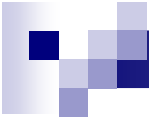


Day 5 Notes - Populations & Interactions

SCI 10

Ecology

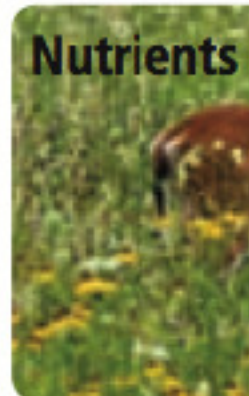
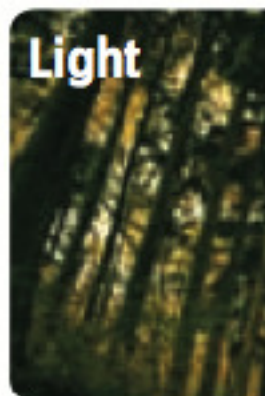
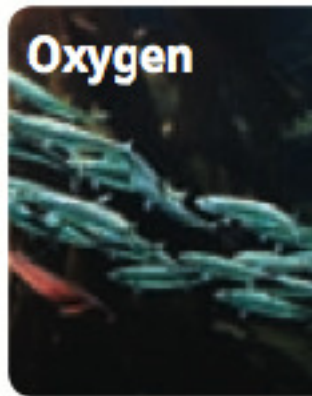
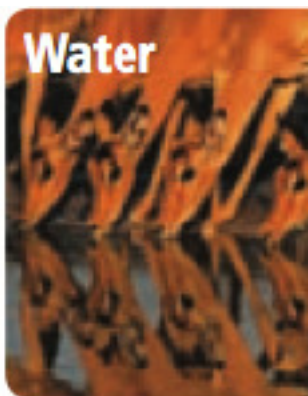


Biotic Interaction and Sustainability (Table 7.1, page 282)

- Three types of factors:
 - **Symbiosis** – the interaction between members of two different species that live together in a close association.
 - **Predation** –when one organism (the predator) consumes another organism (its prey) for food.
 - **Competition** –when two or more organisms fight for the same resource.

Abiotic Characteristics and Sustainability (Table 7.2, page 283)

- Five abiotic characteristics are:
 - Water
 - Oxygen
 - Light
 - Nutrients
 - Soil



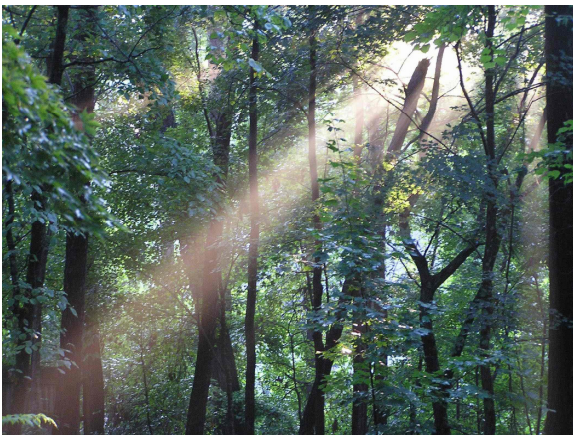


Type of Competition

- **Intraspecific Competition:** members of the *same* species compete for the same resource in an ecosystem (e.g. food, light, nutrients, space).
- **Interspecific Competition:** individuals of *different* species compete for the same resource in an ecosystem (e.g. food or living space).

Is there competition among plants?

- Examples?





Populations

- **Population**: a group of organisms of 1 species that lives in the same place, at the same time, and can successfully reproduce.

