## 6.5 Logistic Growth

$$\frac{dP}{dt} = kP(M - P)$$

Use the differential equation to construct a slopefield

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The growth rate of a population P of bears in a newly established wildlife preserve is modeled by the differential equation

$$\frac{dP}{dt} = .008P(100 - P)$$
 where t is measured in years.

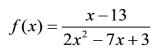
- (a) What is the carrying capacity for bears in this preserve?
- (b) What is the bear population when the population is growing the fastest?
- (c) What is the rate of change of the population when it is growing the fastest.



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Partial fractions:

$$f(x) = \frac{5x+4}{x^2 - 2x - 8}$$



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Sixty one moose were introduced to the upper peninsula in Michigan. The growth rate is given below. Solve for P

$$\frac{dP}{dt} = .0003P(1000 - P)$$

General solution to the logistic differential equation:

$$\frac{dP}{dt} = kP(M - P)$$

$$P = \frac{M}{1 + Ae^{-(Mk)t}} \qquad A = \frac{M - P_0}{P_0}$$

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