Pop Quiz Attendance 23

1a. $x'(t) = -2x(t)$ $\quad -2x = 0 \quad x = 0$ is a FP

$\int \frac{1}{-2x(t)}dx = \int dt$ continuous

$\frac{-\ln(x)}{2} = t + C$

$\ln x = -t - C_c$

$x = e^{-t} = e^{c}$

1b. $x(n) = \frac{1}{2}(x(n-1))$ discrete

$x = \frac{1}{2}x$

$-\frac{1}{2}x = 0$

$x = 0 = FP$

Call this $f(z)$

$f(z) = \frac{1}{2}z$

$f'(z) = \frac{1}{2}$ 0 is not stable

1c. $x(n) = 2x(n-1)(1-x(n-1))$ discrete

$x = 2x - 2x^2$

$2x^2 - x = 0$

$x(2x-1) = 0$

$x = 0,\ x = \frac{1}{2}$ FP

$f(z) = 2z(1-z)$

$= 2z - 2z^2$

$f'(z) = 2 - 4z$

$f'(0) = 2 - 0 > 1$ 0 is unstable

$f'(\frac{1}{2}) = 2 - 2 = 0 < 1$ $\frac{1}{2}$ is stable

1d. continuous $\quad 0 < x(t) < 1$

$$x'(t) = \frac{2x(t)}{1}\left(1 - \frac{x(t)}{1}\right)$$

$$x'(t) = 2x(t) - 2(x(t))^2$$

$$\frac{1}{2}\int \frac{1}{(1-x)x}\,dx = \int dt$$

didn't have time to finish