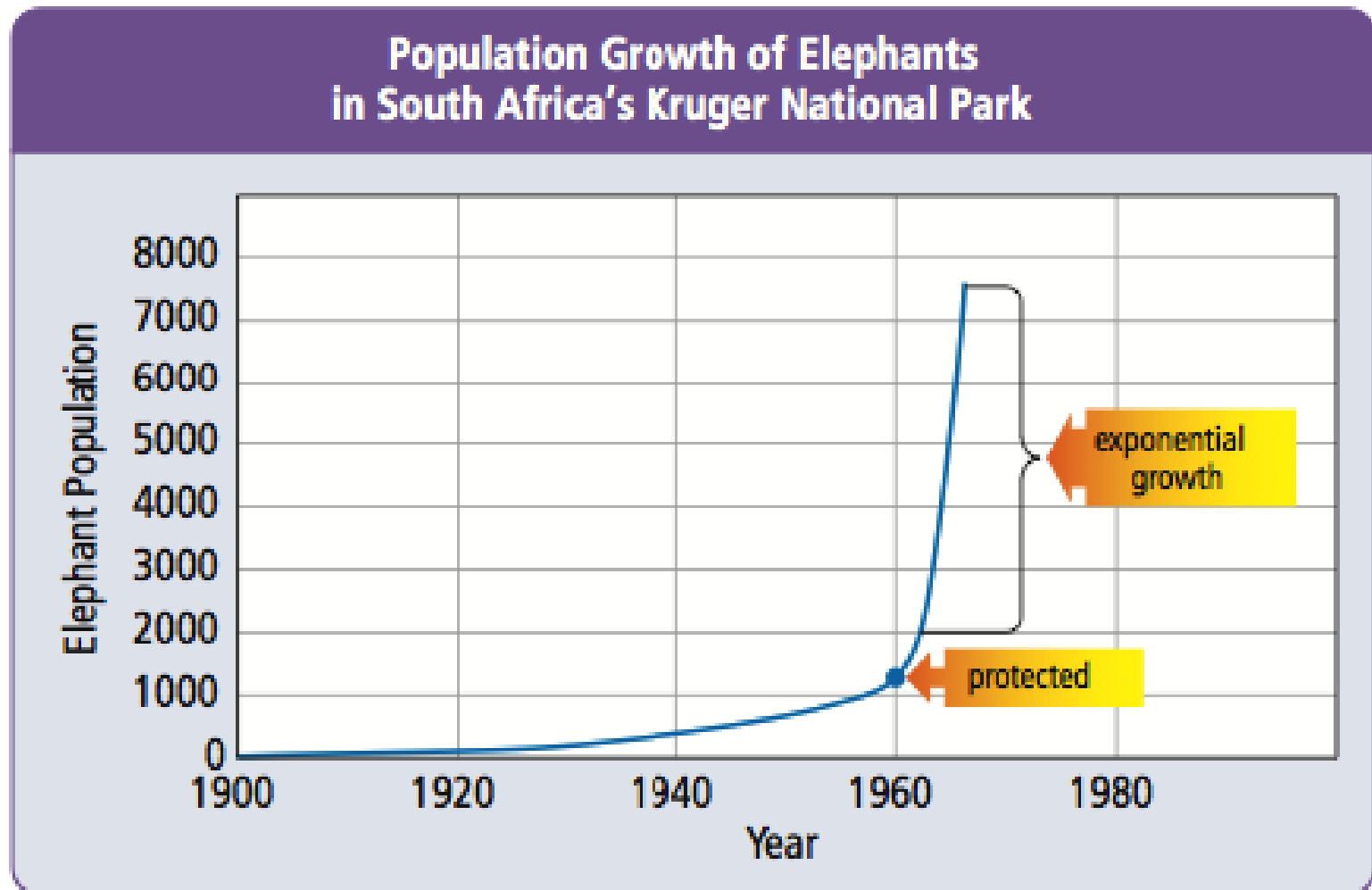


World Population (Humans)

<http://www.worldometers.info/world-population/>

- When does a population increase?
- When does a population decrease?

