

Panel 1

Math 1501: Last time

Details: grading, web site, Dyknow ✓
<http://pirate.shu.edu/~wachsmut/>

Functions, domain, range

~~rem~~ → $f(x) = \frac{1}{x^2 - 4}$, $\mathcal{D} = \{-\infty < x < -2\} \cup \{-2 < x < 2\} \cup \{2 < x < \infty\}$

~~chick~~ Graphs, vertical line test $\mathcal{R} = \mathbb{R} - \{-2, 2\}$

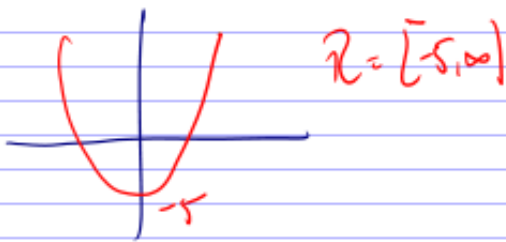
Piecewise defined function $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

Function review: all #'s sum to 2 ✓

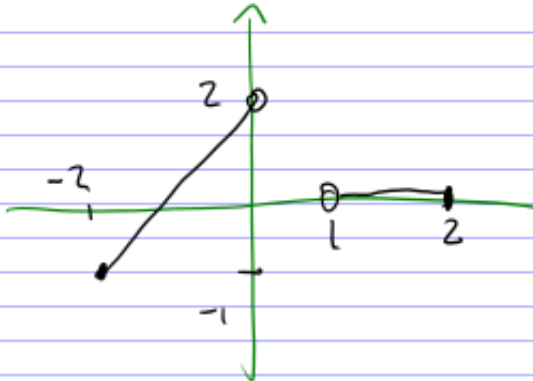
1

Panel 2

$f(x) = x^2 - 5$



$\mathcal{R} = [-5, \infty)$



$\mathcal{D} = [-2, 0) \cup (1, 2]$

$\mathcal{R} = [-1, 2]$

2

Panel 3

Quiz #1:

Name: _____

① What is the domain of the function $f(x) = \frac{3}{x^2 - 2x}$

② If $f(x) = 2x^2 + 1$, find

a) $f(-1)$

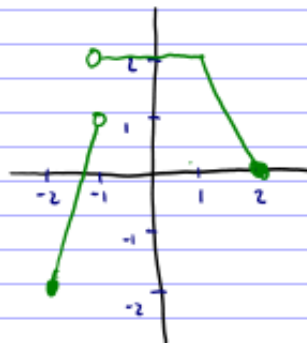
b) $f(2) = 8 + 1$

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Panel 4

Quiz #1 - part 2 -

③ Consider the graphs below. Cross out the one that is not a function. For the others, list domain and range.



Domain:

Range:

4

Panel 5

Shifting and Sketching

Suppose you know graph of $f(x)$:

$f(x)+c$: shifts graph up/down by c

$f(x+c)$: shifts graph left ($c>0$) or right ($c<0$)

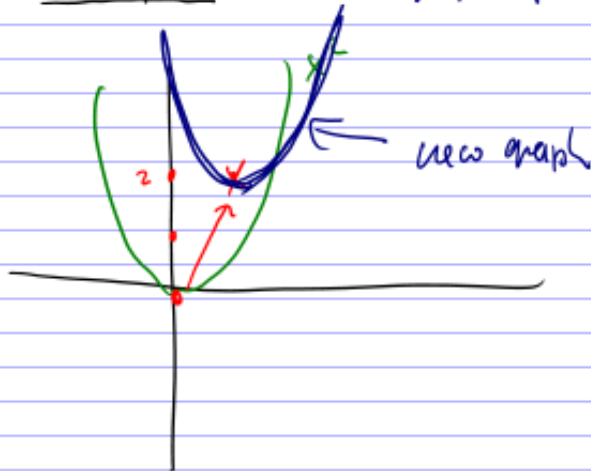
$c f(x)$: expands y ($c>1$), compresss ($c<1$) y .
 $c < 0 \rightarrow$ flips around x -axis

$f(cx)$: expands x ($c<1$), compresss x ($c>1$)
 $c < 0 \rightarrow$ flips around y -axis

