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

Calculus I
EXAM II
Summer Term 083
Tuesday August 18, 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)

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

Calculus I
EXAM II
Summer Term 083
Tuesday August 18, 2009
Net Time Allowed: 120 minutes

MASTER VERSION

1. $\dfrac{d}{dx}\left(\dfrac{e^{x+1}-e^{x}}{e^{x}}\right)=$

(a) 0

(b) 1

(c) e

(d) e^{x}

(e) e^{x+1}

2. If $F(y)=\left(y^{-2}-3y^{-3}\right)\left(y^{-2}+3y^{-3}\right)$, then $F'(1)=$

(a) 50

(b) -45

(c) 40

(d) -50

(e) 45

3. $\cosh\left(\frac{1}{3}\ln x\right) + \sinh\left(\frac{1}{3}\ln x\right) =$

(a) $\sqrt[3]{x}$

(b) $e^{\sqrt[3]{x}} + e^{-\sqrt[3]{x}}$

(c) $2\sqrt[3]{x}$

(d) $\sqrt[3]{x} + \frac{1}{\sqrt[3]{x}}$

(e) $e^{\sqrt[3]{x}}$

4. The y-intercept of the normal line to the graph of $y = \frac{1-3x}{1-6x}$ at $x = \frac{1}{3}$ is

(a) $\left(0, \frac{1}{9}\right)$

(b) $\left(0, \frac{1}{21}\right)$

(c) $\left(0, -\frac{1}{18}\right)$

(d) $\left(0, \frac{1}{12}\right)$

(e) $\left(0, -\frac{1}{21}\right)$

5. If the area A of a circle is increasing at the rate of $\frac{8\pi}{9}$ cm^2/min, then the rate of change of the radius of the circle when $A = \frac{\pi}{9}$ cm^2 is

(a) $\frac{4}{3}$ cm/min

(b) $\frac{1}{3}$ cm/min

(c) $\frac{1}{6}$ cm/min

(d) $\frac{2}{3}$ cm/min

(e) $\frac{2}{9}$ cm/min

6. The position of a particle is given by the equation $s = f(t) = 2t^3 - 27t^2 + 108\,t$ where t is measured in seconds and s in meters. If the particle is moving in the negative direction on the largest time interval (α, β), then $5\alpha - 2\beta =$

(a) 3

(b) 1

(c) 10

(d) 2

(e) 9

7. If α and β are constants such that the function

$$f(x) = \begin{cases} \alpha x + \beta, & x < 0 \\ 2\sin x + 3\cos x, & x \geq 0 \end{cases}$$

is differentiable, then $f(-5) =$

(a) -7

(b) 9

(c) -5

(d) 3

(e) -8

8. The equation of the tangent line to the curve $y = \dfrac{\sec x}{x^2}$ at $x = \pi$, is

(a) $y = \dfrac{2}{\pi^3}x - \dfrac{3}{\pi^2}$

(b) $y = \dfrac{1}{\pi^3}x - \dfrac{2}{\pi^2}$

(c) $y = \dfrac{2}{\pi^3}x + \dfrac{1}{\pi^2}$

(d) $y = -\dfrac{4}{\pi^3}x + \dfrac{3}{\pi^2}$

(e) $y = -\dfrac{3}{\pi^2}x + \dfrac{2}{\pi^2}$

9. If $f(x) = \cot\left(\frac{\pi}{4}\sqrt{\cot 2x}\right)$, then $f'\left(\frac{\pi}{8}\right) =$

(a) π

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

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

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

(e) 4

10. If $3x^2 - 4xy + y^2 = 15$, then $\frac{dy}{dx} =$

(a) $\frac{3x-2y}{2x-y}$

(b) $\frac{2x-3y}{x+2y}$

(c) $\frac{3x+2y}{2x-y}$

(d) $\frac{3x-6y}{2-y}$

(e) $\frac{3}{2+y}$

11. If $y = \frac{1}{3}\tan^{-1}\left(\frac{x+1}{3}\right)$, then $\frac{dy}{dx} =$

(a) $(x^2 + 2x + 10)^{-1}$

(b) $x(x^2 + 2x + 10)^{-1}$

(c) $3(x+1)(x^2 + 2x + 10)^{-1}$

(d) $\frac{1}{3}(x+1)(x^2 + 2x + 10)^{-1}$

(e) $9(x^2 + 2x + 10)^{-1}$

12. If $L(x) = (f \circ g \circ h)(x)$, where $h(1) = 2$, $g(2) = 3$, $h'(1) = 4$, $g'(2) = 5$, and $f'(3) = 6$, then $L'(1) =$