Exponential growth



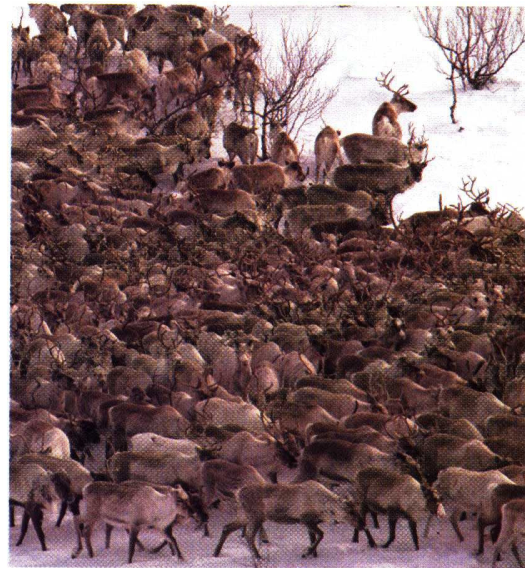
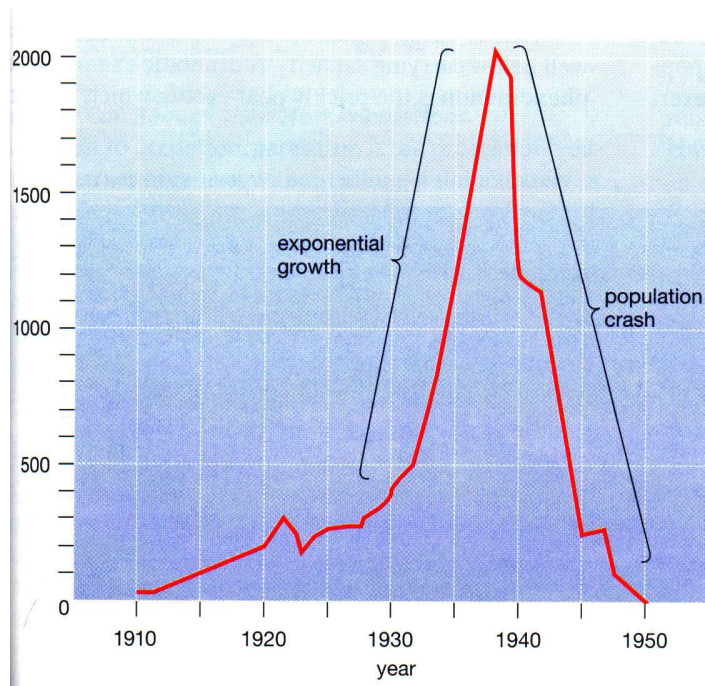


Exponential growth

- **Exponential growth:** accelerating population growth
 - “J”-shaped graph
 - Usually only occurs in nature for a *short time* under certain conditions
 - Organism finds new habitat with lots of resources
 - When other pressures are removed (i.e. hunting ban)
- *Can't last for long – why?*

Population crash

- If the growth is too rapid, resources are rapidly used up and a population crash can occur



Limiting Factors

- A **limiting factor** limits the growth, distribution or amount of a population in an ecosystem.
- As a population increases in size, each individual has access to few resources, limiting the growth of the population.



Figure 7.7 If there were no factors limiting the exponential growth of yellow perch, a single female and her daughters could reach almost 1 trillion individuals in five years.

2 Types of Limiting Factors

1. Density-independent factors

- Any factor in the environment that does not depend on the number of members in a population per unit area (*can occur no matter the population size*)
 - Usually abiotic factors: Natural phenomena, weather, fires, pollution, etc.