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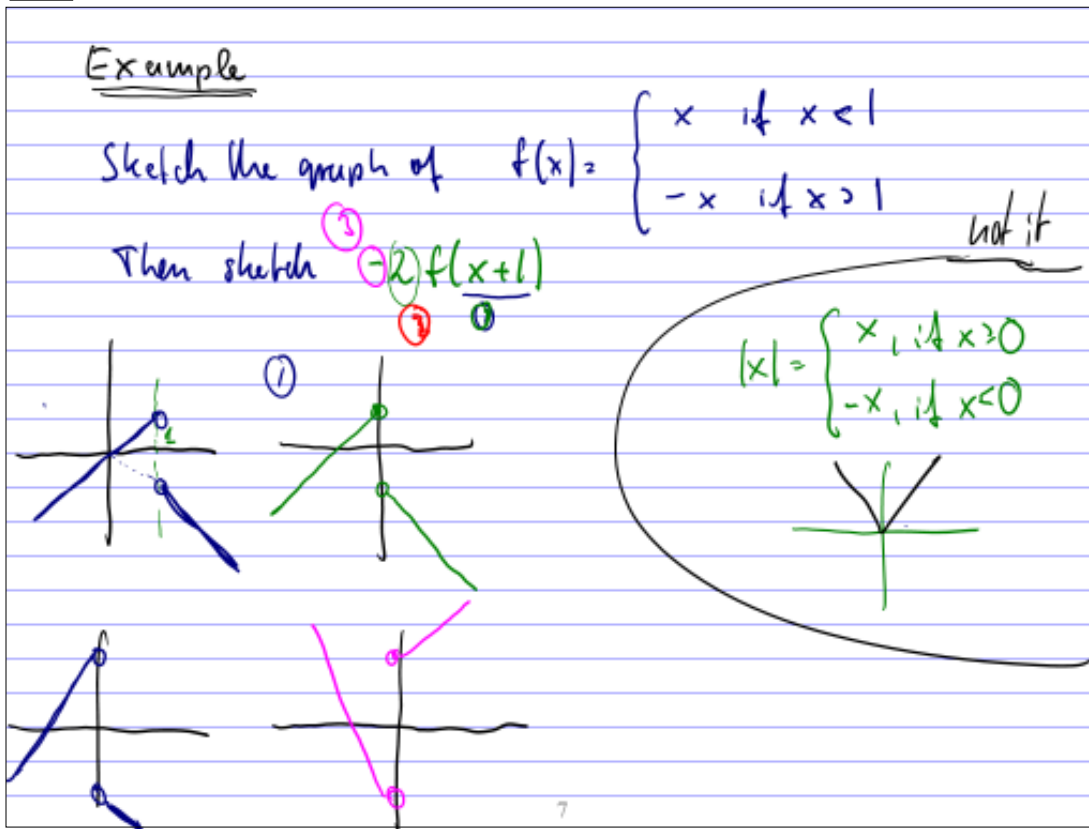
Panel 6

