

Monday, February 25

Clicker Questions

Clicker Question 1

A separable differential equation

Solve the differential equation $(y^2x - y^2)y' = 1$.

- A. $y = \sqrt[3]{3 \ln|x - 1| + C}$
- B. $y = \frac{1}{\ln|x - 1| + C}$
- C. $y = \sqrt[3]{\frac{3x^2}{2} - 3x + C}$
- D. $y = \frac{2}{2x - x^2 + C}$
- E. none of the above

Using our method

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

$$y^2 dy = \frac{1}{x - 1} dx$$

$$\frac{y^3}{3} = \ln|x - 1| + B$$

Clicker Question 2

A rate of change in a mixing problem

A room has volume 180 m^3 . The air in the room has a certain amount $y(t)$ of carbon dioxide at a given time t (in minutes). Air is flowing in and out of the room, at a rate of 2 m^3 per minute. The air flowing out is fully mixed: the rate that carbon dioxide flows out of the room is always proportional to the total amount of carbon dioxide in the room. Which differential equation below describes this situation?

- A. $y'(t) = -2y(t)$
- B. $y'(t) = -\frac{1}{90}y(t)$
- C. $y'(t) = -2t$
- D. $y'(t) = -\frac{t}{90}$
- E. $y'(t) = -\frac{1}{90}$