(a) 120

(b) 50

(c) -50

(d) 240

(e) 720

13. If $f(x) = \sin^2 x$, then $f^{(5)}(x) =$

(a) $32 \sin x \cos x$

(b) $8 \sin x \cos x$

(c) $16(\cos^2 x - \sin^2 x)$

(d) $\cos^2 x$

(e) $16 \sin^2 x \cos x$

14. If $y = \dfrac{x^{2/3}(x-1)^{1/3}}{x+2}$, then $y'(2) =$ [Hint: Use logarithmic differentiation].

(a) $\dfrac{5\sqrt[3]{4}}{48}$

(b) $\dfrac{9\sqrt[3]{2}}{8}$

(c) $\dfrac{7\sqrt[3]{2}}{48}$

(d) $\dfrac{11\sqrt[3]{4}}{24}$

(e) $\dfrac{13\sqrt[3]{4}}{48}$

15. If $f(x) = \sqrt{1+x^2}$ where $x > 0$, then $f(\sinh x) + f'(\text{csch } x) =$

(a) $\cosh x + \text{sech } x$

(b) $2\cosh x$

(c) $\cosh x + \sinh x$

(d) $2\cosh x + 1$

(e) $\cosh x + \coth x$

16. If $f(x) = (\sin^{-1} x)^{x+\frac{1}{2}}$, then $f'\left(\frac{1}{2}\right) =$

(a) $\frac{\pi}{6} \ln \frac{\pi}{6} + \frac{2\sqrt{3}}{3}$

(b) $\frac{\pi}{3} \ln \frac{\pi}{3} + \frac{\pi\sqrt{3}}{3}$

(c) $\frac{\pi}{6} \ln \frac{\pi}{6} + \sqrt{3}$

(d) $\frac{\pi}{3} \ln \frac{\pi}{3} + \frac{3\sqrt{3}}{2}$

(e) $\frac{\pi}{6} \ln \frac{\pi}{6} + \frac{\pi\sqrt{3}}{18}$

17. Let T be the tangent line to the parabola $y = x^2$ at the point $P(\alpha, \beta)$. If $\alpha < 0$ and T passes through the point $(-2, -5)$, then the slope of T is equal to

(a) -10

(b) 2

(c) -15

(d) 5

(e) -25

18. If $Ax^2 + By^2 = C$, where A, B, and C are nonzero constants, then $y'' =$

(a) $-\dfrac{AC}{B^2y^3}$

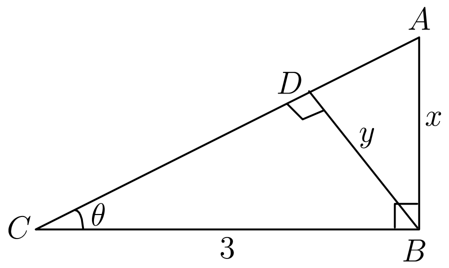
(b) $-\dfrac{AB^2}{Cy^3}$

(c) $-\dfrac{ACx}{By^2}$

(d) $-\dfrac{ABC}{y^3}$

(e) $-\dfrac{AC}{B^4y^3}$

19. The given figure shows a right triangle ABC at B and BD is perpendicular to AC. If the lengths of AB, BD, and BC are, respectively, x, y, and 3, then $\lim_{\theta \to 0^+} \frac{x}{y}$



(a) is equal to 1

(b) is equal to 3

(c) is equal to $\frac{1}{3}$

(d) is equal to 0

(e) does not exist

20. A particle is moving along the curve $y = x^2 + 1$. As the particle passes through the point $(1, 2)$, its y-coordinate increases at a rate of 10 cm/s. At this instant, the distance from the particle to the origin is changing at a rate of

(a) $5\sqrt{5}$ cm/s

(b) $6\sqrt{5}$ cm/s

(c) 5 cm/s

(d) 20 cm/s

(e) $2\sqrt{5}$ cm/s

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

CODE 001 | **Calculus I** | CODE 001

EXAM II

Summer Term 083

Tuesday August 18, 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. If the area A of a circle is increasing at the rate of $\frac{8\pi}{9}\,\text{cm}^2/\text{min}$, then the rate of change of the radius of the circle when $A = \frac{\pi}{9}\,\text{cm}^2$ is

(a) $\frac{4}{3}$ cm/min

(b) $\frac{2}{9}$ cm/min

(c) $\frac{1}{3}$ cm/min

(d) $\frac{2}{3}$ cm/min

(e) $\frac{1}{6}$ cm/min

2. If $F(y) = \left(y^{-2} - 3y^{-3}\right)\left(y^{-2} + 3y^{-3}\right)$, then $F'(1) =$

(a) 40

(b) -45

(c) -50

(d) 45

(e) 50

3. $\cosh\left(\frac{1}{3}\ln x\right) + \sinh\left(\frac{1}{3}\ln x\right) =$

(a) $e^{\sqrt[3]{x}}$

(b) $2\sqrt[3]{x}$

(c) $\sqrt[3]{x}$

(d) $e^{\sqrt[3]{x}} + e^{-\sqrt[3]{x}}$

(e) $\sqrt[3]{x} + \dfrac{1}{\sqrt[3]{x}}$

4. $\dfrac{d}{dx}\left(\dfrac{e^{x+1} - e^x}{e^x}\right) =$

(a) e^x

(b) 0

(c) e^{x+1}

(d) e

(e) 1

5. The position of a particle is given by the equation $s = f(t) = 2t^3 - 27t^2 + 108\,t$ where t is measured in seconds and s in meters. If the particle is moving in the negative direction on the largest time interval (α, β), then $5\alpha - 2\beta =$