Example Sketch graph of $f(x) = (x-1)^2 + 2$

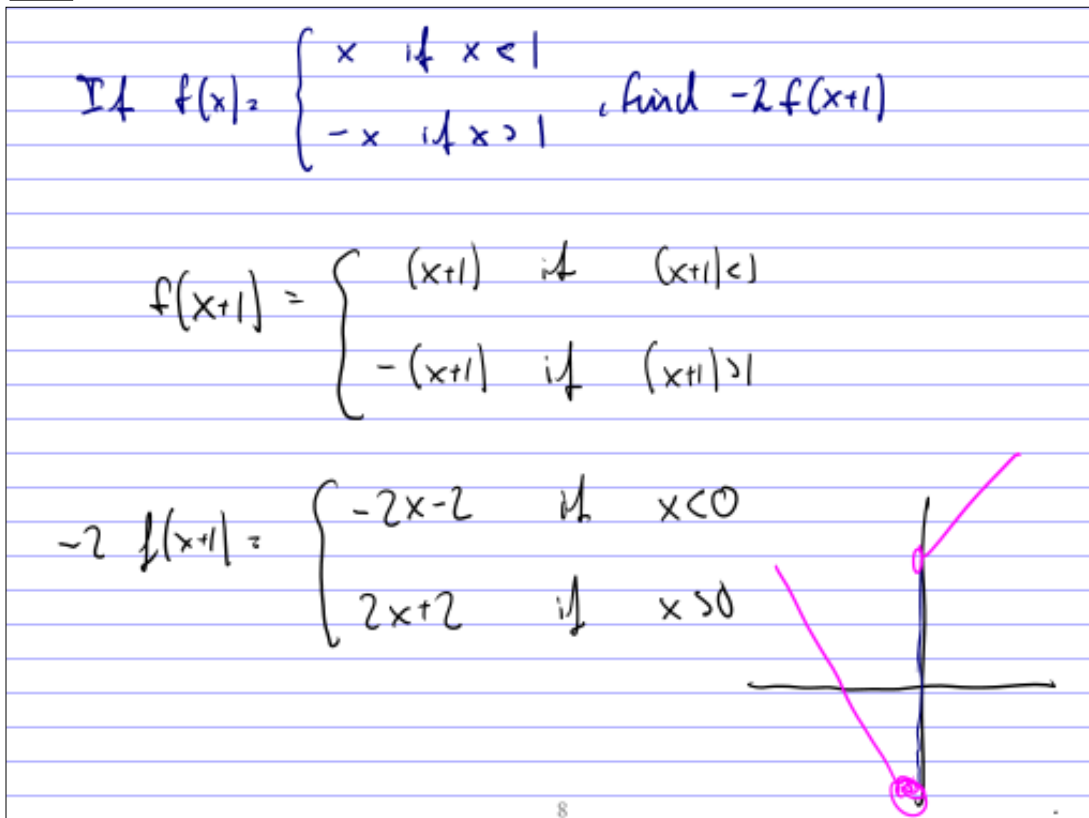


6

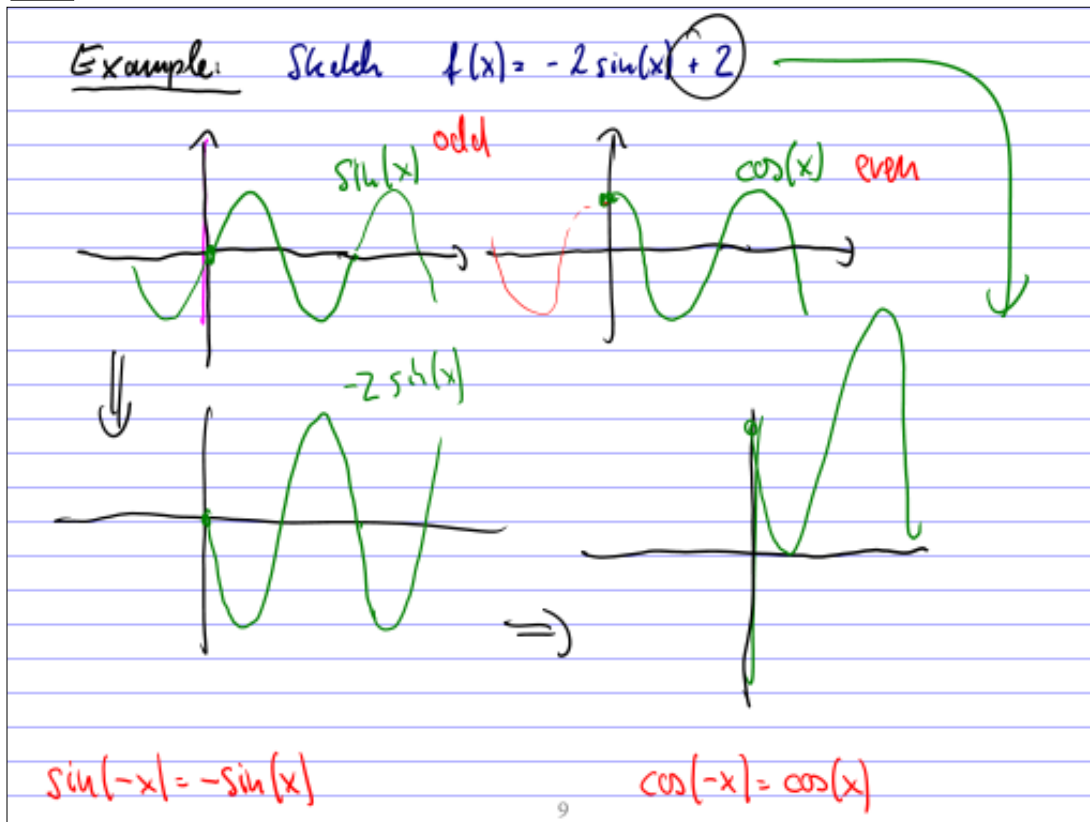
Panel 7



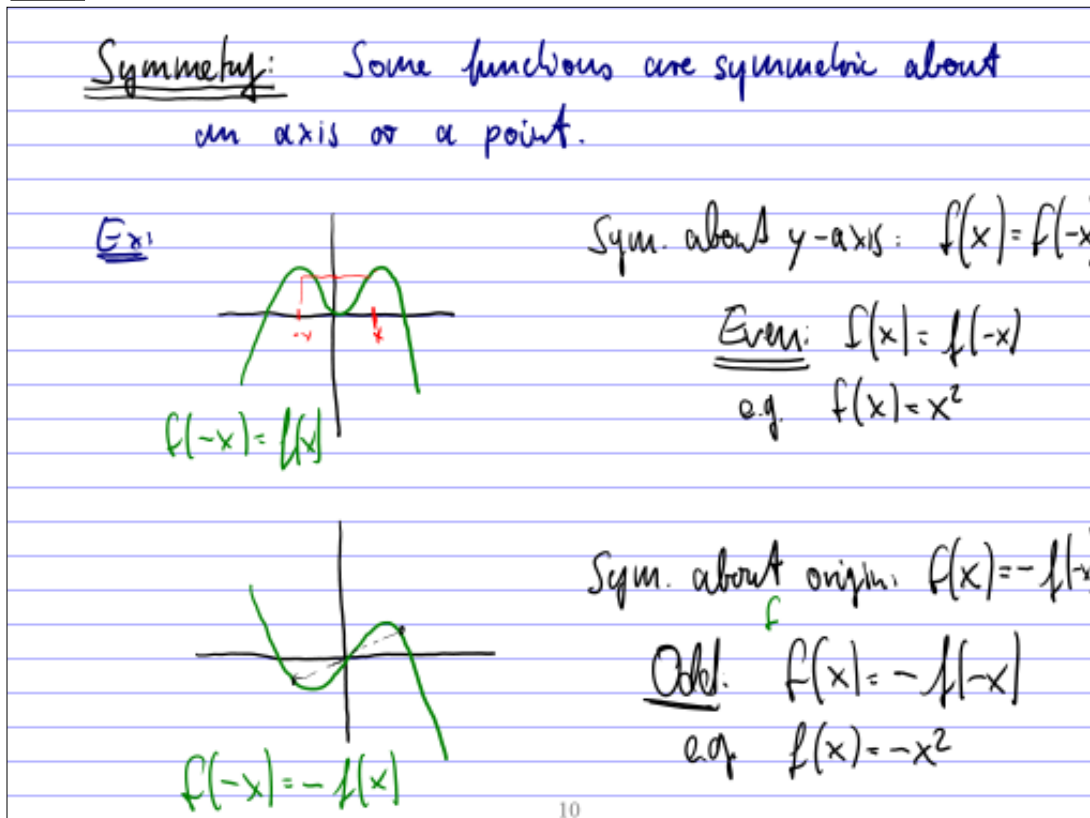
Panel 8



Panel 9



Panel 10



Panel 11

Ex: Which of the following functions are

(a) even (b) odd (c) neither

$$\textcircled{1} f(x) = x^3 - 2x \quad \Rightarrow \quad f(-x) = (-x)^3 - 2(-x) = -x^3 + 2x = -(x^3 - 2x) = -f(x)$$

$$\textcircled{2} g(x) = 2x^4 + x^2 - 1 \quad \Rightarrow \quad -f(x) \quad \text{odd}$$

$$g(-x) = 2(-x)^4 + (-x)^2 - 1 = 2x^4 + x^2 - 1 = g(x) \quad \Rightarrow \quad \underline{\text{even}}$$

$$\textcircled{3} h(x) = \tan(x)$$

$$h(-x) = \tan(-x) = \frac{\sin(-x)}{\cos(-x)} = \frac{-\sin(x)}{\cos(x)} = -\tan(x) = -h(x)$$

$$\textcircled{4} k(x) = x^3 e^{-x^2} \quad \underline{\text{odd}}$$

$$k(-x) = (-x)^3 e^{-(-x)^2} = -x^3 e^{-x^2} = -k(x) \quad \underline{\text{odd}}$$

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Panel 12

We now have a basic understanding of
basic functions.

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Panel 13

$$f(x) = x^6 - 7x^4 + 4x^2 + 1 \quad f(-x) = f(x), \text{ even}$$

$$g(x) = x^6 - 7x^4 + 4x^3 + 1, \quad g(-x) = x^6 - 7x^4 - 4x^3 + 1 \\ \text{neither} \quad -(-x^6 + 7x^4 + 4x^3 + 1)$$

$$k(x) = x^7 - 8x^5 + 9x^2 \quad \text{neither}$$

$$h(x) = x^3 + |x| \quad \text{neither}$$

$$j(x) = x^6 - 7x^0 \quad \text{even}$$