

King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences

CODE 001

**Math 101
Exam 2
061**

CODE 001

**Tuesday 28/11/2006
Net Time Allowed: 90 minutes**

Name: _____

ID: _____ Sec: _____

Check that this exam has 15 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.
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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 x -intercept of the tangent line to the curve $y = x\sqrt{x^2 - 8}$ at $x = -3$ is given by
 - (a) $x = -27$
 - (b) $x = 27$
 - (c) $x = -\frac{27}{10}$
 - (d) $x = 10$
 - (e) $x = \frac{27}{10}$

2. The values of x for which the function $f(x) = x + 2\sin x$ has tangent lines parallel to the line $2x + 2y = 5$ are
 - (a) $(2k + 1)\pi$, k is an integer
 - (b) $2k\pi$, k is an integer
 - (c) $k\pi$, k is an integer
 - (d) $(k + 1)\pi$, k is an integer
 - (e) none of the above

3. If $y = \arctan(\arcsin \sqrt{x})$, then $\frac{dy}{dx} =$

(a) $\frac{1}{\sqrt{1-x^2}[1 + \arcsin x]}$

(b) $\frac{1}{\sqrt{1-x^2}[1 + (\arcsin \sqrt{x})^2]}$

(c) $\frac{1}{1 + (\arcsin \sqrt{x})^2}$

(d) $\frac{1}{2\sqrt{x}\sqrt{1-x}[1 + (\arcsin \sqrt{x})^2]}$

(e) $\frac{1}{\sqrt{1-x}[1 + (\arcsin \sqrt{x})^2]}$

4. If $f(4) = \frac{1}{4}$, $f'(4) = -\frac{1}{4}$ and $g(x) = \frac{1 + xf(x)}{\sqrt{x}}$, then $g'(4) =$

(a) $-\frac{1}{2}$

(b) $\frac{5}{8}$

(c) $-\frac{5}{8}$

(d) -1

(e) 0

5. Suppose that L is a function such that $L'(x) = \frac{1}{x}$ for $x > 0$. Then the derivative of $F(x) = L(x^4) + L\left(\frac{1}{x}\right)$ is equal to

(a) $x^4 - x$

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

(c) x^3

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

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

6. If $u = \sqrt[3]{t^2} + 2\sqrt{t^3}$, then $\frac{du}{dt}$ is equal to

(a) $\frac{2 + 4\sqrt[4]{t^5}}{5\sqrt[5]{t^5}}$

(b) $\frac{2 + 9\sqrt[6]{t^5}}{3\sqrt[3]{t}}$

(c) $\frac{6 + 4\sqrt[4]{t^4}}{6\sqrt[6]{t}}$

(d) $\frac{9 + 4\sqrt{t^4}}{5\sqrt[5]{t}}$

(e) $\frac{2 + 3\sqrt{t}}{6\sqrt[6]{t^3}}$

7. If $y = \frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2}$, then y' is equal to

(a) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[2 \sec x + \frac{4 \sec x}{\sin x} - \frac{8x}{x^2 + 1} \right]$

(b) $\frac{\sin^2 x \sec^8 x}{\cos^4 x (x^2 + 1)^2} \left[\cot x + \frac{5 \sec x}{\sin x} - \frac{6x}{x^2 + 1} \right]$

(c) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[2 \cot x + \frac{4 \sec^2 x}{\tan x} - \frac{4x}{x^2 + 1} \right]$

(d) $\frac{\sin^6 x}{\cos^4 x (x^2 + 1)^2} \left[2 \cot x + \frac{6 \cos x}{\cot x} - \frac{4x}{x^2 + 1} \right]$

(e) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[\cot x + \frac{8 \sec x}{\tan x} - \frac{3x}{x^2 + 1} \right]$

