Warm Up 9/8

Let $f(x) = 2x^2 + 4x - 1$. Evaluate $f(a)$, $f(a+h)$, $f = \frac{f(a+h)-f(a)}{h}$

$f(a) = 2a^2+4a-1$

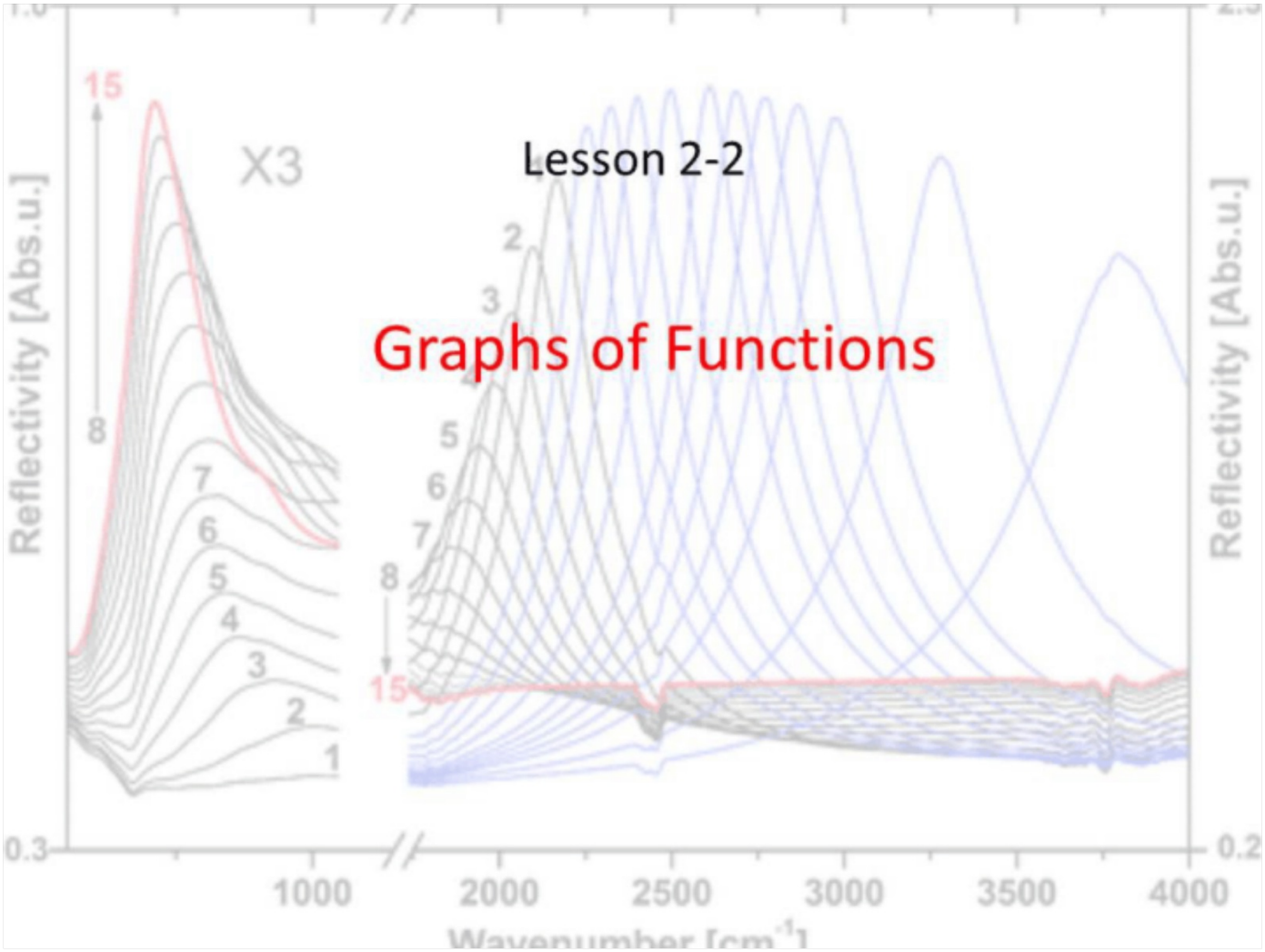
$f(a+h) = 2(a+h)^2+4(a+h)-1$

$= 2(a^2+2ah+h^2)+4a+4h-1$

$\frac{f(a+h)-f(a)}{h} = \frac{2a^2+4ah+2h^2+4a+4h-1-(2a^2+4a-1)}{h}$

$= \frac{4ah+2h^2+4h}{h} = \frac{h(4a+2h+4)}{h}$

$4a+2h+4$


Lesson 2-2
Graphs of Functions
X3
15
8
7
6
5
4
3
2
1
2
3
5
6
7
8
15
Reflectivity [Abs.u.]
Reflectivity [Abs.u.]
0.3
0.2
1000
2000
2500
3000
3500
4000
Wavenumber [cm-1]

Objective

Students will...