2 Types of Limiting Factors (cont.)

2. Density-dependent Factors

- Any factor in the environment that depends on the number of members in a population per unit area. (*only see these when population is large*)
 - Usually biotic factors: disease, parasites, predation, and competition





Carrying Capacity

- **Carrying capacity:** The largest population of a species that can be supported by an environment
 - Controlled by:
 - Abiotic factors
 - Biotic factors (predation, competition)
 - Limiting factors

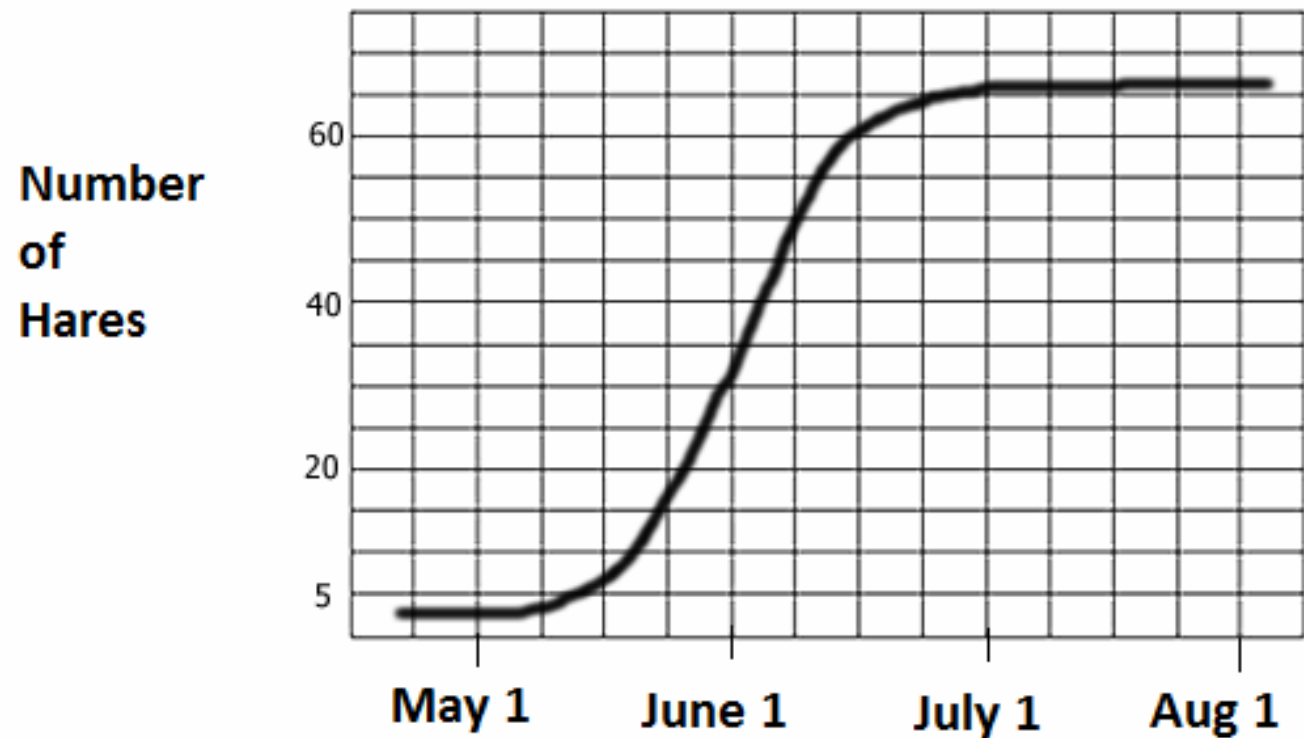


Graphing Carrying Capacity

- Population (Y axis) vs. Year/Time (X axis)
- If the line on the graph is:
 - Going up: population is increasing
 - Going down: population is decreasing
 - Horizontal: population is at its carrying capacity for that species in that ecosystem

