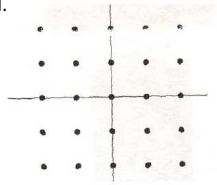
Warm Up

Consider the differential equation, $\frac{dy}{dx} = y$, passing through $(0,1)$.

a) Sketch the slope field for this differential equation on the points provided.



b) Use Euler's Method with step size 0.2 to estimate $f(.6)$
c) Use separation of variables to find the particular solution to the differential equation given $y(0)=1$
d) Determine the error in the Euler approximation of $f(.6)$ as compared to the actual value of $f(.6)$

Answers

a) Sketch on the slope field. Someone can come and put their answer on the board if you would like to discuss.

b) $f(.6)=1.728$

c) $y=e^x$

d) $f(.6)=e^{.6}=1.82211$ so the error is .094 .

Today's POST-QUIZ Classwork…

- Problems #1-4 all require using the equation:

$$y = y_0 e^{kt}$$

- Using this equation is not really a calculus topic but a skill you learned in previous math courses like Algebra II and Precalculus
- HOWEVER, it is important to know/understand where this equation comes from. . . .

continued

Where does $y = y_0 e^{kt}$ come from?

The statement "A quantity *y* (such as population, radioactive element or money) increases or decreases at a rate proportional to the present amount" is represented by this differential equation:

$$\frac{dy}{dt} = ky$$

Separate and Integrate to get $y = Ae^{kt}$, where *A* is an arbitrary constant.

Then if we also know the amount present at time $t=0$ is y_0 the equation $y = Ae^{kt}$ would become $y = y_0 e^{kt}$

continued

Why do we care?

Because on a Calculus free response type question you would be required to show the work to derive the equation $y = y_0 e^{kt}$