} \dfrac{\sqrt{3x^2+6}}{5-2x} =$

    (a) $-\infty$

    (b) $\dfrac{\sqrt{3}}{2}$

    (c) $\infty$

    (d) $0$

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

4. $\lim\limits_{x\to-1^+} \dfrac{x^3-1}{x^2-1} =$

    (a) $0$

    (b) $\infty$

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

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

    (e) $-\infty$

5.  The value of the constant '$k$' that makes

$$g(x) = \begin{cases} x^3 + 2x + k + 3 & \text{if } x \leq 0 \\ \sqrt{x}\sin\dfrac{3}{x} & \text{if } x > 0 \end{cases}$$

continuous on $(-\infty, \infty)$ is

(a)  0

(b)  $-1$

(c)  3

(d)  1

(e)  $-3$

6.  $\lim\limits_{x \to 2} \arctan\left(\dfrac{x^2 - 4}{2\sqrt{3}x^2 - 4\sqrt{3}x}\right) =$

Note:

| $x$ | 0 | $\pi/6$ | $\pi/4$ | $\pi/3$ |
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(a)  $\dfrac{\pi}{6}$

(b)  0

(c)  does not exist

(d)  $\pi$

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

7. The tangent line to the graph of a function $f(x)$ at $x = -1$ is $4x + y = 0$. Thus the value of the limit $\displaystyle\lim_{x \to -1} \frac{f(x) - f(-1)}{x + 1}$ is

(a) 0

(b) $\infty$

(c) 4

(d) 1

(e) $-4$

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**063**
**Tuesday 17/7/2007**
**Net Time Allowed: (For both parts) 70 minutes**

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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. $\displaystyle\lim_{x \to 4^+} \frac{4 - x}{\sqrt{x} - 2} =$

    (a) 0

    (b) does not exist

    (c) 4

    (d) $-4$

    (e) $\infty$

2. $\displaystyle\lim_{x \to -\infty} \frac{\sqrt{3x^2 + 6}}{5 - 2x} =$

    (a) 0

    (b) $-\dfrac{\sqrt{3}}{2}$

    (c) $-\infty$

    (d) $\infty$

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

3.  The value of the constant '$k$' that makes

$$g(x) = \begin{cases} x^3 + 2x + k + 3 & \text{if } x \leq 0 \\ \sqrt{x}\sin\dfrac{3}{x} & \text{if } x > 0 \end{cases}$$

continuous on $(-\infty, \infty)$ is

(a)  0

(b)  3

(c)  −1

(d)  1

(e)  −3

4.  The tangent line to the graph of a function $f(x)$ at $x = -1$ is $4x + y = 0$. Thus the value of the limit $\displaystyle\lim_{x \to -1} \frac{f(x) - f(-1)}{x + 1}$ is

(a)  1

(b)  4

(c)  −4

(d)  0

(e)  $\infty$

5.  $\displaystyle\lim_{x\to-1^+}\frac{x^3-1}{x^2-1}=$

(a)  0

(b)  $\infty$

(c)  $\dfrac{1}{2}$

(d)  $\dfrac{3}{2}$

(e)  $-\infty$

6.  The vertical and horizontal asymptotes of the graph of the function $f(x)=\dfrac{x^2-9}{x^2+2x-3}$ are

(a)  $x=-3, y=-1$

(b)  $x=1, y=1$

(c)  $x=1, y=-1$

(d)  $x=1, x=-3, y=1$

(e)  $x=1, y=-3$

7.  $\displaystyle\lim_{x\to 2}\arctan\left(\frac{x^2-4}{2\sqrt{3}x^2-4\sqrt{3}x}\right)=$

Note:

| $x$ | 0 | $\pi/6$ | $\pi/4$ | $\pi/3$ |
|---|---|---|---|---|
| $\tan x$ | 0 | $1/\sqrt{3}$ | 1 | $\sqrt{3}$ |

(a)  does not exist

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

(c)  0

(d)  $\pi$

(e)  $\dfrac{\pi}{6}$

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  | d  | b  | d  |
| 2 | a  | a  | a  | e  | e  |
| 3 | a  | c  | d  | b  | e  |
| 4 | a  | d  | a  | b  | c  |
| 5 | a  | b  | d  | e  | b  |
| 6 | a  | e  | e  | a  | b  |
| 7 | a  | d  | b  | e  | e  |

# Answer Counts

| V | a | b | c | d | e |
|---|---|---|---|---|---|
| 1 | 1 | 2 | 1 | 1 | 2 |
| 2 | 1 | 2 | 3 | 0 | 1 |
| 3 | 3 | 0 | 1 | 1 | 2 |
| 4 | 2 | 4 | 0 | 0 | 1 |