Chapter 5 Review

#1

An equation for a tangent to the graph of $y = \arcsin \dfrac{x}{2}$ at the origin is

(A) $x - 2y = 0$ (B) $x - y = 0$ (C) $x = 0$ (D) $y = 0$ (E) $\pi x - 2y = 0$

#2

At $x = 0$, which of the following is true of the function f defined by $f(x) = x^2 + e^{-2x}$?

(A) f is increasing.

(B) f is decreasing.

(C) f is discontinuous.

(D) f has a relative minimum.

(E) f has a relative maximum.

#3

If $f(x) = \sin\left(e^{-x}\right)$, then $f'(x) =$

(A) $-\cos(e^{-x})$

(B) $\cos(e^{-x}) + e^{-x}$

(C) $\cos(e^{-x}) - e^{-x}$

(D) $e^{-x}\cos(e^{-x})$

(E) $-e^{-x}\cos(e^{-x})$

#4

If $\dfrac{dy}{dx} = \tan x$, then $y =$

(A) $\dfrac{1}{2}\tan^2 x + C$ (B) $\sec^2 x + C$ (C) $\ln|\sec x| + C$

(D) $\ln|\cos x| + C$ (E) $\sec x \tan x + C$

#5

If $y = \arctan(e^{2x})$, then $\dfrac{dy}{dx} =$

(A) $\dfrac{2e^{2x}}{\sqrt{1-e^{4x}}}$ (B) $\dfrac{2e^{2x}}{1+e^{4x}}$ (C) $\dfrac{e^{2x}}{1+e^{4x}}$ (D) $\dfrac{1}{\sqrt{1-e^{4x}}}$ (E) $\dfrac{1}{1+e^{4x}}$

#6

The slope of the line tangent to the graph of $y = \ln\left(x^2\right)$ at $x = e^2$ is

(A) $\dfrac{1}{e^2}$ (B) $\dfrac{2}{e^2}$ (C) $\dfrac{4}{e^2}$ (D) $\dfrac{1}{e^4}$ (E) $\dfrac{4}{e^4}$

#7

$\dfrac{1}{2}\displaystyle\int e^{\frac{t}{2}}\, dt =$

(A) $e^{-t} + C$ (B) $e^{-\frac{t}{2}} + C$ (C) $e^{\frac{t}{2}} + C$ (D) $2e^{\frac{t}{2}} + C$ (E) $e^{t} + C$

#8

$\dfrac{d}{dx}\left(\arcsin 2x\right) =$

(A) $\dfrac{-1}{2\sqrt{1-4x^2}}$ (B) $\dfrac{-2}{\sqrt{4x^2-1}}$ (C) $\dfrac{1}{2\sqrt{1-4x^2}}$

(D) $\dfrac{2}{\sqrt{1-4x^2}}$ (E) $\dfrac{2}{\sqrt{4x^2-1}}$

#9

Suppose $f(x) = 2x^3 - 3x$. If h(x) is the inverse of f, then h'(-1) =

(A)   -1   (B)   1/5   (C)   1/3   (D)   1   (E)   3

#10

If $f(x) = e^{1/x}$, then $f'(x) =$

(A) $-\dfrac{e^{1/x}}{x^2}$

(B) $-e^{1/x}$

(C) $\dfrac{e^{1/x}}{x}$

(D) $\dfrac{e^{1/x}}{x^2}$

(E) $\dfrac{1}{x}e^{(1/x)-1}$

#11

If $y = 10^{\left(x^2-1\right)}$, then $\dfrac{dy}{dx} =$

(A) $(\ln 10)10^{\left(x^2-1\right)}$

(B) $(2x)10^{\left(x^2-1\right)}$

(C) $\left(x^2-1\right)10^{\left(x^2-2\right)}$

(D) $2x(\ln 10)10^{\left(x^2-1\right)}$

(E) $x^2(\ln 10)10^{\left(x^2-1\right)}$

#12

$\displaystyle\int \tan(2x)\,dx =$

(A) $-2\ln\left|\cos(2x)\right| + C$

(B) $-\dfrac{1}{2}\ln\left|\cos(2x)\right| + C$

(C) $\dfrac{1}{2}\ln\left|\cos(2x)\right| + C$

(D) $2\ln\left|\cos(2x)\right| + C$

(E) $\dfrac{1}{2}\sec(2x)\tan(2x) + C$

#13

Which of the following is equal to $\displaystyle\int \dfrac{1}{\sqrt{25-x^2}}\,dx$?

