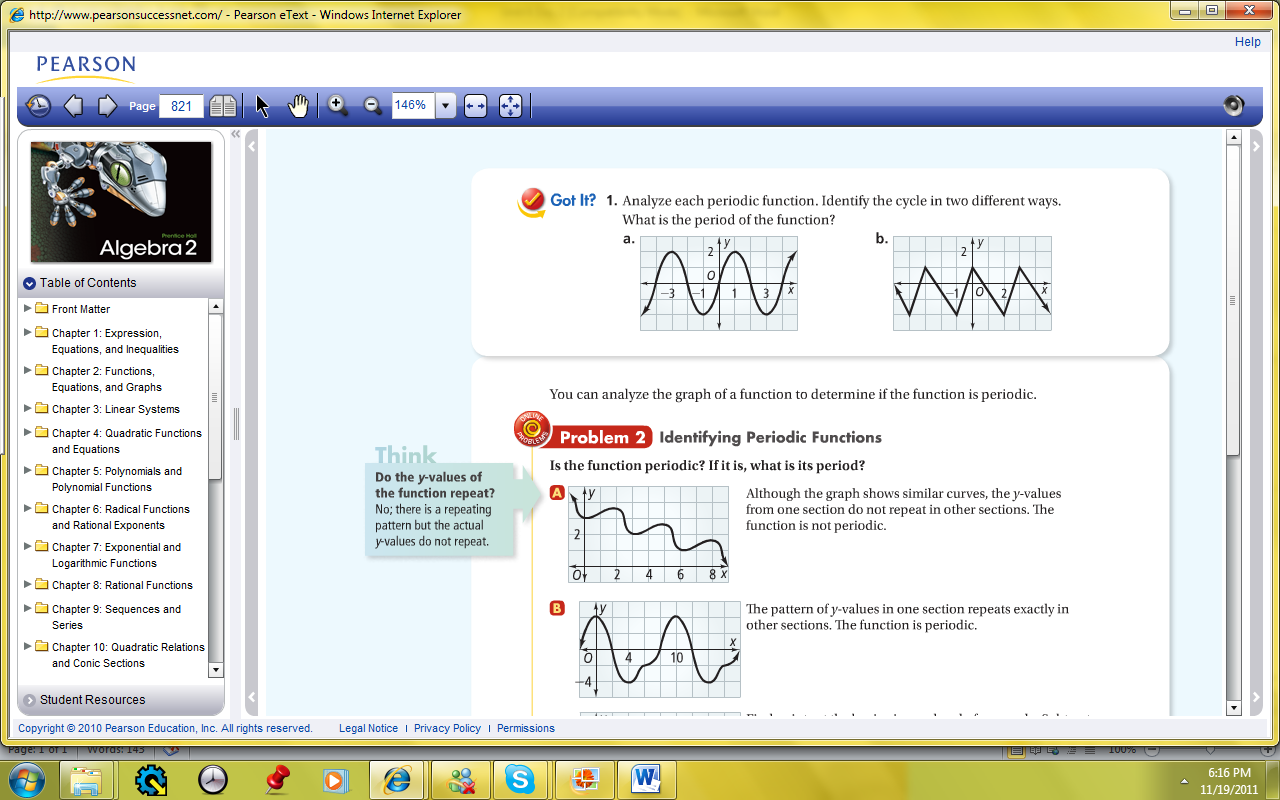
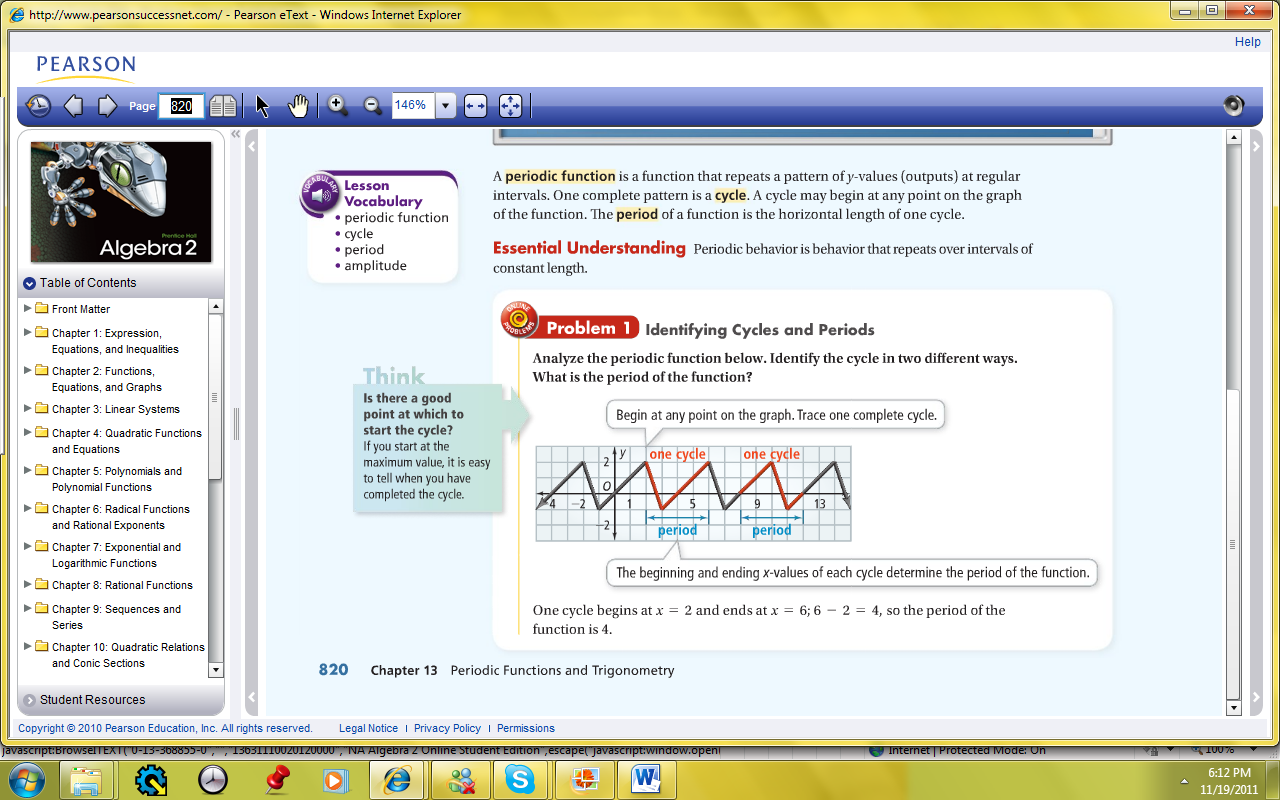
Math 37.6 Exploring Periodic DataUnit 7

