

Watch. Practice. Understand. | Lesson 321

2022 AP Calculus AB and BC Slope Field Students Must know

Watch the matching video: <https://www.youtube.com/watch?v=49mSB1bRELS>

Practice focus: Separable differential equations and slope fields

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Solve $y' = 2xy$ with $y(0) = 3$.

02 For $y' = x - y$, find slopes at $(0,1)$, $(1,1)$, and $(2,1)$.

03 Solve $y' = 3y$ with $y(0) = 2$.

04 Find equilibrium solutions of $y' = y(4 - y)$.

Worked answers | Lesson 321

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Practice focus: Separable differential equations and slope fields

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01 Solve $y'=2xy$ with $y(0)=3$.

Separate $dy/y=2x \, dx$. $\ln|y|=x^2+C$, so $y=3e^{(x^2)}$.

02 For $y'=x-y$, find slopes at $(0,1)$, $(1,1)$, and $(2,1)$.

Substitute coordinates: -1, 0, and 1 respectively.

03 Solve $y'=3y$ with $y(0)=2$.

Separate or recognize exponential growth: $y=2e^{(3t)}$ if independent variable is t ; using x , $y=2e^{(3x)}$.

04 Find equilibrium solutions of $y'=y(4-y)$.

Set the derivative to zero: $y=0$ and $y=4$ are constant solutions.