

Chapter 5 Test Review 2

Date _____ Period _____

Differentiate each function with respect to x .

1) $f(x) = \log_4 3x^3$

A) $f'(x) = 9x^2$

B) $f'(x) = \frac{\ln 4}{9x^2}$

C) $f'(x) = \frac{3}{x \ln 4}$

D) $f'(x) = 3x^3$

E) None of these

2) $f(x) = 3^{3x^2}$

A) $f'(x) = 3^{3x^2} \ln 3$

B) $f'(x) = 3^{3x^2} \ln 3 \cdot 6x$

C) $f'(x) = 3^{(3x^2-1)\ln 3} \cdot 6x$

D) $f'(x) = 6x$

E) None of these

3) $y = \log_4 \sqrt[4]{\frac{x^4}{4x^2 + 3}}$

A) $\frac{dy}{dx} = \frac{1}{4}(x^4 - (4x^2 + 3))$

B) None of these

C) $\frac{dy}{dx} = \frac{1}{4} \left(\frac{\ln 4}{x^4} - \frac{\ln 4}{4x^2 + 3} \right)$

D) $\frac{dy}{dx} = \frac{1}{4}(4x^3 - 8x)$

E) $\frac{dy}{dx} = \frac{1}{4} \left(\frac{1}{x^4 \ln 4} \cdot 4x^3 - \frac{1}{(4x^2 + 3) \ln 4} \cdot 8x \right)$

4) $f(x) = \ln x^5$

A) $f'(x) = 5x^4$

B) $f'(x) = \frac{1}{x^5} \cdot 5x^4$

C) None of these

D) $f'(x) = \frac{1}{x^5}$

E) $f'(x) = \frac{1}{5x^4}$

5) $f(x) = e^{4x^3}$

A) None of these

B) $f'(x) = e^{4x^3}$

C) $f'(x) = 12x^2 e^{4x^3}$

D) $f'(x) = 4x^3 e^{4x^3 - 1}$

E) $f'(x) = 12x^2$

6) $y = \ln \sqrt[5]{\frac{x^3}{2x^2 + 3}}$

A) $\frac{dy}{dx} = \frac{1}{5}(x^3 - (2x^2 + 3))$

B) $\frac{dy}{dx} = \frac{1}{5} \left(\frac{1}{x^3} \cdot 3x^2 - \frac{1}{2x^2 + 3} \cdot 4x \right)$

C) $\frac{dy}{dx} = \frac{1}{5}(3x^2 - 4x)$

D) None of these

E) $\frac{dy}{dx} = \frac{1}{5} \left(\frac{1}{3x^2} - \frac{1}{4x} \right)$

Use logarithmic differentiation to differentiate each function with respect to x .

7) $y = 4x^{x^2}$

A) $\frac{dy}{dx} = y(4x \ln x + 2x)$

B) $\frac{dy}{dx} = y(10x \ln x + 5x)$

C) None of these

D) $\frac{dy}{dx} = y(6x \ln x + 3x)$

E) $\frac{dy}{dx} = y(8x \ln x + 4x)$

For each problem, find the derivative of the function at the given value.

9) $f(x) = e^{-x-2}$ at $x = -3$

A) $f'(-3) = -e$

B) $f'(-3) = -\frac{1}{e^2}$

C) None of these

D) $f'(-3) = -e^2$

E) $f'(-3) = -\frac{1}{e}$

Evaluate each definite integral.

11) $\int_{-5}^{-2} 3e^{x+2} dx$

A) $\frac{3e^3 - 3}{4e^3} \approx 0.713$

B) None of these

C) $\frac{-7e^3 - 3}{e^3} \approx -7.149$

D) $\frac{-10e^3 + 9}{6e^3} \approx -1.592$

E) $\frac{6e^3 + 7}{e^3} \approx 6.349$

For each problem, use implicit differentiation to find y' in terms of x and y .

