Ex: The spread of a flu in a certain school is modeled by the equation $P(t)=\frac{100}{1+e^{3-t}}$ where P(t) is the total number of students infected t days after the flu was first noticed. $100(1+e^{3-t})^{-1}$

a. Estimate the initial number of students infected.

$$P(0)=\frac{100}{1+e^{3-0}}=\frac{100}{1+e^{3}}\approx 5 \text{ students}$$

b. How fast is the flu spreading after 3 days?

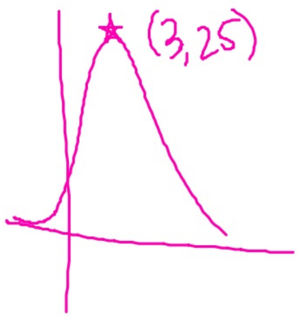
$$P'(t)=-100(1+e^{3-t})^{-2}(e^{3-t})(-1)=\left.\frac{100e^{3-t}}{(1+e^{3-t})^2}\right|_{t=3}=\frac{100e^{3-3}}{(1+e^{3-3})^2}=\frac{100e^{0}}{(1+e^{0})^2}$$

$$=\frac{100}{4}=25 \text{ students/day}$$

c. When will the flu spread at its maximum rate? What is this rate?

$Y_1 = \text{nDeriv}(100/(1+e\text{^}3-t), X, X)$

$(100/(1+e^{\wedge(3-t)}), X, X)$



The flu will spread at its max rate at approx 3 days and that rate is approx 25 students/day.

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