

Solve the initial value problem

(1, 3)

15)  $\frac{dy}{dx} = \frac{-1}{x^2} - \frac{3}{x^4} + 12$  and  $y = 3$  when  $x = 1$

- ① integrate
- ② + C
- ③ Plug in x and y and solve for C
- ④ Write y =

$$\int \frac{dy}{dx} = \int -x^{-2} - 3x^{-4} + 12$$

$$y = \frac{1}{x} + \frac{1}{x^3} + 12x - 11$$

$$y = x^{-1} + x^{-3} + 12x + C$$

$$y = \frac{1}{x} + \frac{1}{x^3} + 12x + C$$

$$3 = 1 + 1 + 12 + C$$

$$3 = 14 + C \quad (C = -11)$$

16)  $\left( \frac{dy}{dx} = \sec^2 x - \frac{3}{2}x^{1/2} \right) \quad (y(0) = 7) \quad (0, 7)$

$$y = \tan x - x^{3/2} + C$$

$$7 = \tan(0) - 0^{3/2} + C$$

$$7 = C$$

$$y = \tan x - x^{3/2} + 7$$

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11-14, 17-20

What you'll Learn About

- How integrate by separating the variables

A)  $\frac{dy}{dx} = x + 2$

B)  $\frac{dy}{dx} = y + 2$

C)  $\frac{dy}{dx} = \frac{5x}{y}$       when  $x = 1$  and  $y = 2$

D)  $\frac{dy}{dx} = y\sqrt{x}$  when  $x = 1$  and  $y = 2$

E)  $\frac{dy}{dx} = y\sqrt{x}$  when  $x = 1$  and  $y = -2$

$$E) \quad \frac{dy}{dx} = -yx - y \quad f(-2) = 1$$

