

Recommended Study Method

Do lots and lots of odd number problems in the book within sections 1.1 – 1.4. If you run into problem, ask (me or a friend)! Redo various worksheet problems from 1st week of class.

Reading this document should only be a small portion of your study time.

Chapter 1 Review Guide

Function Notation

- Relations – ordered pair with an input and an output; a relationship between 2 sets of number
- Function – a special type of relation where an input only has **one** output
 - Vertical Line Test – if any vertical line on a graph intersects more than 1 point, then not a function
 - Function Notation – Ex. $f(x) = x^2 + 2x$
- Function Composition
 - $f \circ g(x) = f(g(x))$
 - Ex. $g(x) = x + 2$ and $f(x) = x^2 + 2x$
 $f(g(x)) = (x + 2)^2 + 2(x + 2) = (\text{simplify...})$



← think as $f(\square) = \square^2 + 2\square$

$$f(x) = \frac{1}{(5-x)} + x^2 - x$$

$$g(x) = x + 2$$

Find $f \circ g(x)$

Find $g(f(x))$

Interval Notation

Used to specify domain and range of a function.

- Ex. $[0, 10)$ – means all number from 0 to 10, including 0, not including 10
- Convention
 - [smaller number, bigger number]
 - Infinity always with “)” or “(“
 - Ex. $(-\infty, -3] \cup (10, \infty)$

Graph $f(x) = |x - 3| + 2$

What is the domain and range using interval notation?

Domain/Range

- Domain – set of all inputs (x's) of relation
 - Consider all x-coordinate of points in a graph
- Range – set of all output (y's) of relation
 - Consider all y-coordinate of points in a graph

Parent Functions

- Constant Function – $f(x) = c$
- Linear Function – $f(x) = x$
- Absolute Value Function – $f(x) = |x|$

Graph $f(x) = |x - 3| + 2$

- Translate $f(x)$ up by 5
- Reflect $f(x)$ over the y-axis
- Reflect $f(x)$ over the x-axis and then translate down by 3
- Horizontally stretch $f(x)$ by 3 and then translate to the right by 2

Transformations

	Vertical	Horizontal
Translation k>0: up h>0: right	$f(x) + k$ $(x,y) \rightarrow (x,y+k)$	$f(x - h)$ $(x,y) \rightarrow (x+h,y)$
Reflection x-axis: vertical y-axis: horizontal	$-f(x)$ $(x,y) \rightarrow (x,-y)$	$f(-x)$ $(x,y) \rightarrow (-x,y)$
Stretch / Shrink (a>1) (a<1)	$af(x)$ $(x,y) \rightarrow (x,ay)$	$f\left(\frac{1}{a}x\right)$ $(x,y) \rightarrow (ax,y)$

- Translation/Reflections: Rigid transformation (pre/post graphs are “congruent”)

Line Equations

- Slope: $m = \Delta x / \Delta y \leftarrow$ Rate of change
 - Example: Given a graph with x-axis of distance and y-axis of cost, explain the meaning of the slope of the graph
- Equations Forms

	Equation	Example
Slope Intercept Form	$y = mx + b$	$y = 2x + 5$ slope 2 and y-intercept at (0,5)
Point Slope Form	$(y - y_1) = m(x - x_1)$	$(y - 3) = -2(x + 4)$ slope of -2 going through point (-4, 3)

- Example: Given points (2, 5) and (-3, 12), write the equation of the line through them in both slope intercept form and point slope form. What is x when $y = -20$?
- Modeling
 - Linear Regression: method to calculate line of best fit between data
 - Know how to use calculator to generate $y=mx+b$ for set of data
 - See bit.ly/TI84_Intro
 - Correlation value r:
 - -1: strong negative slope correlation
 - 0: no correlation
 - 1: strong positive slope correlation

Press STAT.

```

2:0:0: CALC TESTS
1:1:Edit
2:SortA(
3:SortD(
4:ClrList
5:SetUpEditor
  
```

```

EDIT CALC TESTS
1:1-Var Stats
2:2-Var Stats
3:Med-Med
4:LinReg(ax+b)
5:QuadReg
6:CubicReg
7:QuartReg
  
```

Press STAT and highlight the CALC column.

System of Linear Equations

- Solution to system of equations: the common intersection between all graphs
- Solving 3x3 (i.e. 3 equation, 3 variable) linear equation
 - Strategy: Remove 1 variable to reduce a 2x2 system
 - Solve by elimination - Make coefficient of variable term opposite and then add both equations
 - Solve by substitution - Solve for a variable, then substitute this variable in other equations
- Special cases
 - $0=0$ infinite solutions
 - In case of 3x3, express the solution space where all three planes intersect [ex. $(x, 3-x, 2)$]
 - $0=1$ no solutions