8. $\lim_{x \rightarrow \pi/4} \frac{\sin x - \cos x}{\cos(2x)}$ is equal to

(a) 1

(b) -1

(c) $\sqrt{2}$

(d) $-\frac{\sqrt{2}}{2}$

(e) 0

9. If $g(x) = \sqrt{5 - 2x}$, then $g'''(2)$ is equal to

(a) 2

(b) -1

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

(d) -3

(e) 1

10. $\tanh(\ln x) =$

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

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

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

(d) ∞

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

11. If $(x - y)^2 = x + y$, then

(a) $\frac{dy}{dx} = \frac{2x - 2y + 1}{2x - 2y - 1}$

(b) $\frac{dy}{dx} = \frac{2x - 2y - 1}{2x + 2y + 1}$

(c) $\frac{dy}{dx} = \frac{2x - 2y - 1}{2x - 2y + 1}$

(d) $\frac{dy}{dx} = 2x - 2y - 1$

(e) $\frac{dy}{dx} = \frac{2x - 2y + 1}{2x + 2y + 1}$

12. An equation of the normal line to the graph of $y = x^{x \cos x}$ when $x = \frac{\pi}{2}$ is given by

(a) $2\pi(\ln \sqrt{\pi} - \ln \sqrt{2})(y - 1) = 2x - \pi$

(b) $\pi \ln \sqrt{\pi}(y - 1) = (\ln 2)x - \pi$

(c) $(\ln \sqrt{\pi} - \ln \sqrt{2})(y - 1) = 2x - \pi$

(d) $\pi(\ln \sqrt{\pi} - \ln \sqrt{2})(y - \pi) = x - 1$

(e) $2\pi \ln(\pi - 2)(y - 1) = x - \pi$

13. Which one of the following statements is true about the function $f(x) = x|x|$?
- (a) f is not differentiable at $x = 0$
 - (b) $f'(-x) = -f'(x)$
 - (c) f is differentiable on $(-\infty, \infty)$ and $f'(x) = 2x$
 - (d) f is differentiable on $(-\infty, \infty)$ and $f'(x) = 2|x|$
 - (e) f is differentiable on $(-\infty, \infty)$ and $f'(x) = -2x$
14. There are two lines through the point $(2, -3)$ that are tangent to the parabola $y = x^2 + x$. Then the **sum** of the slopes of these lines is
- (a) 11
 - (b) 13.5
 - (c) 7.5
 - (d) 10
 - (e) 9

15. If $\sqrt{x} + \sqrt{y} = 4$ defines implicitly a relation between x and y , then y'' is equal to

(a) $\frac{\sqrt{xy}}{2x^2y}(x + y)$

(b) $\frac{xy + y\sqrt{xy}}{2x^2y}$

(c) $-\sqrt{\frac{y}{x}}$

(d) $-\sqrt{\frac{x}{y}}$

(e) $\frac{x\sqrt{y} + y\sqrt{x}}{2x^2}$

King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences

CODE 002

Math 101

CODE 002

Exam 2

061

Tuesday 28/11/2006

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Name: _____

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1. The x -intercept of the tangent line to the curve $y = x\sqrt{x^2 - 8}$ at $x = -3$ is given by

