

Calculus Practice: Differential Equations 2b

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$y = -x^2 + 3x + 3$$

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

$$y = 2x^2 - 3x + 1$$

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

$$y = 2x^2 + 2x$$

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

$$y = -x^2 - x - 1$$

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

$$y = -2x^2 + 2x + 1$$

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

$$f(x) = -2 \ln -x - 3, x < 0$$

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

$$f(x) = \frac{1}{4x^4} - 2, x < 0$$

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

$$f(x) = -\frac{1}{x} - 2, x < 0$$

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

$$f(x) = -\ln x - 1, x > 0$$

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

$$f(x) = -2 \ln x, x > 0$$

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

$$f(x) = -\ln(-x+1), x < 1$$

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

$$f(x) = -\ln(-x+2) + 2, x < 2$$

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

$$f(x) = -\frac{3}{x+3} + 3, x > -3$$

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

$$f(x) = \frac{2}{x-1} - 1, x < 1$$

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

$$f(x) = -2\ln(x+1) + 2, x > -1$$

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

$$y = -2\cos x + 1$$

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

$$y = 3\cos x - 2$$

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

$$y = -2\cos x + 1$$

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

$$y = -\cos x + 3$$

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

$$y = \sin x + 2$$