(a) 2

(b) 10

(c) 1

(d) 3

(e) 9

6. The y-intercept of the normal line to the graph of $y = \dfrac{1-3x}{1-6x}$ at $x = \dfrac{1}{3}$ is

(a) $\left(0, \dfrac{1}{21}\right)$

(b) $\left(0, -\dfrac{1}{21}\right)$

(c) $\left(0, -\dfrac{1}{18}\right)$

(d) $\left(0, \dfrac{1}{12}\right)$

(e) $\left(0, \dfrac{1}{9}\right)$

7. If $y = \frac{1}{3}\tan^{-1}\left(\frac{x+1}{3}\right)$, then $\frac{dy}{dx} =$

(a) $9(x^2 + 2x + 10)^{-1}$

(b) $x(x^2 + 2x + 10)^{-1}$

(c) $(x^2 + 2x + 10)^{-1}$

(d) $3(x+1)(x^2 + 2x + 10)^{-1}$

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

8. The equation of the tangent line to the curve $y = \frac{\sec x}{x^2}$ at $x = \pi$, is

(a) $y = -\frac{3}{\pi^2}x + \frac{2}{\pi^2}$

(b) $y = -\frac{4}{\pi^3}x + \frac{3}{\pi^2}$

(c) $y = \frac{2}{\pi^3}x + \frac{1}{\pi^2}$

(d) $y = \frac{1}{\pi^3}x - \frac{2}{\pi^2}$

(e) $y = \frac{2}{\pi^3}x - \frac{3}{\pi^2}$

9. If $3x^2 - 4xy + y^2 = 15$, then $\dfrac{dy}{dx} =$

(a) $\dfrac{3x-2y}{2x-y}$

(b) $\dfrac{3x+2y}{2x-y}$

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

(d) $\dfrac{3x-6y}{2-y}$

(e) $\dfrac{2x-3y}{x+2y}$

10. If $y = \dfrac{x^{2/3}(x-1)^{1/3}}{x+2}$, then $y'(2) =$ [Hint: Use logarithmic differentiation].

(a) $\dfrac{11\sqrt[3]{4}}{24}$

(b) $\dfrac{9\sqrt[3]{2}}{8}$

(c) $\dfrac{5\sqrt[3]{4}}{48}$

(d) $\dfrac{13\sqrt[3]{4}}{48}$

(e) $\dfrac{7\sqrt[3]{2}}{48}$

11. If $f(x) = \sin^2 x$, then $f^{(5)}(x) =$

(a) $\cos^2 x$

(b) $16(\cos^2 x - \sin^2 x)$

(c) $32 \sin x \cos x$

(d) $8 \sin x \cos x$

(e) $16 \sin^2 x \cos x$

12. If $L(x) = (f \circ g \circ h)(x)$, where $h(1) = 2$, $g(2) = 3$, $h'(1) = 4$, $g'(2) = 5$, and $f'(3) = 6$, then $L'(1) =$

(a) 720

(b) 240

(c) -50

(d) 50

(e) 120

13. If α and β are constants such that the function

$$f(x) = \begin{cases} \alpha x + \beta, & x < 0 \\ 2\sin x + 3\cos x, & x \geq 0 \end{cases}$$

is differentiable, then $f(-5) =$

(a) 9

(b) -7

(c) 3

(d) -5

(e) -8

14. If $f(x) = \cot\left(\frac{\pi}{4}\sqrt{\cot 2x}\right)$, then $f'\left(\frac{\pi}{8}\right) =$

(a) $\frac{\pi}{4}$

(b) π

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

(d) 4

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

15. If $f(x) = \sqrt{1+x^2}$ where $x > 0$, then $f(\sinh x) + f'(\text{csch } x) =$

(a) $\cosh x + \coth x$

(b) $\cosh x + \text{sech } x$

(c) $2\cosh x$

(d) $\cosh x + \sinh x$

(e) $2\cosh x + 1$

16. If $Ax^2 + By^2 = C$, where A, B, and C are nonzero constants, then $y'' =$

(a) $-\dfrac{AC}{B^2y^3}$

(b) $-\dfrac{ABC}{y^3}$

(c) $-\dfrac{ACx}{By^2}$

(d) $-\dfrac{AB^2}{Cy^3}$

(e) $-\dfrac{AC}{B^4y^3}$

17. A particle is moving along the curve $y = x^2 + 1$. As the particle passes through the point $(1, 2)$, its y-coordinate increases at a rate of $10\,\text{cm/s}$. At this instant, the distance from the particle to the origin is changing at a rate of

(a) 5 cm/s

(b) $6\sqrt{5}$ cm/s

(c) $2\sqrt{5}$ cm/s

(d) $5\sqrt{5}$ cm/s

(e) 20 cm/s

18. If $f(x) = (\sin^{-1} x)^{x+\frac{1}{2}}$, then $f'\left(\frac{1}{2}\right) =$

(a) $\frac{\pi}{6} \ln \frac{\pi}{6} + \sqrt{3}$

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

(c) $\frac{\pi}{6} \ln \frac{\pi}{6} + \frac{2\sqrt{3}}{3}$

(d) $\frac{\pi}{6} \ln \frac{\pi}{6} + \frac{\pi\sqrt{3}}{18}$

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

19. Let T be the tangent line to the parabola $y = x^2$ at the point $P(\alpha, \beta)$. If $\alpha < 0$ and T passes through the point $(-2, -5)$, then the slope of T is equal to

(a) -10

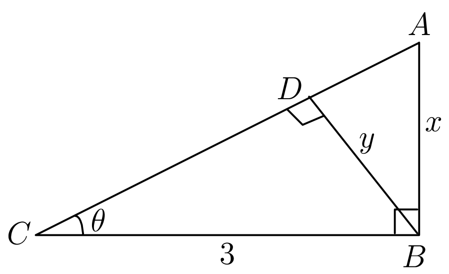
(b) 2

(c) -25

(d) -15

(e) 5

20. The given figure shows a right triangle ABC at B and BD is perpendicular to AC. If the lengths of AB, BD, and BC are, respectively, x, y, and 3, then $\lim_{\theta \to 0^+} \frac{x}{y}$



(a) is equal to $\frac{1}{3}$

(b) does not exist

(c) is equal to 3

(d) is equal to 0

(e) is equal to 1

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

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

CODE 002 | **Calculus I** | CODE 002

EXAM II

Summer Term 083

Tuesday August 18, 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. $\dfrac{d}{dx}\left(\dfrac{e^{x+1}-e^{x}}{e^{x}}\right) =$

(a) 1

(b) e^{x}

(c) e

(d) e^{x+1}

(e) 0

2. If the area A of a circle is increasing at the rate of $\dfrac{8\pi}{9}$ cm^2/min, then the rate of change of the radius of the circle when $A = \dfrac{\pi}{9}$ cm^2 is

