

Chapter 5 Test Review

*#1

An equation for a tangent to the graph of $y = \arcsin \frac{x}{2}$ 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

The area of the region bounded by the curve $y = e^{2x}$, the x -axis, the y -axis, and the line $x = 2$ is equal to

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

*#4

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

- (A) $\frac{1}{2} \tan^2 x + C$ (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 $\frac{dy}{dx} =$

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

*#6

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

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

#7

The area of the region bounded by the lines $x = 0$, $x = 2$, and $y = 0$ and the curve $y = e^{\frac{x}{2}}$ is

- (A) $\frac{e-1}{2}$ (B) $e-1$ (C) $2(e-1)$ (D) $2e-1$ (E) $2e$

*#8

$$\frac{d}{dx}(\arcsin 2x) =$$

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

#9

$$\int_0^1 (x+1)e^{x^2+2x} dx =$$

- (A) $\frac{e^3}{2}$ (B) $\frac{e^3-1}{2}$ (C) $\frac{e^4-e}{2}$ (D) e^3-1 (E) e^4-e

*#10

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

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

*#11

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

- (A) $(\ln 10)10^{(x^2-1)}$ (B) $(2x)10^{(x^2-1)}$ (C) $(x^2-1)10^{(x^2-2)}$
(D) $2x(\ln 10)10^{(x^2-1)}$ (E) $x^2(\ln 10)10^{(x^2-1)}$

*#12

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

- (A) $-2 \ln |\cos(2x)| + C$ (B) $-\frac{1}{2} \ln |\cos(2x)| + C$ (C) $\frac{1}{2} \ln |\cos(2x)| + C$
(D) $2 \ln |\cos(2x)| + C$ (E) $\frac{1}{2} \sec(2x) \tan(2x) + C$

*#13

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

- (A) $\arcsin \frac{x}{5} + C$ (B) $\arcsin x + C$ (C) $\frac{1}{5} \arcsin \frac{x}{5} + C$
(D) $\sqrt{25-x^2} + C$ (E) $2\sqrt{25-x^2} + C$

#14

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

- (A) $\frac{1}{4}(e-1)$ (B) $\frac{1}{4}e$ (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 $y = \frac{\ln x}{x}$, then $\frac{dy}{dx} =$

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

#17

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

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

#18

The area of the region bounded by the curve $y = e^{2x}$, the x -axis, the y -axis, and the line $x = 2$ is equal to

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

*#19

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

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

*#20

For all $x > 1$, if $f(x) = \int_1^x \frac{1}{t} dt$, then $f'(x) =$

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

*#21

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

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

*#22

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

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

*#23

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

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

*#24

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

- (A) $\frac{-10x}{(1+x^2)^2} + C$ (B) $\frac{5}{2x} \ln(1+x^2) + C$ (C) $5x - \frac{5}{x} + C$
(D) $5 \arctan x + C$ (E) $5 \ln(1+x^2) + C$

#25

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

- (A) $\ln \sqrt{2}$ (B) $\ln \frac{\pi}{4}$ (C) $\ln \sqrt{3}$ (D) $\ln \frac{\sqrt{3}}{2}$ (E) $\ln e$

*#20

For all $x > 1$, if $f(x) = \int_1^x \frac{1}{t} dt$, then $f'(x) =$

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