

Calculus Practice: Differential Equations 2a

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

1) $\frac{dy}{dx} = -2x + 3, y(3) = 3$

- A) $y = x^2 + 3x + 1$
 B) $y = x^2 + 2x - 2$
 C) $y = -x^2 + 3x + 3$
 D) $y = x^2 + 2x + 1$

2) $\frac{dy}{dx} = 4x - 3, y(1) = 0$

- A) $y = 2x^2 + x - 1$
 B) $y = -x^2 + x - 2$
 C) $y = 2x^2 + x + 1$
 D) $y = 2x^2 - 3x + 1$

3) $\frac{dy}{dx} = 4x + 2, y(0) = 0$

- A) $y = 2x^2 + 2x$
 B) $y = 2x^2 + 3x - 3$
 C) $y = -2x^2 + 3x + 1$
 D) $y = 2x^2 + x$

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

- A) $y = 2x^2 + 3x + 3$
 B) $y = x^2 + 2x + 1$
 C) $y = x^2 + x - 2$
 D) $y = -x^2 - x - 1$

5) $\frac{dy}{dx} = -4x + 2, y(1) = 1$

- A) $y = -x^2 + x + 3$
 B) $y = -2x^2 + 2x + 1$
 C) $y = x^2 + x - 3$
 D) $y = 2x^2 + x + 2$

6) $f'(x) = -\frac{2}{x}, f(-1) = -3$

- A) $f(x) = 2 \ln -x - 1, x < 0$
 B) $f(x) = -2 \ln -x - 3, x < 0$
 C) $f(x) = -\ln -x - 2, x < 0$
 D) $f(x) = 2 \ln -x, x < 0$

7) $f'(x) = -\frac{1}{x^5}, f(-1) = -\frac{7}{4}$

- A) $f(x) = -\frac{1}{x^2} - 2, x < 0$
 B) $f(x) = -\frac{3}{x}, x > 0$
 C) $f(x) = \frac{1}{4x^4} - 3, x > 0$
 D) $f(x) = \frac{1}{4x^4} - 2, x < 0$

8) $f'(x) = \frac{1}{x^2}, f(-1) = -1$

- A) $f(x) = -\frac{1}{2x^4} + 2, x < 0$
 B) $f(x) = -\frac{1}{x} - 2, x < 0$
 C) $f(x) = \frac{1}{x} - 2, x < 0$
 D) $f(x) = -\frac{1}{x^2} + 2, x < 0$

9) $f'(x) = -\frac{1}{x}, f(3) = -\ln 3 - 1$

- A) $f(x) = -3 \ln -x, x < 0$
 B) $f(x) = 2 \ln x + 1, x > 0$
 C) $f(x) = -2 \ln -x + 3, x < 0$
 D) $f(x) = -\ln x - 1, x > 0$

10) $f'(x) = -\frac{2}{x}, f(2) = -2 \ln 2$

- A) $f(x) = -\ln -x + 3, x < 0$
 B) $f(x) = -2 \ln x + 2, x > 0$
 C) $f(x) = -2 \ln x, x > 0$
 D) $f(x) = -\ln -x - 1, x < 0$

11) $f'(x) = -\frac{1}{x-1}, f(-3) = -\ln 4$

- A) $f(x) = -\ln(x+3), x > -3$
- B) $f(x) = -\ln(-x+2), x < 2$
- C) $f(x) = -\ln(-x+1), x < 1$
- D) $f(x) = -2\ln(-x+1)+2, x < 1$

12) $f'(x) = -\frac{1}{x-2}, f(-2) = -\ln 4 + 2$

- A) $f(x) = -\ln(-x+2)+2, x < 2$
- B) $f(x) = \ln(x+3)-2, x > -3$
- C) $f(x) = -\ln(x+3)+3, x > -3$
- D) $f(x) = -2\ln(-x+1)+3, x < 1$

13) $f'(x) = \frac{3}{(x+3)^2}, f(2) = \frac{12}{5}$

- A) $f(x) = -\frac{1}{x-1} + 2, x < 1$
- B) $f(x) = -\frac{3}{x+3} + 3, x > -3$
- C) $f(x) = \frac{2}{x-3} + 3, x < 3$
- D) $f(x) = \frac{2}{x+1} + 1, x > -1$

14) $f'(x) = -\frac{2}{(x-1)^2}, f(-1) = -2$

- A) $f(x) = \frac{2}{x-1} - 1, x < 1$
- B) $f(x) = -\frac{1}{x-1} + 1, x < 1$
- C) $f(x) = \frac{2}{x-3} + 2, x < 3$
- D) $f(x) = -\frac{3}{x-3} - 3, x < 3$

15) $f'(x) = -\frac{2}{x+1}, f(2) = -2\ln 3 + 2$

- A) $f(x) = 2\ln(-x+2)-2, x < 2$
- B) $f(x) = -\ln(-x+3)+1, x < 3$
- C) $f(x) = -2\ln(x+2)+3, x > -2$
- D) $f(x) = -2\ln(x+1)+2, x > -1$

16) $\frac{dy}{dx} = 2\sin x, y\left(\frac{\pi}{6}\right) = -\sqrt{3} + 1$

- A) $y = 2\cos x - 3$
- B) $y = -2\cos x + 1$
- C) $y = 2\sin x$
- D) $y = -\cos x + 2$

17) $\frac{dy}{dx} = -3\sin x, y\left(\frac{\pi}{2}\right) = -2$

- A) $y = 3\cos x - 2$
- B) $y = 2\cos x + 1$
- C) $y = -2\sin x + 2$
- D) $y = -\sin x + 1$

18) $\frac{dy}{dx} = 2\sin x, y(0) = -1$

- A) $y = -2\cos x + 1$
- B) $y = \cos x$
- C) $y = -2\cos x - 1$
- D) $y = 3\cos x - 2$

19) $\frac{dy}{dx} = \sin x, y\left(\frac{\pi}{2}\right) = 3$

- A) $y = 3\sin x + 2$
- B) $y = -\cos x + 3$
- C) $y = 2\sin x - 1$
- D) $y = -3\sin x - 2$

20) $\frac{dy}{dx} = \cos x, y\left(\frac{\pi}{4}\right) = \frac{4 + \sqrt{2}}{2}$

- A) $y = 3\cos x - 3$
- B) $y = \sin x + 2$
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