- Be able to sketch the graph of the Greatest Integer Function (Step Function).
- Be able to solve word problems involving a step function.
- Be able to use graphing device to graph functions.

Greatest Integer

The greatest integer simply means the greatest integer within a range of numbers. ~~The key here is that the negative signs almost have no effect. You can also think of it as the greatest absolute value.~~

Ex. Find the greatest integer.

Between -6 and -5: -5

Between -1 and 0: 0

Between 0 and 1: 1

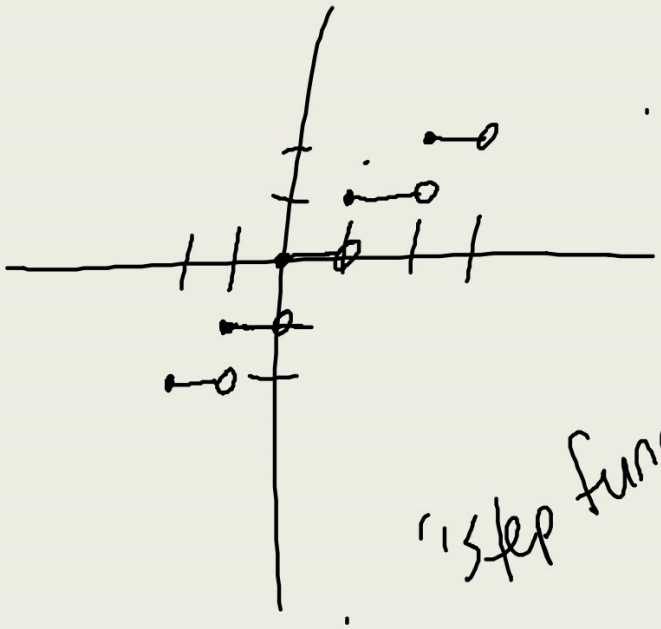
Between 4 and 5: 5

The Greatest Integer Function

That being said, there is a function involving the greatest integer and it is known as **The Greatest Integer Function**: $f(x) = [\![x]\!]$.

ex.

$[[x]]$	$f(x)$
$-2 \le x < -1$	-2
$-1 \le x < 0$	-1
$0 \le x < 1$	0
$1 \le x < 2$	1
$2 \le x < 3$	2

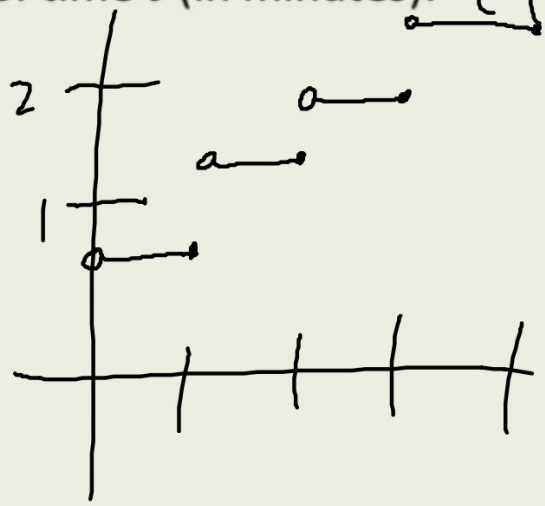


"step function"!

Application of the Greatest Integer Function

The cost of a long-distance daytime phone call from Toronto to Mumbai, India, is 69 cents for the first minute and 58 cents for each additional minute (or part of a minute). Draw the graph of the cost C (in dollars) of the phone call as a function of time t (in minutes).

t	$C(t)$
$0 < t \leq 1$	0.69
$1 < t \leq 2$	1.27
$2 < t \leq 3$	1.85
$3 < t \leq 4$	2.43



Using Graphing Device

Graph the function $f(x) = x^n$ for $n = 2, 4$, and 6 in the viewing rectangle $[-2, 2]$ by $[-1, 3]$.

Using Graphing Device

Graph the function $f(x) = x^n$ for $n = 1, 3$, and 5 in the viewing rectangle $[-2, 2]$ by $[-2, 2]$.

Piecewise Function using a Graphing Device

Draw the graph of the piecewise function using a graphing device.

$$f(x) = \begin{cases} x^2 & \text{if } x \leq 1 \\ 2x + 1 & \text{if } x > 1 \end{cases}$$

Example

For the following function, use a graphing device to sketch its graph, and find its domain and range: $f(x) = -\sqrt{25 - x^2}$

Homework 9/8

TB pg. 167-169 #27, 31, 35