(a) $\dfrac{1}{6}$ cm/min

(b) $\dfrac{1}{3}$ cm/min

(c) $\dfrac{2}{3}$ cm/min

(d) $\dfrac{2}{9}$ cm/min

(e) $\dfrac{4}{3}$ cm/min

3. If $F(y) = \left(y^{-2} - 3y^{-3}\right)\left(y^{-2} + 3y^{-3}\right)$, then $F'(1) =$

(a) -45

(b) 50

(c) 40

(d) -50

(e) 45

4. The y-intercept of the normal line to the graph of $y = \dfrac{1-3x}{1-6x}$ at $x = \dfrac{1}{3}$ is

(a) $\left(0, -\dfrac{1}{18}\right)$

(b) $\left(0, \dfrac{1}{21}\right)$

(c) $\left(0, \dfrac{1}{12}\right)$

(d) $\left(0, \dfrac{1}{9}\right)$

(e) $\left(0, -\dfrac{1}{21}\right)$

5. The position of a particle is given by the equation $s = f(t) = 2t^3 - 27t^2 + 108\,t$ where t is measured in seconds and s in meters. If the particle is moving in the negative direction on the largest time interval (α, β), then $5\alpha - 2\beta =$

(a) 3

(b) 10

(c) 9

(d) 1

(e) 2

6. $\cosh\left(\frac{1}{3}\ln x\right) + \sinh\left(\frac{1}{3}\ln x\right) =$

(a) $\sqrt[3]{x}$

(b) $e^{\sqrt[3]{x}} + e^{-\sqrt[3]{x}}$

(c) $\sqrt[3]{x} + \dfrac{1}{\sqrt[3]{x}}$

(d) $e^{\sqrt[3]{x}}$

(e) $2\sqrt[3]{x}$

7. If $L(x) = (f \circ g \circ h)(x)$, where $h(1) = 2$, $g(2) = 3$, $h'(1) = 4$, $g'(2) = 5$, and $f'(3) = 6$, then $L'(1) =$

(a) 720

(b) 240

(c) 120

(d) -50

(e) 50

8. If $f(x) = \sin^2 x$, then $f^{(5)}(x) =$

(a) $32 \sin x \cos x$

(b) $\cos^2 x$

(c) $16(\cos^2 x - \sin^2 x)$

(d) $8 \sin x \cos x$

(e) $16 \sin^2 x \cos x$

9. If $y = \dfrac{x^{2/3}(x-1)^{1/3}}{x+2}$, then $y'(2) =$ [Hint: Use logarithmic differentiation].

(a) $\dfrac{7\sqrt[3]{2}}{48}$

(b) $\dfrac{9\sqrt[3]{2}}{8}$

(c) $\dfrac{13\sqrt[3]{4}}{48}$

(d) $\dfrac{5\sqrt[3]{4}}{48}$

(e) $\dfrac{11\sqrt[3]{4}}{24}$

10. If $f(x) = \cot\left(\dfrac{\pi}{4}\sqrt{\cot 2x}\right)$, then $f'\left(\dfrac{\pi}{8}\right) =$

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

(b) π

(c) 4

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

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

11. If $y = \frac{1}{3}\tan^{-1}\left(\frac{x+1}{3}\right)$, then $\frac{dy}{dx} =$

(a) $3(x+1)(x^2+2x+10)^{-1}$

(b) $(x^2+2x+10)^{-1}$

(c) $x(x^2+2x+10)^{-1}$

(d) $9(x^2+2x+10)^{-1}$

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

12. If $3x^2 - 4xy + y^2 = 15$, then $\frac{dy}{dx} =$

(a) $\frac{3x+2y}{2x-y}$

(b) $\frac{2x-3y}{x+2y}$

(c) $\frac{3x-6y}{2-y}$

(d) $\frac{3x-2y}{2x-y}$

(e) $\frac{3}{2+y}$

13. If $f(x) = \sqrt{1+x^2}$ where $x > 0$, then $f(\sinh x) + f'(\text{csch } x) =$

(a) $\cosh x + \sinh x$

(b) $\cosh x + \coth x$

(c) $2\cosh x + 1$

(d) $2\cosh x$

(e) $\cosh x + \text{sech } x$

14. If α and β are constants such that the function

$$f(x) = \begin{cases} \alpha x + \beta, & x < 0 \\ 2\sin x + 3\cos x, & x \geq 0 \end{cases}$$

is differentiable, then $f(-5) =$

(a) -5

(b) -8

(c) 9

(d) 3

(e) -7

15. The equation of the tangent line to the curve $y = \dfrac{\sec x}{x^2}$ at $x = \pi$, is

(a) $y = \dfrac{1}{\pi^3}x - \dfrac{2}{\pi^2}$

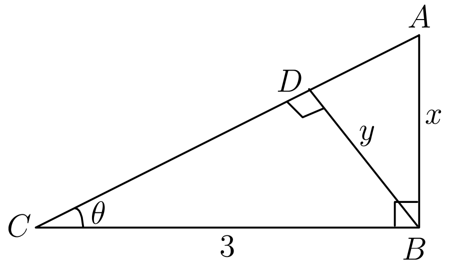
(b) $y = \dfrac{2}{\pi^3}x - \dfrac{3}{\pi^2}$