**Identifying Cycles and Periods of a Function**

* A periodic function is a function that repeats a pattern of ­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (or outputs) at regular intervals.
* One complete pattern is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. A cycle may begin at any point on the graph of a function.
* The period of a function is the horizontal length of one cycle. Periodic behavior is behavior that repeats over intervals of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Example 1**: Analyze the periodic function below. Identify the cycle in two different ways. What is the period of this function?



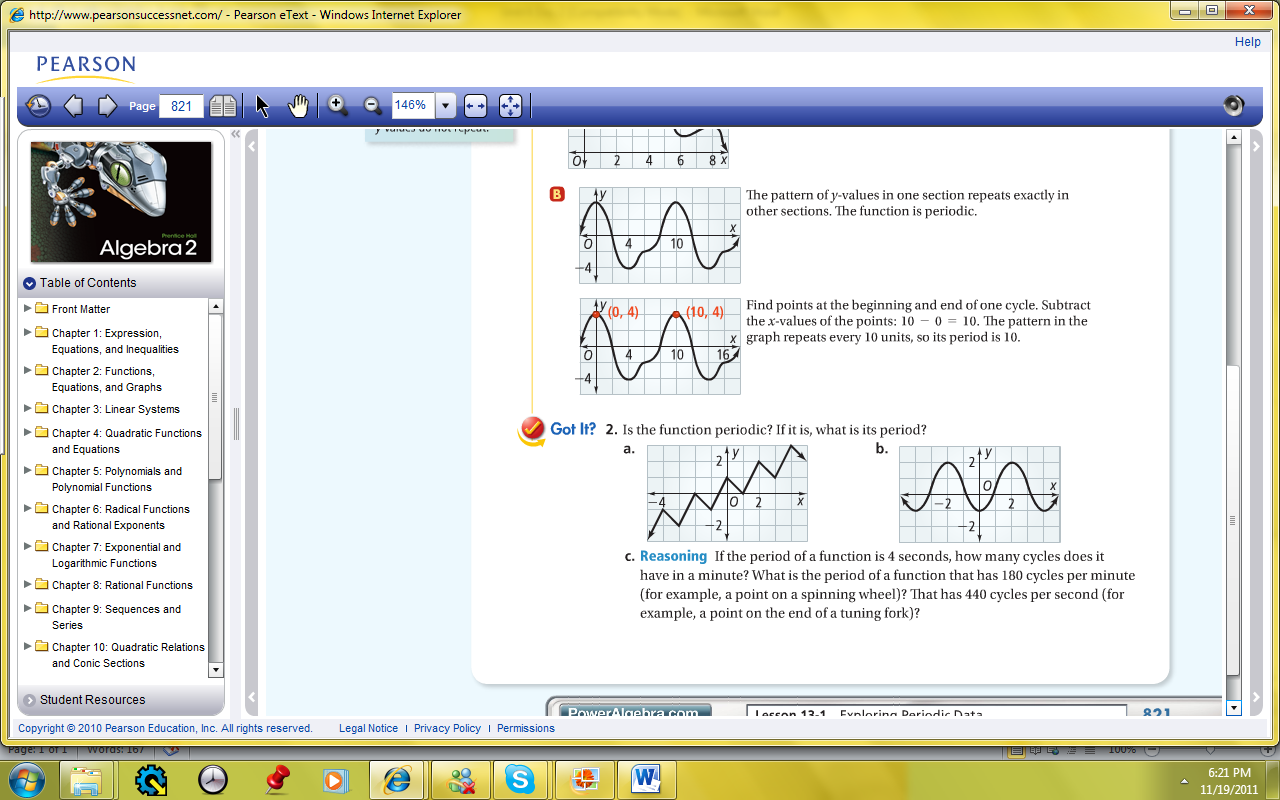
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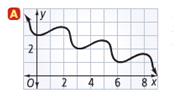
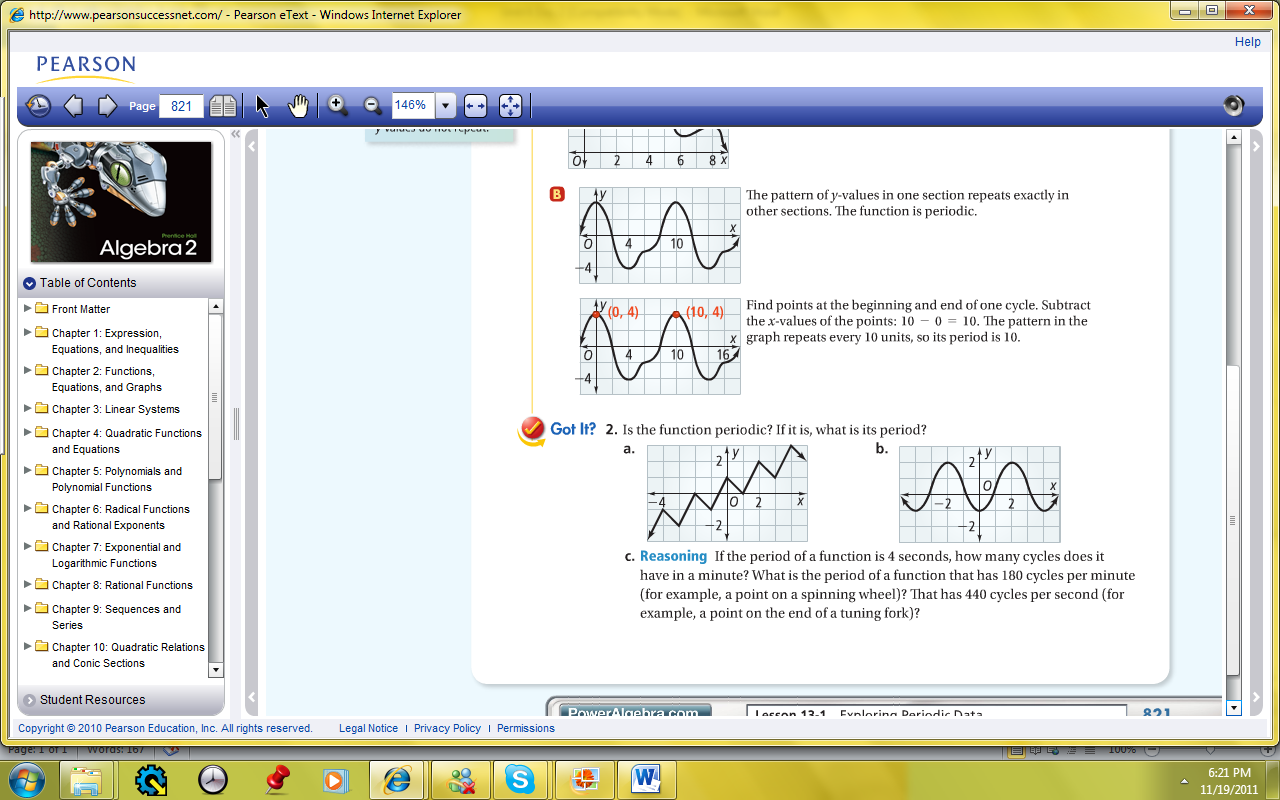
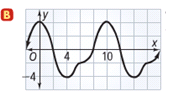
**Identifying Periodic Functions**

