

EX 1) Growth rate of population P of bears in a newly established wildlife preserve is modeled by

$$\frac{dP}{dt} = 0.008 P(100 - P), \text{ where } t = \text{years}$$

a) Carrying capacity? (100)

$$100 - P = \frac{100}{100} - \frac{P}{100}$$

$$= 1 - \frac{P}{100}$$

b) What is pop. when it is growing fastest?

POI?

$$\frac{dP}{dt} = 0.008 P(100 - P) = .8P - .008P^2$$

$$\frac{d^2P}{dt^2} = .8 - .016P$$

$$0 = .8 - .016P$$

$$-.8 = -.016P$$

$$50 = P$$

c)

$$\frac{dP}{dt} = 0.008(50)(100 - 50) = 20$$