(c) $y = \dfrac{2}{\pi^3}x + \dfrac{1}{\pi^2}$

(d) $y = -\dfrac{3}{\pi^2}x + \dfrac{2}{\pi^2}$

(e) $y = -\dfrac{4}{\pi^3}x + \dfrac{3}{\pi^2}$

16. The given figure shows a right triangle ABC at B and BD is perpendicular to AC. If the lengths of AB, BD, and BC are, respectively, x, y, and 3, then $\lim\limits_{\theta \to 0^+} \dfrac{x}{y}$



(a) does not exist

(b) is equal to 1

(c) is equal to 0

(d) is equal to $\dfrac{1}{3}$

(e) is equal to 3

17. If $f(x) = (\sin^{-1} x)^{x+\frac{1}{2}}$, then $f'\left(\frac{1}{2}\right) =$

(a) $\frac{\pi}{3} \ln \frac{\pi}{3} + \frac{\pi\sqrt{3}}{3}$

(b) $\frac{\pi}{6} \ln \frac{\pi}{6} + \frac{\pi\sqrt{3}}{18}$

(c) $\frac{\pi}{6} \ln \frac{\pi}{6} + \sqrt{3}$

(d) $\frac{\pi}{6} \ln \frac{\pi}{6} + \frac{2\sqrt{3}}{3}$

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

18. Let T be the tangent line to the parabola $y = x^2$ at the point $P(\alpha, \beta)$. If $\alpha < 0$ and T passes through the point $(-2, -5)$, then the slope of T is equal to

(a) 2

(b) 5

(c) -10

(d) -25

(e) -15

19. A particle is moving along the curve $y = x^2 + 1$. As the particle passes through the point $(1, 2)$, its y-coordinate increases at a rate of 10 cm/s. At this instant, the distance from the particle to the origin is changing at a rate of

(a) $5\sqrt{5}$ cm/s

(b) 5 cm/s

(c) $6\sqrt{5}$ cm/s

(d) 20 cm/s

(e) $2\sqrt{5}$ cm/s

20. If $Ax^2 + By^2 = C$, where A, B, and C are nonzero constants, then $y'' =$

(a) $-\dfrac{AC}{B^4y^3}$

(b) $-\dfrac{ACx}{By^2}$

(c) $-\dfrac{AC}{B^2y^3}$

(d) $-\dfrac{AB^2}{Cy^3}$

(e) $-\dfrac{ABC}{y^3}$

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

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

CODE 003 | **Calculus I** | **CODE 003**

EXAM II

Summer Term 083

Tuesday August 18, 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. $\cosh\left(\frac{1}{3}\ln x\right) + \sinh\left(\frac{1}{3}\ln x\right) =$

(a) $e^{\sqrt[3]{x}}$

(b) $2\sqrt[3]{x}$

(c) $\sqrt[3]{x}$

(d) $\sqrt[3]{x} + \frac{1}{\sqrt[3]{x}}$

(e) $e^{\sqrt[3]{x}} + e^{-\sqrt[3]{x}}$

2. The y-intercept of the normal line to the graph of $y = \frac{1-3x}{1-6x}$ at $x = \frac{1}{3}$ is

(a) $\left(0, \frac{1}{9}\right)$

(b) $\left(0, -\frac{1}{21}\right)$

(c) $\left(0, \frac{1}{21}\right)$

(d) $\left(0, -\frac{1}{18}\right)$

(e) $\left(0, \frac{1}{12}\right)$

3. If the area A of a circle is increasing at the rate of $\frac{8\pi}{9}$ cm^2/min, then the rate of change of the radius of the circle when $A = \frac{\pi}{9}$ cm^2 is

(a) $\frac{4}{3}$ cm/min

(b) $\frac{1}{3}$ cm/min

(c) $\frac{1}{6}$ cm/min

(d) $\frac{2}{3}$ cm/min

(e) $\frac{2}{9}$ cm/min

4. The position of a particle is given by the equation $s = f(t) = 2t^3 - 27t^2 + 108\,t$ where t is measured in seconds and s in meters. If the particle is moving in the negative direction on the largest time interval (α, β), then $5\alpha - 2\beta =$