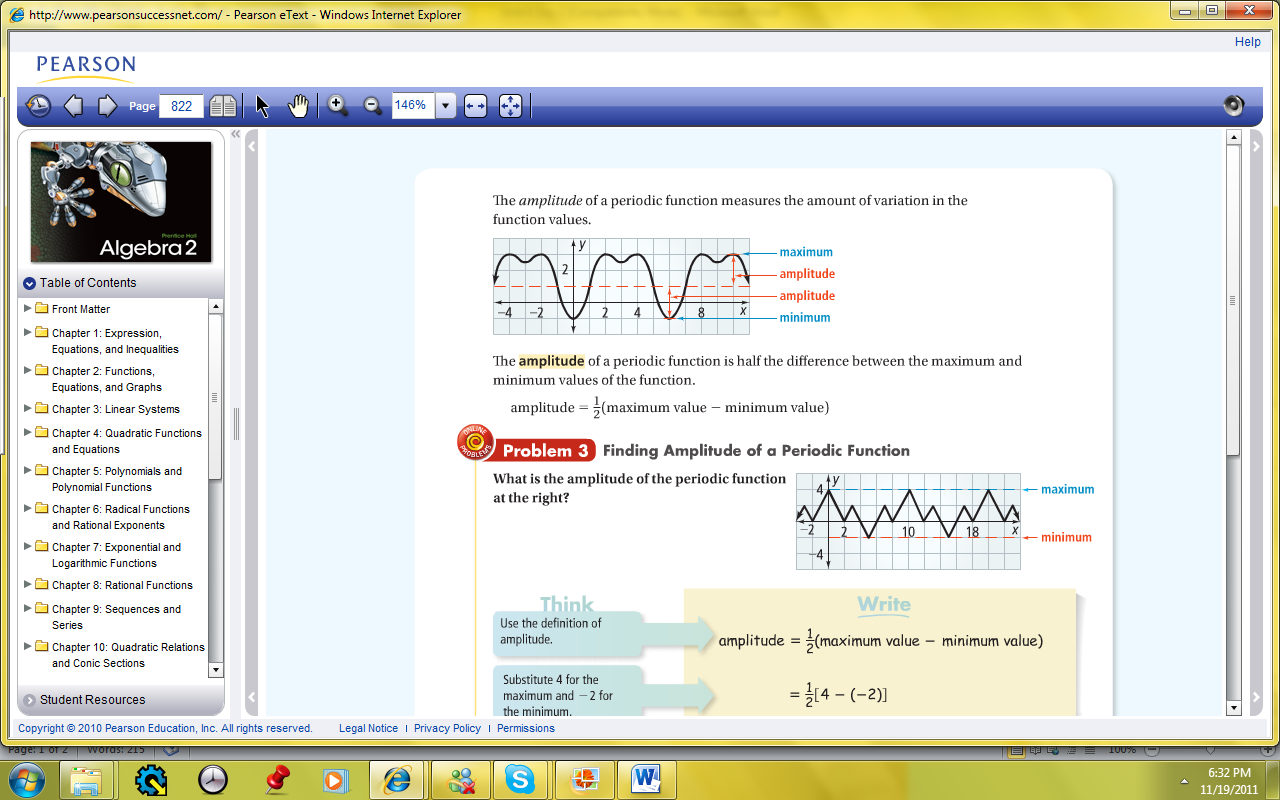
To determine if a function is periodic, analyze the functions graph to see if the y-values (or outputs) of the graph repeat.