8) $3x^3 + 4x^2 + 4 = e^{2y^3}$

A) $y' = \frac{e^{2y^3}}{3x^3 + 4x^2 + 4}$

B) $y' = \frac{9x^2 + 8x}{6y^2 e^{2y^3}}$

C) None of these

D) $y' = \frac{3x^3 + 4x^2 + 4}{e^{2y^3}}$

E) $y' = \frac{6y^2 e^{2y^3}}{9x^2 + 8x}$

For each problem, find the slope of the function at the given value.

10) $f(x) = \ln(-x + 1)$ at $x = -2$

A) $-\frac{1}{4}$ B) 3

C) 0 D) $-\frac{1}{3}$

E) None of these

12) $\int_{-2}^1 -e^x dx$

A) $\frac{e^3 - 1}{2e^2} \approx 1.291$

B) None of these

C) $\frac{-e^3 - 3}{11e^2} \approx -0.284$

D) $\frac{-e^3 + 1}{2e^2} \approx -1.291$

E) $\frac{-e^3 + 1}{e^2} \approx -2.583$

$$13) \int_4^7 \frac{5}{2x-6} dx$$

- A) None of these
 B) $\frac{5 \ln 8 - 5 \ln 2}{2} \approx 3.466$
 C) $\frac{-\ln 8 - 5 \ln 2}{2} \approx -2.773$
 D) $\frac{-15 \ln 8 + 5 \ln 2}{6} \approx -4.621$
 E) $\frac{5 \ln 8 + 5 \ln 2}{2} \approx 6.931$

For each problem, find the average value of the function over the given interval.

$$14) f(x) = -3e^x; [-2, 0]$$

- A) $\frac{-3e^2 + 7}{2e^2} \approx -1.026$
 B) $\frac{-3e^2 + 3}{4e^2} \approx -0.648$
 C) $\frac{-3e^2 + 3}{2e^2} \approx -1.297$
 D) None of these
 E) $\frac{-3e^2 + 4}{9e^2} \approx -0.273$

For each problem, find $F'(x)$.

$$15) F(x) = \int_1^{2x} -e^{t-3} dt$$

- A) $F'(x) = -2e^{2x-3}$
 B) $F'(x) = 4e^{2x-2}$
 C) None of these
 D) $F'(x) = -2e^{2x-1}$
 E) $F'(x) = 6e^{2x+2}$

Evaluate each indefinite integral.

$$16) \int -\frac{2}{x} dx$$

- A) None of these
 B) $-\frac{2 \cdot 5^x}{\ln 5} + C$
 C) $e^x + C$
 D) $-2 \ln |x| + C$
 E) $-2e^x + C$

$$17) \int 5e^x dx$$

- A) $\ln |x| + C$
 B) $5 \ln |x| + C$
 C) $5e^x + C$
 D) None of these
 E) $\frac{5 \cdot 2^x}{\ln 2} + C$

$$18) \int 3 \cdot 5^x dx$$

- A) $e^x + C$
 B) None of these
 C) $3 \ln |x| + C$
 D) $\ln |x| + C$
 E) $\frac{3 \cdot 5^x}{\ln 5} + C$

$$19) \int -\cot x dx$$

- A) $-\csc x + C$
 B) None of these
 C) $-\cos x + C$
 D) $-\ln |\sin x| + C$
 E) $-\sec x + C$

$$20) \int \frac{3 \sin x}{\cos x} dx$$

- A) $3 \ln |\sin x| + C$
- B) $3 \ln |\sec x| + C$
- C) None of these
- D) $3 \ln |\sec x + \tan x| + C$
- E) $3 \cot x + C$

$$21) \int (e^{2x} + 2)^4 \cdot 2e^{2x} dx$$

- A) None of these
- B) $\frac{1}{2}(e^{2x} + 2)^6 + C$
- C) $\frac{5}{4}(e^{2x} + 2)^4 + C$
- D) $\frac{1}{5}(e^{2x} + 2)^5 + C$
- E) $(e^{2x} + 2)^4 + C$