(a) 10

(b) 9

(c) 2

(d) 3

(e) 1

5. $$\frac{d}{dx}\left(\frac{e^{x+1}-e^x}{e^x}\right) =$$

(a) e^{x+1}

(b) e^x

(c) e

(d) 1

(e) 0

6. If $F(y) = \left(y^{-2} - 3y^{-3}\right)\left(y^{-2} + 3y^{-3}\right)$, then $F'(1) =$

(a) 45

(b) 40

(c) -50

(d) 50

(e) -45

7. If $f(x) = \sqrt{1+x^2}$ where $x > 0$, then $f(\sinh x) + f'(\text{csch } x) =$

(a) $\cosh x + \text{sech } x$

(b) $2\cosh x + 1$

(c) $\cosh x + \sinh x$

(d) $2\cosh x$

(e) $\cosh x + \coth x$

8. If $3x^2 - 4xy + y^2 = 15$, then $\dfrac{dy}{dx} =$

(a) $\dfrac{3x+2y}{2x-y}$

(b) $\dfrac{3x-6y}{2-y}$

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

(d) $\dfrac{3x-2y}{2x-y}$

(e) $\dfrac{2x-3y}{x+2y}$

9. If $f(x) = \sin^2 x$, then $f^{(5)}(x) =$

(a) $16 \sin^2 x \cos x$

(b) $\cos^2 x$

(c) $16(\cos^2 x - \sin^2 x)$

(d) $8 \sin x \cos x$

(e) $32 \sin x \cos x$

10. If $y = \dfrac{1}{3} \tan^{-1}\left(\dfrac{x+1}{3}\right)$, then $\dfrac{dy}{dx} =$

(a) $x(x^2 + 2x + 10)^{-1}$

(b) $\dfrac{1}{3}(x+1)(x^2 + 2x + 10)^{-1}$

(c) $9(x^2 + 2x + 10)^{-1}$

(d) $(x^2 + 2x + 10)^{-1}$

(e) $3(x+1)(x^2 + 2x + 10)^{-1}$

11. The equation of the tangent line to the curve $y = \dfrac{\sec x}{x^2}$ at $x = \pi$, is

(a) $y = \dfrac{2}{\pi^3}x - \dfrac{3}{\pi^2}$

(b) $y = \dfrac{2}{\pi^3}x + \dfrac{1}{\pi^2}$

(c) $y = \dfrac{1}{\pi^3}x - \dfrac{2}{\pi^2}$

(d) $y = -\dfrac{3}{\pi^2}x + \dfrac{2}{\pi^2}$

(e) $y = -\dfrac{4}{\pi^3}x + \dfrac{3}{\pi^2}$

12. If $y = \dfrac{x^{2/3}(x-1)^{1/3}}{x+2}$, then $y'(2) =$ [Hint: Use logarithmic differentiation].

(a) $\dfrac{7\sqrt[3]{2}}{48}$

(b) $\dfrac{9\sqrt[3]{2}}{8}$

(c) $\dfrac{11\sqrt[3]{4}}{24}$

(d) $\dfrac{13\sqrt[3]{4}}{48}$

(e) $\dfrac{5\sqrt[3]{4}}{48}$

13. If α and β are constants such that the function

$$f(x) = \begin{cases} \alpha x + \beta, & x < 0 \\ 2\sin x + 3\cos x, & x \geq 0 \end{cases}$$

is differentiable, then $f(-5) =$

(a) 9

(b) 3

(c) -7

(d) -5

(e) -8

14. If $f(x) = \cot\left(\frac{\pi}{4}\sqrt{\cot 2x}\right)$, then $f'\left(\frac{\pi}{8}\right) =$

(a) 4

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

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

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

(e) π

15. If $L(x) = (f \circ g \circ h)(x)$, where $h(1) = 2$, $g(2) = 3$, $h'(1) = 4$, $g'(2) = 5$, and $f'(3) = 6$, then $L'(1) =$

(a) 120

(b) -50

(c) 50

(d) 240

(e) 720

16. If $Ax^2 + By^2 = C$, where A, B, and C are nonzero constants, then $y'' =$

(a) $-\dfrac{ACx}{By^2}$

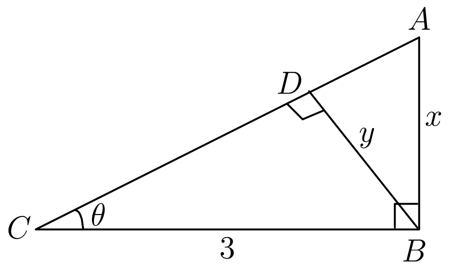
(b) $-\dfrac{AC}{B^2y^3}$

(c) $-\dfrac{AB^2}{Cy^3}$

(d) $-\dfrac{ABC}{y^3}$

(e) $-\dfrac{AC}{B^4y^3}$

17. The given figure shows a right triangle ABC at B and BD is perpendicular to AC. If the lengths of AB, BD, and BC are, respectively, x, y, and 3, then $\lim\limits_{\theta \to 0^+} \dfrac{x}{y}$



(a) does not exist

(b) is equal to $\dfrac{1}{3}$

(c) is equal to 1

(d) is equal to 0

(e) is equal to 3

18. If $f(x) = (\sin^{-1} x)^{x+\frac{1}{2}}$, then $f'\left(\dfrac{1}{2}\right) =$

(a) $\dfrac{\pi}{6} \ln \dfrac{\pi}{6} + \dfrac{\pi\sqrt{3}}{18}$

(b) $\dfrac{\pi}{3} \ln \dfrac{\pi}{3} + \dfrac{3\sqrt{3}}{2}$

(c) $\dfrac{\pi}{6} \ln \dfrac{\pi}{6} + \sqrt{3}$

(d) $\dfrac{\pi}{6} \ln \dfrac{\pi}{6} + \dfrac{2\sqrt{3}}{3}$

(e) $\dfrac{\pi}{3} \ln \dfrac{\pi}{3} + \dfrac{\pi\sqrt{3}}{3}$

19. Let T be the tangent line to the parabola $y = x^2$ at the point $P(\alpha, \beta)$. If $\alpha < 0$ and T passes through the point $(-2, -5)$, then the slope of T is equal to

(a) 5

(b) -25

(c) -10

(d) 2

(e) -15

20. A particle is moving along the curve $y = x^2 + 1$. As the particle passes through the point $(1, 2)$, its y-coordinate increases at a rate of 10 cm/s. At this instant, the distance from the particle to the origin is changing at a rate of

(a) $5\sqrt{5}$ cm/s

(b) $6\sqrt{5}$ cm/s

(c) 5 cm/s

(d) $2\sqrt{5}$ cm/s

(e) 20 cm/s

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

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

CODE 004 **Calculus I** **CODE 004**

EXAM II

Summer Term 083

Tuesday August 18, 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. If $F(y) = \left(y^{-2} - 3y^{-3}\right)\left(y^{-2} + 3y^{-3}\right)$, then $F'(1) =$

(a) -45

(b) 50

(c) 45

(d) 40

(e) -50

2. The y-intercept of the normal line to the graph of $y = \dfrac{1-3x}{1-6x}$ at $x = \dfrac{1}{3}$ is

(a) $\left(0, -\dfrac{1}{18}\right)$

(b) $\left(0, \dfrac{1}{21}\right)$

(c) $\left(0, \dfrac{1}{12}\right)$

(d) $\left(0, \dfrac{1}{9}\right)$

(e) $\left(0, -\dfrac{1}{21}\right)$

3. The position of a particle is given by the equation $s = f(t) = 2t^3 - 27t^2 + 108\,t$ where t is measured in seconds and s in meters. If the particle is moving in the negative direction on the largest time interval (α, β), then $5\alpha - 2\beta =$