(a) $x = \frac{27}{10}$

(b) $x = 27$

(c) $x = -\frac{27}{10}$

(d) $x = -27$

(e) $x = 10$

2. If $f(4) = \frac{1}{4}$, $f'(4) = -\frac{1}{4}$ and $g(x) = \frac{1 + xf(x)}{\sqrt{x}}$, then $g'(4) =$

(a) -1

(b) $-\frac{5}{8}$

(c) $\frac{5}{8}$

(d) 0

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

3. If $u = \sqrt[3]{t^2} + 2\sqrt{t^3}$, then $\frac{du}{dt}$ is equal to

(a) $\frac{6 + 4\sqrt[4]{t^4}}{6\sqrt[6]{t}}$

(b) $\frac{2 + 3\sqrt{t}}{6\sqrt{t^3}}$

(c) $\frac{9 + 4\sqrt{t^4}}{5\sqrt[5]{t}}$

(d) $\frac{2 + 9\sqrt[6]{t^5}}{3\sqrt[3]{t}}$

(e) $\frac{2 + 4\sqrt[4]{t^5}}{5\sqrt[5]{t^5}}$

4. If $g(x) = \sqrt{5 - 2x}$, then $g'''(2)$ is equal to

(a) $-\frac{1}{2}$

(b) 2

(c) -3

(d) 1

(e) -1

5. If $y = \arctan(\arcsin \sqrt{x})$, then $\frac{dy}{dx} =$

(a) $\frac{1}{1 + (\arcsin \sqrt{x})^2}$

(b) $\frac{1}{\sqrt{1-x^2}[1 + \arcsin x]}$

(c) $\frac{1}{\sqrt{1-x^2}[1 + (\arcsin \sqrt{x})^2]}$

(d) $\frac{1}{2\sqrt{x}\sqrt{1-x}[1 + (\arcsin \sqrt{x})^2]}$

(e) $\frac{1}{\sqrt{1-x}[1 + (\arcsin \sqrt{x})^2]}$

6. $\lim_{x \rightarrow \pi/4} \frac{\sin x - \cos x}{\cos(2x)}$ is equal to

(a) 0

(b) $\sqrt{2}$

(c) -1

(d) 1

(e) $-\frac{\sqrt{2}}{2}$

7. $\tanh(\ln x) =$

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

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

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

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

(e) ∞

8. Suppose that L is a function such that $L'(x) = \frac{1}{x}$ for $x > 0$.

Then the derivative of $F(x) = L(x^4) + L\left(\frac{1}{x}\right)$ is equal to

(a) $\frac{4}{x^3}$

(b) $x^4 - x$

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

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

(e) x^3

9. If $y = \frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2}$, then y' is equal to

(a) $\frac{\sin^6 x}{\cos^4 x (x^2 + 1)^2} \left[2 \cot x + \frac{6 \cos x}{\cot x} - \frac{4x}{x^2 + 1} \right]$

(b) $\frac{\sin^2 x \sec^8 x}{\cos^4 x (x^2 + 1)^2} \left[\cot x + \frac{5 \sec x}{\sin x} - \frac{6x}{x^2 + 1} \right]$

(c) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[\cot x + \frac{8 \sec x}{\tan x} - \frac{3x}{x^2 + 1} \right]$

(d) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[2 \sec x + \frac{4 \sec x}{\sin x} - \frac{8x}{x^2 + 1} \right]$

(e) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[2 \cot x + \frac{4 \sec^2 x}{\tan x} - \frac{4x}{x^2 + 1} \right]$

10. The values of x for which the function $f(x) = x + 2 \sin x$ has tangent lines parallel to the line $2x + 2y = 5$ are

(a) $2k\pi$, k is an integer

(b) $k\pi$, k is an integer

(c) none of the above

(d) $(k + 1)\pi$, k is an integer

(e) $(2k + 1)\pi$, k is an integer

11. An equation of the normal line to the graph of $y = x^{x \cos x}$ when $x = \frac{\pi}{2}$ is given by

(a) $(\ln \sqrt{\pi} - \ln \sqrt{2})(y - 1) = 2x - \pi$

(b) $\pi(\ln \sqrt{\pi} - \ln \sqrt{2})(y - \pi) = x - 1$

(c) $2\pi(\ln \sqrt{\pi} - \ln \sqrt{2})(y - 1) = 2x - \pi$

(d) $2\pi \ln(\pi - 2)(y - 1) = x - \pi$

(e) $\pi \ln \sqrt{\pi}(y - 1) = (\ln 2)x - \pi$

12. If $\sqrt{x} + \sqrt{y} = 4$ defines implicitly a relation between x and y , then y'' is equal to

(a) $\frac{x\sqrt{y} + y\sqrt{x}}{2x^2}$

(b) $\frac{xy + y\sqrt{xy}}{2x^2y}$

(c) $-\sqrt{\frac{x}{y}}$

(d) $-\sqrt{\frac{y}{x}}$

(e) $\frac{\sqrt{xy}}{2x^2y}(x + y)$

13. There are two lines through the point $(2, -3)$ that are tangent to the parabola $y = x^2 + x$. Then the **sum** of the slopes of these lines is

(a) 10

(b) 13.5

(c) 9

(d) 11

(e) 7.5

14. If $(x - y)^2 = x + y$, then

(a) $\frac{dy}{dx} = \frac{2x - 2y - 1}{2x - 2y + 1}$

(b) $\frac{dy}{dx} = \frac{2x - 2y + 1}{2x - 2y - 1}$

(c) $\frac{dy}{dx} = \frac{2x - 2y - 1}{2x + 2y + 1}$

(d) $\frac{dy}{dx} = \frac{2x - 2y + 1}{2x + 2y + 1}$

(e) $\frac{dy}{dx} = 2x - 2y - 1$

15. Which one of the following statements is true about the function $f(x) = x|x|$?
- (a) f is differentiable on $(-\infty, \infty)$ and $f'(x) = 2|x|$
 - (b) f is not differentiable at $x = 0$
 - (c) f is differentiable on $(-\infty, \infty)$ and $f'(x) = -2x$
 - (d) f is differentiable on $(-\infty, \infty)$ and $f'(x) = 2x$
 - (e) $f'(-x) = -f'(x)$