$$22) \int \frac{(-4 + \ln -5x)^5}{x} dx$$

- A) $\frac{1}{2}(-4 + \ln -5x)^6 + C$
- B) $\frac{1}{6}(-4 + \ln -5x)^6 + C$
- C) $\frac{5}{6}(-4 + \ln -5x)^6 + C$
- D) None of these
- E) $\frac{5}{4}(-4 + \ln -5x)^4 + C$

$$23) \int (e^{4x} + 4)^4 \cdot 16e^{4x} dx$$

- A) $\frac{4}{5}(e^{4x} + 4)^5 + C$
- B) $\frac{5}{4}(e^{4x} + 4)^4 + C$
- C) None of these
- D) $(e^{4x} + 4)^4 + C$
- E) $\frac{1}{3}(e^{4x} + 4)^6 + C$

$$24) \int \frac{15x^2}{5x^3 + 4} dx$$

- A) $\ln |5x^3 + 4| + C$
- B) $e^{5x^3 + 4} + C$
- C) $\ln |5x^3 + 4| + C$
- D) None of these
- E) $\frac{2^{5x^3 + 4}}{\ln 2} + C$

$$25) \int -\frac{4 \csc^2 4x}{\cot 4x} dx$$

- A) $e^{\cot 4x} + C$
- B) $\ln |\cot 4x| + C$
- C) None of these
- D) $\frac{3^{\cot 4x}}{\ln 3} + C$
- E) $2 \ln |\cot 4x| + C$

$$26) \int \frac{4e^{-1 + \ln 5x}}{x} dx$$

- A) $4e^{-1 + \ln 5x} + C$
- B) $4 \ln |-1 + \ln 5x| + C$
- C) $\ln |-1 + \ln 5x| + C$
- D) None of these
- E) $\frac{4 \cdot 5^{-1 + \ln 5x}}{\ln 5} + C$

$$27) \int 100x^3 \csc(5x^4 + 1) dx$$

- A) $5 \ln |\sin(5x^4 + 1)| + C$
- B) $5 \tan(5x^4 + 1) + C$
- C) $5 \ln |\sec(5x^4 + 1)| + C$
- D) None of these
- E) $5 \ln |\csc(5x^4 + 1) - \cot(5x^4 + 1)| + C$

For each problem, find the particular solution of the differential equation that satisfies the initial condition.

28) $f'(x) = \frac{1}{x^5}, f(1) = \frac{3}{4}$

A) $f(x) = -\frac{1}{x^2} + 2, x > 0$

B) None of these

C) $f(x) = -\frac{1}{4x^4} + 1, x > 0$

D) $f(x) = -\frac{1}{2x^2} - 1, x > 0$

E) $f(x) = \frac{1}{x} - 3, x > 0$

Use logarithmic differentiation to differentiate each function with respect to x .

29) $y = \sqrt{x^2 - 5}(3x^3 + 4)^3$

A) None of these

B) $\frac{dy}{dx} = y\left(\frac{2x}{x^2 - 5} - \frac{27x^2}{3x^3 + 4}\right)$

C) $\frac{dy}{dx} = y\left(\frac{x}{x^2 - 5} + \frac{27x^2}{3x^3 + 4}\right)$

D) $\frac{dy}{dx} = y\left(\frac{4x}{x^2 - 5} - \frac{27x^2}{3x^3 + 4}\right)$

E) $\frac{dy}{dx} = y\left(\frac{x}{x^2 - 5} - \frac{54x^2}{3x^3 + 4}\right)$

Answers to Chapter 5 Test Review 2 (ID: 1)

1) C
5) C
9) A
13) B
17) C
21) D
25) B
29) C

2) B
6) B
10) D
14) C
18) E
22) B
26) A

3) E
7) C
11) B
15) A
19) D
23) A
27) E

4) B
8) B
12) E
16) D
20) B
24) C
28) C