(A) $\arcsin\dfrac{x}{5} + C$

(B) $\arcsin x + C$

(C) $\dfrac{1}{5}\arcsin\dfrac{x}{5} + C$

(D) $\sqrt{25-x^2} + C$

(E) $2\sqrt{25-x^2} + C$

#14

$$\int_0^1 x^3 e^{x^4} \, dx =$$

(A) $\dfrac{1}{4}(e-1)$ 　　(B) $\dfrac{1}{4}e$ 　　(C) $e-1$ 　　(D) e 　　(E) $4(e-1)$

#15

If $f(x) = x^2 e^x$, then the graph of f is decreasing for all x such that

(A) $x < -2$ 　(B) $-2 < x < 0$ 　(C) $x > -2$ 　(D) $x < 0$ 　(E) $x > 0$

#16

If $y = \dfrac{\ln x}{x}$, then $\dfrac{dy}{dx} =$

(A) $\dfrac{1}{x}$ 　　(B) $\dfrac{1}{x^2}$ 　　(C) $\dfrac{\ln x - 1}{x^2}$ 　　(D) $\dfrac{1 - \ln x}{x^2}$ 　　(E) $\dfrac{1 + \ln x}{x^2}$

#17

$$\int_2^3 \frac{x}{x^2+1} \, dx =$$

(A) $\dfrac{1}{2}\ln\dfrac{3}{2}$ 　　(B) $\dfrac{1}{2}\ln 2$ 　　(C) $\ln 2$ 　　(D) $2\ln 2$ 　　(E) $\dfrac{1}{2}\ln 5$

#18

If $f(x) = \dfrac{e^{2x}}{2x}$, then $f'(x) =$

(A) 1

(B) $\dfrac{e^{2x}(1-2x)}{2x^2}$

(C) e^{2x}

(D) $\dfrac{e^{2x}(2x+1)}{x^2}$

(E) $\dfrac{e^{2x}(2x-1)}{2x^2}$

#19

$$\frac{d}{dx}\left(\ln e^{2x}\right) =$$

(A) $\dfrac{1}{e^{2x}}$ (B) $\dfrac{2}{e^{2x}}$ (C) $2x$ (D) 1 (E) 2

#20

For all $x > 1$, if $f(x) = \displaystyle\int_{1}^{x} \frac{1}{t}\,dt$, then $f'(x) =$

(A) 1 (B) $\dfrac{1}{x}$ (C) $\ln x - 1$ (D) $\ln x$ (E) e^x

#21
Suppose $f(1) = 2$, $f'(1) = 5$, and $f'(2) = 4$. Find $(f^{-1})'(2)$.

(A) $\dfrac{1}{5}$ (B) $-\dfrac{1}{5}$ (C) $\dfrac{1}{4}$ (D) $-\dfrac{1}{4}$ (E) none of these

#22

$$\frac{d}{dx}\ln\left(\frac{1}{1-x}\right) =$$

(A) $\dfrac{1}{1-x}$ (B) $\dfrac{1}{x-1}$ (C) $1-x$ (D) $x-1$ (E) $(1-x)^2$

#23

The average value of $\dfrac{1}{x}$ on the closed interval $[1,3]$ is

(A) $\dfrac{1}{2}$ (B) $\dfrac{2}{3}$ (C) $\dfrac{\ln 2}{2}$ (D) $\dfrac{\ln 3}{2}$ (E) $\ln 3$

#24

$$\int \frac{5}{1+x^2}\,dx =$$

(A) $\dfrac{-10x}{\left(1+x^2\right)^2}+C$

(B) $\dfrac{5}{2x}\ln\left(1+x^2\right)+C$

(C) $5x-\dfrac{5}{x}+C$

(D) $5\arctan x+C$

(E) $5\ln\left(1+x^2\right)+C$

#25

$$\int_{\pi/4}^{\pi/2} \frac{\cos x}{\sin x}\,dx =$$

(A) $\ln\sqrt{2}$

(B) $\ln\dfrac{\pi}{4}$

(C) $\ln\sqrt{3}$

(D) $\ln\dfrac{\sqrt{3}}{2}$

(E) $\ln e$

#26

$$\int_1^e \left(\frac{x^2-1}{x}\right)dx =$$

(A) $e-\dfrac{1}{e}$

(B) e^2-e

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

(D) e^2-2

(E) $\dfrac{e^2}{2}-\dfrac{3}{2}$

Answers

1	A
2	B
3	E
4	C
5	B
6	B
7	C
8	D
9	C
10	A
11	D
12	B
13	A
14	A
15	B
16	D
17	B
18	E
19	E
20	B
21	A
22	A
23	D
24	D
25	A
26	E