King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences

CODE 003

Math 101

CODE 003

Exam 2

061

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1. If $f(4) = \frac{1}{4}$, $f'(4) = -\frac{1}{4}$ and $g(x) = \frac{1 + xf(x)}{\sqrt{x}}$, then $g'(4) =$

(a) $-\frac{5}{8}$

(b) 0

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

(d) $\frac{5}{8}$

(e) -1

2. If $y = \frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2}$, then y' is equal to

(a) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[\cot x + \frac{8 \sec x}{\tan x} - \frac{3x}{x^2 + 1} \right]$

(b) $\frac{\sin^6 x}{\cos^4 x (x^2 + 1)^2} \left[2 \cot x + \frac{6 \cos x}{\cot x} - \frac{4x}{x^2 + 1} \right]$

(c) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[2 \sec x + \frac{4 \sec x}{\sin x} - \frac{8x}{x^2 + 1} \right]$

(d) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[2 \cot x + \frac{4 \sec^2 x}{\tan x} - \frac{4x}{x^2 + 1} \right]$

(e) $\frac{\sin^2 x \sec^8 x}{\cos^4 x (x^2 + 1)^2} \left[\cot x + \frac{5 \sec x}{\sin x} - \frac{6x}{x^2 + 1} \right]$

3. The values of x for which the function $f(x) = x + 2 \sin x$ has tangent lines parallel to the line $2x + 2y = 5$ are

(a) $(2k + 1)\pi$, k is an integer

(b) none of the above

(c) $k\pi$, k is an integer

(d) $(k + 1)\pi$, k is an integer

(e) $2k\pi$, k is an integer

4. $\lim_{x \rightarrow \pi/4} \frac{\sin x - \cos x}{\cos(2x)}$ is equal to

(a) $-\frac{\sqrt{2}}{2}$

(b) 0

(c) $\sqrt{2}$

(d) 1

(e) -1

5. $\tanh(\ln x) =$

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

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

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

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

(e) ∞

6. If $u = \sqrt[3]{t^2} + 2\sqrt{t^3}$, then $\frac{du}{dt}$ is equal to

(a) $\frac{2 + 3\sqrt{t}}{6\sqrt{t^3}}$

(b) $\frac{2 + 9\sqrt[6]{t^5}}{3\sqrt[3]{t}}$

(c) $\frac{9 + 4\sqrt{t^4}}{5\sqrt[5]{t}}$

(d) $\frac{6 + 4\sqrt[4]{t^4}}{6\sqrt[6]{t}}$

(e) $\frac{2 + 4\sqrt[4]{t^5}}{5\sqrt[5]{t^5}}$

7. The x -intercept of the tangent line to the curve $y = x\sqrt{x^2 - 8}$ at $x = -3$ is given by

(a) $x = -27$

(b) $x = 10$

(c) $x = -\frac{27}{10}$

(d) $x = \frac{27}{10}$

(e) $x = 27$

8. Suppose that L is a function such that $L'(x) = \frac{1}{x}$ for $x > 0$. Then the derivative of $F(x) = L(x^4) + L\left(\frac{1}{x}\right)$ is equal to