(a) 10

(b) 1

(c) 9

(d) 3

(e) 2

4. If the area A of a circle is increasing at the rate of $\frac{8\pi}{9}$ cm^2/min, then the rate of change of the radius of the circle when $A = \frac{\pi}{9}$ cm^2 is

(a) $\frac{4}{3}$ cm/min

(b) $\frac{1}{6}$ cm/min

(c) $\frac{1}{3}$ cm/min

(d) $\frac{2}{9}$ cm/min

(e) $\frac{2}{3}$ cm/min

5. $\frac{d}{dx}\left(\frac{e^{x+1}-e^{x}}{e^{x}}\right)=$

(a) 1

(b) e^{x}

(c) 0

(d) e^{x+1}

(e) e

6. $\cosh\left(\frac{1}{3}\ln x\right)+\sinh\left(\frac{1}{3}\ln x\right)=$

(a) $e^{\sqrt[3]{x}}$

(b) $e^{\sqrt[3]{x}}+e^{-\sqrt[3]{x}}$

(c) $\sqrt[3]{x}+\frac{1}{\sqrt[3]{x}}$

(d) $\sqrt[3]{x}$

(e) $2\sqrt[3]{x}$

7. If α and β are constants such that the function

$$f(x) = \begin{cases} \alpha x + \beta, & x < 0 \\ 2\sin x + 3\cos x, & x \geq 0 \end{cases}$$

is differentiable, then $f(-5) =$

(a) -8

(b) -7

(c) -5

(d) 9

(e) 3

8. If $f(x) = \cot\left(\frac{\pi}{4}\sqrt{\cot 2x}\right)$, then $f'\left(\frac{\pi}{8}\right) =$

(a) $\frac{\pi}{4}$

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

(c) 4

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

(e) π

9. If $f(x) = \sqrt{1+x^2}$ where $x > 0$, then $f(\sinh x) + f'(\text{csch } x) =$

(a) $\cosh x + \sinh x$

(b) $2\cosh x + 1$

(c) $\cosh x + \text{sech } x$

(d) $\cosh x + \coth x$

(e) $2\cosh x$

10. If $3x^2 - 4xy + y^2 = 15$, then $\dfrac{dy}{dx} =$

(a) $\dfrac{3}{2+y}$

(b) $\dfrac{3x-2y}{2x-y}$

(c) $\dfrac{3x+2y}{2x-y}$

(d) $\dfrac{2x-3y}{x+2y}$

(e) $\dfrac{3x-6y}{2-y}$

11. If $L(x) = (f \circ g \circ h)(x)$, where $h(1) = 2$, $g(2) = 3$, $h'(1) = 4$, $g'(2) = 5$, and $f'(3) = 6$, then $L'(1) =$

(a) 240

(b) 720

(c) -50

(d) 50

(e) 120

12. If $y = \dfrac{1}{3}\tan^{-1}\left(\dfrac{x+1}{3}\right)$, then $\dfrac{dy}{dx} =$

(a) $\dfrac{1}{3}(x+1)(x^2+2x+10)^{-1}$

(b) $3(x+1)(x^2+2x+10)^{-1}$

(c) $x(x^2+2x+10)^{-1}$

(d) $(x^2+2x+10)^{-1}$

(e) $9(x^2+2x+10)^{-1}$

13. The equation of the tangent line to the curve $y = \dfrac{\sec x}{x^2}$ at $x = \pi$, is

(a) $y = -\dfrac{4}{\pi^3}x + \dfrac{3}{\pi^2}$

(b) $y = \dfrac{1}{\pi^3}x - \dfrac{2}{\pi^2}$

(c) $y = \dfrac{2}{\pi^3}x + \dfrac{1}{\pi^2}$

(d) $y = -\dfrac{3}{\pi^2}x + \dfrac{2}{\pi^2}$

(e) $y = \dfrac{2}{\pi^3}x - \dfrac{3}{\pi^2}$

14. If $f(x) = \sin^2 x$, then $f^{(5)}(x) =$

(a) $16 \sin^2 x \cos x$

(b) $\cos^2 x$

(c) $16(\cos^2 x - \sin^2 x)$

(d) $32 \sin x \cos x$

(e) $8 \sin x \cos x$

15. If $y = \dfrac{x^{2/3}(x-1)^{1/3}}{x+2}$, then $y'(2) =$ [Hint: Use logarithmic differentiation].

(a) $\dfrac{11\sqrt[3]{4}}{24}$

(b) $\dfrac{9\sqrt[3]{2}}{8}$

(c) $\dfrac{13\sqrt[3]{4}}{48}$

(d) $\dfrac{7\sqrt[3]{2}}{48}$

(e) $\dfrac{5\sqrt[3]{4}}{48}$

16. Let T be the tangent line to the parabola $y = x^2$ at the point $P(\alpha, \beta)$. If $\alpha < 0$ and T passes through the point $(-2, -5)$, then the slope of T is equal to

