

Chapter 1 (and some of 2) Semester Final Test Guide

Final test structure:

- 34(ish) multiple choice and 4 free response questions.

Transformations:

- The final has *A LOT* of these problems! Almost 25% of the problems on the multiple-choice section are related to transformations and parent functions.
- You will have to transform linear, absolute value and quadratic functions
- Remember, take it one step at a time, apply one transformation at a time in order.
- You really had a hard time with the algebra of these, especially horizontal stretches/scales. Here you are multiplying by a factor **inside** the parenthesis, in other words, you are substituting an expression for x . Make sure you review these problems!
- Review the slides/lessons/homework problems from sections 1.1, 1.2a, 1.2b, and 2.1b.
- If you need review of absolute value functions, see slides from Wed 9/15.

Transformation	Function notation	Description
Reflection over the x-axis	$g(x) = -f(x)$	<ul style="list-style-type: none"> • Negating all the y values, the entire function • Negative outside the parenthesis
Reflection around the y-axis	$g(x) = f(-x)$	<ul style="list-style-type: none"> • Negating the x values • Negative inside the parenthesis
Horizontal translation by h	$g(x) = f(x - h)$	<ul style="list-style-type: none"> • Horizontal = sideways \rightarrow along the x-axis, change x values • Add/subtract inside the parenthesis • Subtracting moves right • Adding moves left
Vertical translation by k	$g(x) = f(x) + k$	<ul style="list-style-type: none"> • Vertical = up/down \rightarrow along the y-axis, change y values • Add/subtract outside the parenthesis • Adding moves up • Subtracting moves down
Vertical stretch/scale by a factor of a	$g(x) = af(x)$	<ul style="list-style-type: none"> • Vertical = up/down \rightarrow along the y-axis, change y values • Multiply outside the parenthesis (the entire function) • An a value greater than zero stretches (pulls up) • An a value less than zero shrinks (pulls down)
Horizontal stretch/scale by a factor of a	$g(x) = f\left(\frac{1}{a}x\right)$	<ul style="list-style-type: none"> • Horizontal = sideways \rightarrow along the x-axis, change x values • Multiply inside the parenthesis. • REMEMBER for horizontal stretch/scale invert the factor • Multiply inside the parenthesis by $\frac{1}{a}$

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Solving systems of equations:

- 3(ish) of these with 2 equations and 2 variables.
- 1(ish) of these with 3 equations and 3 variables.
- Review the slides/lesson/homework problems from Thur 9/16 for systems of 2 equations.
- Review the slides/lesson/homework problems from Mon 9/20 for systems of 3 equations.
- Generally, you can pick your method to solve these, however one problem does tell you to use a particular method – make sure you use the proscribed method!

Method	Description
Substitution	Use when it is easy to solve one of the equations for a variable. Then substitute the equivalent expression for the variable in the other equation of the system.
Elimination	Add the two equations together to cancel out (eliminate) one of the variables. May need to multiply one (or both) by a constant to make it so one of the variables disappears when added.

- There are three possible outcomes when you solve a system of equations:

Outcome	Graph related explanation	Algebra related explanation
Exactly one solution	The lines (2 equations) or planes (3 equations) intersect in a single point.	You come up with values for x , y (& z if <i>system of 3 equations</i>)
Infinitely many solutions	...intersect in a line.	You end up with a valid identity $0 = 0$
No solution	...do not intersect at all.	You end up with an invalid identity such as $7 = 0$