(a) $x^4 - x$

(b) x^3

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

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

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

9. If $y = \arctan(\arcsin \sqrt{x})$, then $\frac{dy}{dx} =$

(a) $\frac{1}{2\sqrt{x}\sqrt{1-x}[1 + (\arcsin \sqrt{x})^2]}$

(b) $\frac{1}{\sqrt{1-x}[1 + (\arcsin \sqrt{x})^2]}$

(c) $\frac{1}{\sqrt{1-x^2}[1 + (\arcsin \sqrt{x})^2]}$

(d) $\frac{1}{\sqrt{1-x^2}[1 + \arcsin x]}$

(e) $\frac{1}{1 + (\arcsin \sqrt{x})^2}$

10. If $g(x) = \sqrt{5 - 2x}$, then $g'''(2)$ is equal to

(a) $-\frac{1}{2}$

(b) 2

(c) -1

(d) 1

(e) -3

11. An equation of the normal line to the graph of $y = x^{x \cos x}$ when $x = \frac{\pi}{2}$ is given by

(a) $\pi(\ln \sqrt{\pi} - \ln \sqrt{2})(y - \pi) = x - 1$

(b) $2\pi(\ln \sqrt{\pi} - \ln \sqrt{2})(y - 1) = 2x - \pi$

(c) $2\pi \ln(\pi - 2)(y - 1) = x - \pi$

(d) $(\ln \sqrt{\pi} - \ln \sqrt{2})(y - 1) = 2x - \pi$

(e) $\pi \ln \sqrt{\pi}(y - 1) = (\ln 2)x - \pi$

12. There are two lines through the point $(2, -3)$ that are tangent to the parabola $y = x^2 + x$. Then the **sum** of the slopes of these lines is

(a) 9

(b) 13.5

(c) 10

(d) 7.5

(e) 11

13. Which one of the following statements is true about the function $f(x) = x|x|$?

- (a) f is differentiable on $(-\infty, \infty)$ and $f'(x) = 2x$
- (b) f is differentiable on $(-\infty, \infty)$ and $f'(x) = -2x$
- (c) f is not differentiable at $x = 0$
- (d) $f'(-x) = -f'(x)$
- (e) f is differentiable on $(-\infty, \infty)$ and $f'(x) = 2|x|$

14. If $\sqrt{x} + \sqrt{y} = 4$ defines implicitly a relation between x and y , then y'' is equal to

- (a) $-\sqrt{\frac{y}{x}}$
- (b) $-\sqrt{\frac{x}{y}}$
- (c) $\frac{\sqrt{xy}}{2x^2y}(x + y)$
- (d) $\frac{x\sqrt{y} + y\sqrt{x}}{2x^2}$
- (e) $\frac{xy + y\sqrt{xy}}{2x^2y}$

15. If $(x - y)^2 = x + y$, then

(a) $\frac{dy}{dx} = \frac{2x - 2y + 1}{2x + 2y + 1}$

(b) $\frac{dy}{dx} = \frac{2x - 2y - 1}{2x + 2y + 1}$

(c) $\frac{dy}{dx} = \frac{2x - 2y - 1}{2x - 2y + 1}$

(d) $\frac{dy}{dx} = \frac{2x - 2y + 1}{2x - 2y - 1}$

(e) $\frac{dy}{dx} = 2x - 2y - 1$

King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences

CODE 004

Math 101

CODE 004

Exam 2

061

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(a) $x = -\frac{27}{10}$

(b) $x = 27$

(c) $x = -27$

(d) $x = \frac{27}{10}$

(e) $x = 10$

2. Suppose that L is a function such that $L'(x) = \frac{1}{x}$ for $x > 0$. Then the derivative of $F(x) = L(x^4) + L\left(\frac{1}{x}\right)$ is equal to

(a) $x^4 - x$

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

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

(d) x^3

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

3. If $f(4) = \frac{1}{4}$, $f'(4) = -\frac{1}{4}$ and $g(x) = \frac{1 + xf(x)}{\sqrt{x}}$, then $g'(4) =$

(a) $\frac{5}{8}$

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

(c) 0

(d) $-\frac{5}{8}$

(e) -1

4. $\tanh(\ln x) =$

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

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

(c) ∞

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

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

5. If $u = \sqrt[3]{t^2} + 2\sqrt{t^3}$, then $\frac{du}{dt}$ is equal to

(a) $\frac{2 + 9\sqrt[6]{t^5}}{3\sqrt[3]{t}}$

(b) $\frac{9 + 4\sqrt{t^4}}{5\sqrt[5]{t}}$

(c) $\frac{6 + 4\sqrt[4]{t^4}}{6\sqrt[6]{t}}$

(d) $\frac{2 + 3\sqrt{t}}{6\sqrt{t^3}}$

(e) $\frac{2 + 4\sqrt[4]{t^5}}{5\sqrt[5]{t^5}}$

6. If $y = \frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2}$, then y' is equal to

(a) $\frac{\sin^2 x \sec^8 x}{\cos^4 x (x^2 + 1)^2} \left[\cot x + \frac{5 \sec x}{\sin x} - \frac{6x}{x^2 + 1} \right]$

(b) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[2 \sec x + \frac{4 \sec x}{\sin x} - \frac{8x}{x^2 + 1} \right]$