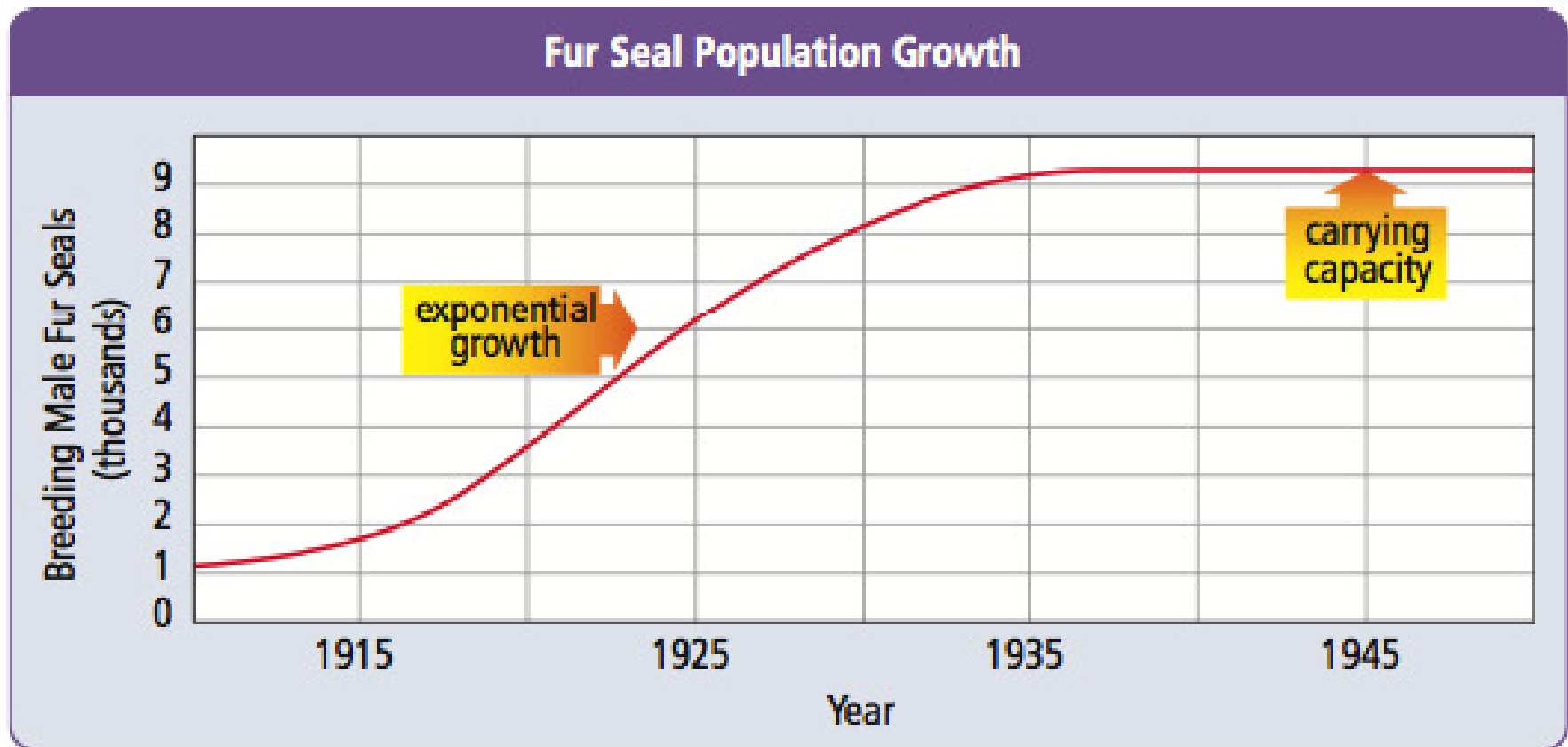
Example

Population of Hares in Sackville 1995

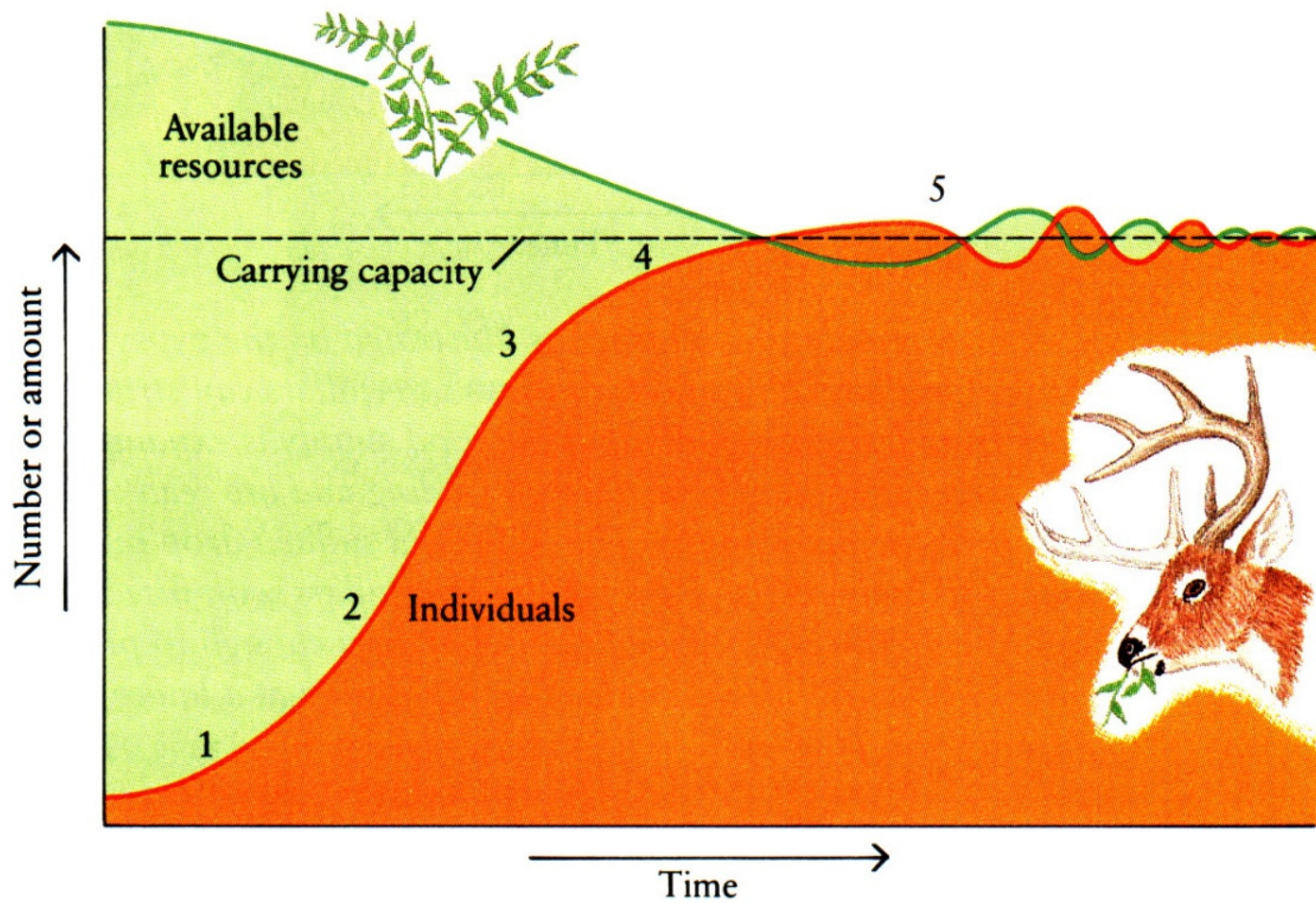


- During which months is the hare population increasing?
- What is the carrying capacity of hares in Sackville?

When the population is at carrying capacity (straight line), what is happening to the population?



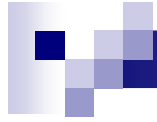
Carrying capacity





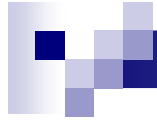
To Do

- *Outcome: predict and analyze the impact of external factors on the sustainability of an ecosystem, using a variety of formats*
- p.291 Graphing Population Change
 - Due:
 - Line of best fit
 - Extrapolate



Homework

- p.287 #1-3, 9, 17, 18



Homework – Review answers