(a) -10

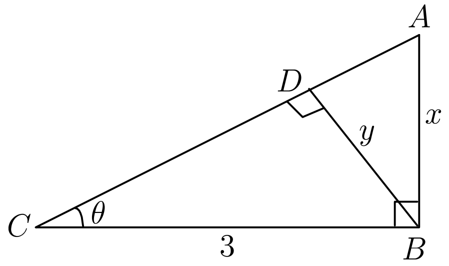
(b) 5

(c) 2

(d) -25

(e) -15

17. The given figure shows a right triangle ABC at B and BD is perpendicular to AC. If the lengths of AB, BD, and BC are, respectively, x, y, and 3, then $\lim_{\theta\to 0^+} \frac{x}{y}$



(a) does not exist

(b) is equal to $\frac{1}{3}$

(c) is equal to 3

(d) is equal to 0

(e) is equal to 1

18. If $Ax^2 + By^2 = C$, where A, B, and C are nonzero constants, then $y'' =$

(a) $-\frac{ACx}{By^2}$

(b) $-\frac{AC}{B^4y^3}$

(c) $-\frac{AC}{B^2y^3}$

(d) $-\frac{AB^2}{Cy^3}$

(e) $-\frac{ABC}{y^3}$

19. If $f(x) = (\sin^{-1} x)^{x+\frac{1}{2}}$, then $f'\left(\frac{1}{2}\right) =$

(a) $\frac{\pi}{3} \ln \frac{\pi}{3} + \frac{\pi\sqrt{3}}{3}$

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

(c) $\frac{\pi}{6} \ln \frac{\pi}{6} + \frac{2\sqrt{3}}{3}$

(d) $\frac{\pi}{6} \ln \frac{\pi}{6} + \frac{\pi\sqrt{3}}{18}$

(e) $\frac{\pi}{6} \ln \frac{\pi}{6} + \sqrt{3}$

20. A particle is moving along the curve $y = x^2 + 1$. As the particle passes through the point $(1, 2)$, its y-coordinate increases at a rate of 10 cm/s. At this instant, the distance from the particle to the origin is changing at a rate of

(a) 20 cm/s

(b) $5\sqrt{5}$ cm/s

(c) $2\sqrt{5}$ cm/s

(d) 5 cm/s

(e) $6\sqrt{5}$ cm/s

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	a	e	c	b
2	a	e	e	a	d
3	a	c	b	a	d
4	a	b	d	d	a
5	a	d	a	e	c
6	a	e	a	d	d
7	a	c	c	a	b
8	a	e	a	d	e
9	a	a	d	e	c
10	a	c	b	d	b
11	a	c	b	a	e
12	a	e	d	e	d
13	a	b	e	c	e
14	a	b	e	e	d
15	a	b	b	a	e
16	a	a	b	b	a
17	a	d	d	c	e
18	a	c	c	d	c
19	a	a	a	c	c
20	a	e	c	a	b

Answer Counts

V	a	b	c	d	e
1	4	5	4	4	3
2	5	5	3	4	3
3	1	3	5	8	3
4	4	5	3	6	2

VQ	MQ	Answers				
1	5	a	e	b	d	c
2	2	c	b	d	e	a
3	3	e	c	a	b	d
4	1	d	a	e	c	b
5	6	d	c	b	a	e
6	4	b	e	c	d	a
7	11	e	b	a	c	d
8	8	e	d	c	b	a
9	10	a	c	e	d	b
10	14	d	b	a	e	c
11	13	d	c	a	b	e
12	12	e	d	c	b	a
13	7	b	a	d	c	e
14	9	b	a	d	e	c
15	15	e	a	b	c	d
16	18	a	d	c	b	e
17	20	c	b	e	a	d
18	16	c	d	a	e	b
19	17	a	b	e	c	d
20	19	c	e	b	d	a

VQ	MQ	Answers				
1	1	b	d	c	e	a
2	5	c	b	d	e	a
3	2	b	a	c	d	e
4	4	c	b	d	a	e
5	6	a	c	e	b	d
6	3	a	b	d	e	c
7	12	e	d	a	c	b
8	13	a	d	c	b	e
9	14	c	b	e	a	d
10	9	c	a	e	b	d
11	11	c	a	b	e	d
12	10	c	b	d	a	e
13	15	c	e	d	b	a
14	7	c	e	b	d	a
15	8	b	a	c	e	d
16	19	e	a	d	c	b
17	16	b	e	c	a	d
18	17	b	d	a	e	c
19	20	a	c	b	d	e
20	18	e	c	a	b	d

VQ	MQ	Answers				
1	3	e	c	a	d	b
2	4	a	e	b	c	d
3	5	a	b	c	d	e
4	6	c	e	d	a	b
5	1	e	d	c	b	a
6	2	e	c	d	a	b
7	15	a	d	c	b	e
8	10	c	d	e	a	b
9	13	e	d	c	b	a
10	11	b	d	e	a	c
11	8	a	c	b	e	d
12	14	c	b	d	e	a
13	7	b	d	a	c	e
14	9	e	d	b	c	a
15	12	a	c	b	d	e
16	18	c	a	b	d	e
17	19	e	c	a	d	b
18	16	e	d	c	a	b
19	17	d	e	a	b	c
20	20	a	b	c	e	d

VQ	MQ	Answers				
1	2	b	a	e	c	d
2	4	c	b	d	a	e
3	6	c	b	e	a	d
4	5	a	c	b	e	d
5	1	b	d	a	e	c
6	3	e	b	d	a	c
7	7	e	a	c	b	d
8	9	b	d	e	c	a
9	15	c	d	a	e	b
10	10	e	a	c	b	d
11	12	d	e	c	b	a
12	11	d	c	b	a	e
13	8	d	b	c	e	a
14	13	e	d	c	a	b
15	14	d	b	e	c	a
16	17	a	d	b	e	c
17	19	e	c	b	d	a
18	18	c	e	a	b	d
19	16	b	d	a	e	c
20	20	d	a	e	c	b