

Compositions Graphically

ID: 9990

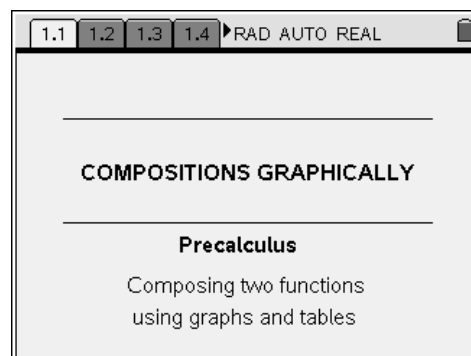
Name _____

Class _____

In this activity, you will explore:

- Finding compositions using graphs and tables.

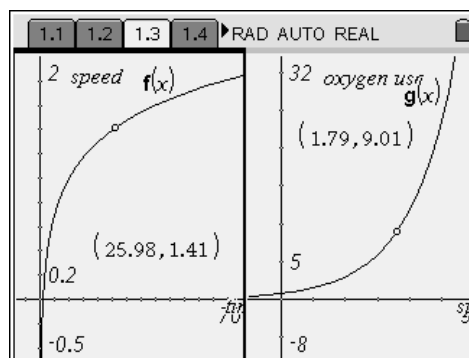
Open the file *PreCalcAct07_CompositionGraph_EN.tns* on your handheld and follow along with your teacher to work through the activity. Use this document as a reference and to record your answers.



Problem 1 – Swimming

The graphs on page 1.3 show the functions $f(x)$, which represents the speed (in m/s) of a swimmer versus time (s), and $g(x)$, which represents oxygen use (L/min) for the same swimmer versus speed (m/s).

Drag the points on the graph or change the coordinates to answer the questions.



- Using the graph of $f(x)$, what was the swimmer's speed at 10 seconds?
- Using the graph of $g(x)$, how much oxygen was the swimmer using at a speed of 1 m/s?
- At 10 seconds, how much oxygen was the swimmer using?
- At 45 seconds, how much oxygen was the swimmer using?
- At 12 seconds, how much oxygen was the swimmer using?
- If the swimmer is using 5 L/min of oxygen, how long has she been swimming?
- How long into the swim did it take the swimmer to use 9 L/min of oxygen?

Now try it with tables. Use the function tables on page 1.8 to answer these questions.

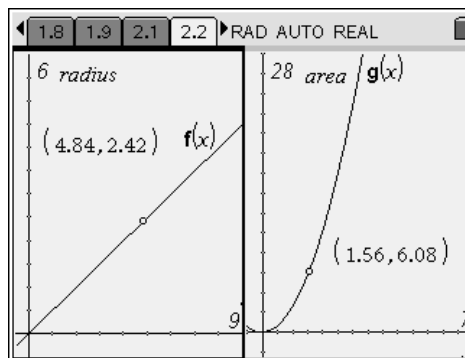
- A swimmer swimming for 32 seconds will use how much oxygen?
- A swimmer who is using 12 L/min of oxygen has been swimming for how long?
- In your own words, how would you describe a composition of two functions?

Problem 2 – An Oil Spill

Page 2.2 shows the graphs of $f(x)$ and $g(x)$.

The graph of $f(x)$ shows the radius (feet) of an oil spill over time (s). The graph of $g(x)$ shows the area (square feet) of the oil spill based on the radius (feet).

Use the graph to answer the questions below.
Note how these compositions are also given in function notation.



- What is the area of the oil spill after 3 seconds?
The way to represent this algebraically is $g(f(3))$.
- What is the area of the oil spill after 5.2 seconds—i.e., what is $g(f(5.2))$?
- How long did it take for the oil spill to have an area of 2.5 square feet?
This can be represented algebraically as $g(f(x))=2.5$.
- Find x if $g(f(x))=25$. Write what this means in words.

Problem 3 – Additional Practice

Page 3.2 displays a graph for $f(x)$ and a table for $g(x)$.
Find the compositions below using the graph and table.

- $g(f(-2)) = \underline{\hspace{2cm}}$
- $f(g(5)) = \underline{\hspace{2cm}}$
- $g(f(x)) = -10, \quad x = \underline{\hspace{2cm}}$
- $f(g(x)) = 3, \quad x = \underline{\hspace{2cm}}$

A Challenge!

- Can you find an algebraic expression for $f(g(x))$?

- How about $g(f(x))$?