(c) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[\cot x + \frac{8 \sec x}{\tan x} - \frac{3x}{x^2 + 1} \right]$

(d) $\frac{\sin^6 x}{\cos^4 x (x^2 + 1)^2} \left[2 \cot x + \frac{6 \cos x}{\cot x} - \frac{4x}{x^2 + 1} \right]$

(e) $\frac{\sin^2 x \tan^4 x}{(x^2 + 1)^2} \left[2 \cot x + \frac{4 \sec^2 x}{\tan x} - \frac{4x}{x^2 + 1} \right]$

7. If $y = \arctan(\arcsin \sqrt{x})$, then $\frac{dy}{dx} =$

(a) $\frac{1}{\sqrt{1-x^2}[1+(\arcsin \sqrt{x})^2]}$

(b) $\frac{1}{2\sqrt{x}\sqrt{1-x}[1+(\arcsin \sqrt{x})^2]}$

(c) $\frac{1}{1+(\arcsin \sqrt{x})^2}$

(d) $\frac{1}{\sqrt{1-x}[1+(\arcsin \sqrt{x})^2]}$

(e) $\frac{1}{\sqrt{1-x^2}[1+\arcsin x]}$

8. If $g(x) = \sqrt{5-2x}$, then $g'''(2)$ is equal to

(a) 2

(b) 1

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

(d) -1

(e) -3

9. The values of x for which the function $f(x) = x + 2 \sin x$ has tangent lines parallel to the line $2x + 2y = 5$ are

- (a) $(k + 1)\pi$, k is an integer
- (b) $2k\pi$, k is an integer
- (c) $k\pi$, k is an integer
- (d) none of the above
- (e) $(2k + 1)\pi$, k is an integer

10. $\lim_{x \rightarrow \pi/4} \frac{\sin x - \cos x}{\cos(2x)}$ is equal to

- (a) $-\frac{\sqrt{2}}{2}$
- (b) $\sqrt{2}$
- (c) -1
- (d) 1
- (e) 0

11. There are two lines through the point $(2, -3)$ that are tangent to the parabola $y = x^2 + x$. Then the **sum** of the slopes of these lines is

(a) 9

(b) 13.5

(c) 10

(d) 11

(e) 7.5

12. If $\sqrt{x} + \sqrt{y} = 4$ defines implicitly a relation between x and y , then y'' is equal to

(a) $\frac{\sqrt{xy}}{2x^2y}(x + y)$

(b) $-\sqrt{\frac{y}{x}}$

(c) $-\sqrt{\frac{x}{y}}$

(d) $\frac{x\sqrt{y} + y\sqrt{x}}{2x^2}$

(e) $\frac{xy + y\sqrt{xy}}{2x^2y}$

13. An equation of the normal line to the graph of $y = x^{x \cos x}$ when $x = \frac{\pi}{2}$ is given by

(a) $2\pi \ln(\pi - 2)(y - 1) = x - \pi$

(b) $(\ln \sqrt{\pi} - \ln \sqrt{2})(y - 1) = 2x - \pi$

(c) $2\pi(\ln \sqrt{\pi} - \ln \sqrt{2})(y - 1) = 2x - \pi$

(d) $\pi(\ln \sqrt{\pi} - \ln \sqrt{2})(y - \pi) = x - 1$

(e) $\pi \ln \sqrt{\pi}(y - 1) = (\ln 2)x - \pi$

14. Which one of the following statements is true about the function $f(x) = x|x|$?

(a) $f'(-x) = -f'(x)$

(b) f is differentiable on $(-\infty, \infty)$ and $f'(x) = 2x$

(c) f is differentiable on $(-\infty, \infty)$ and $f'(x) = 2|x|$

(d) f is not differentiable at $x = 0$

(e) f is differentiable on $(-\infty, \infty)$ and $f'(x) = -2x$

15. If $(x - y)^2 = x + y$, then

(a) $\frac{dy}{dx} = \frac{2x - 2y + 1}{2x - 2y - 1}$

(b) $\frac{dy}{dx} = \frac{2x - 2y - 1}{2x - 2y + 1}$

(c) $\frac{dy}{dx} = \frac{2x - 2y - 1}{2x + 2y + 1}$

(d) $\frac{dy}{dx} = \frac{2x - 2y + 1}{2x + 2y + 1}$

(e) $\frac{dy}{dx} = 2x - 2y - 1$

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