**Example 2:** Is the function periodic? If it is, what is its period?

**You Try!** Is the function periodic? If is it, what is its period?



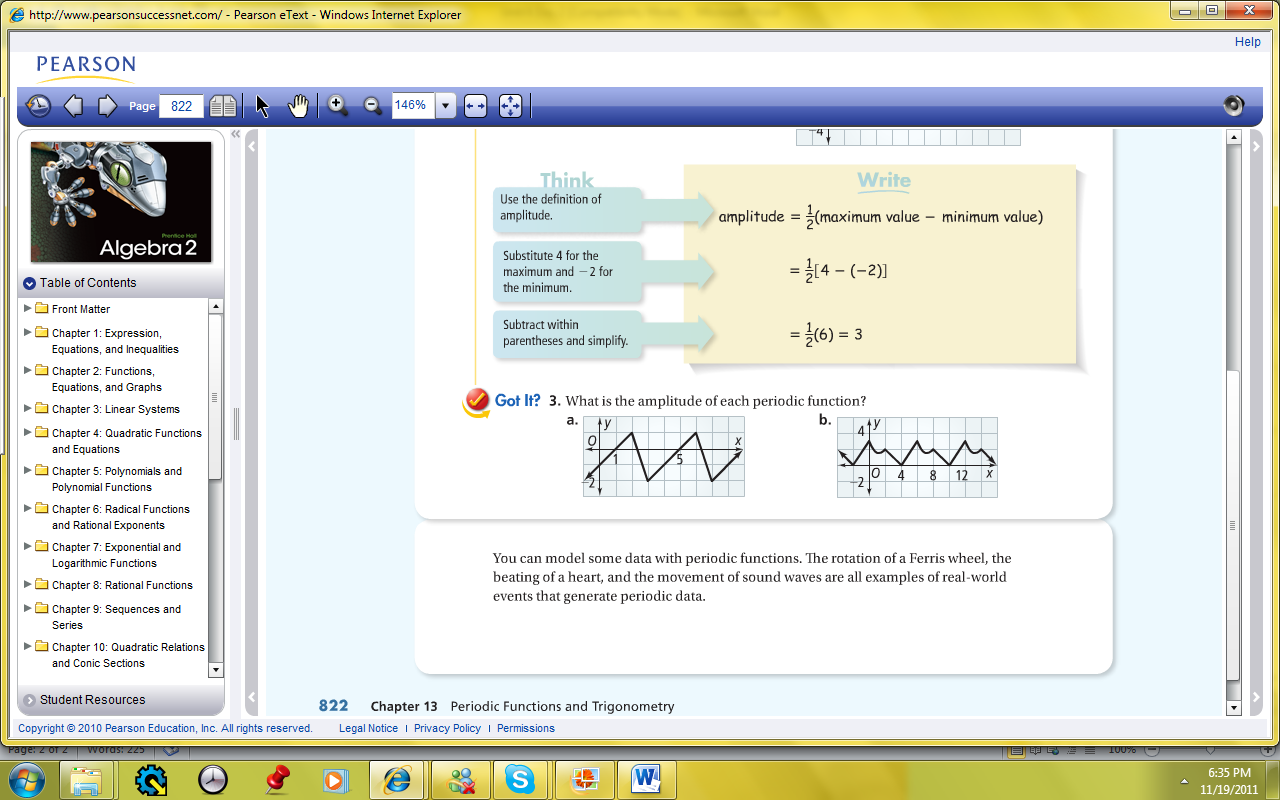
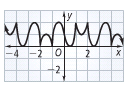
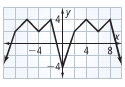


**Midline:** The line (y = ) that cuts the function in half horizontally.

**Amplitude:** The amplitude of a periodic function measures the amount of variation from the midline in the function values. The amplitude can be found by finding the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_between the maximum and minimum value and dividing it by 2.

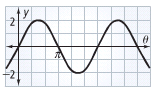
*Midline = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Amplitude= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**Example 3:** What is the amplitude and midline of the periodic functions below?

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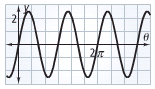
|  |  |  |
| --- | --- | --- |
|  | The Sine Function | The Cosine Function |
| Equation |  |  |
| Graph |  |  |
|

|  |
| --- |
| Key Ideas |
| \_\_\_\_\_\_ is the amplitude of the function |
| \_\_\_\_\_\_ is the number of cycles in the interval from \_\_\_\_\_\_\_\_\_\_\_\_\_  **b** = \_\_\_\_\_\_\_\_\_\_\_ |
| **Period** = \_\_\_\_\_\_\_\_\_\_\_ |

 **Example 4:** Find the period of the sine curve. Then write an equation for the function.

Period = Amplitude = a = b =

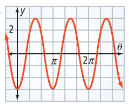
Equation:



**You Try!**  Find the period of the sine curve. Then write an equation for the function.

Period = Amplitude = a = b =

Equation:

**Example 5:** Find the period of the cosine curve. Then write an equation for the function.

Period = Amplitude = a = b =

Equation: