Math 130 - Test #2 Study Guide

Fall 2011, David Beydler

Test #2

- Date: Wednesday, October 26, 2011
- Will cover sections 2.7, 2.8, and 3.1-3.6
- Same as quizzes – no calculators (this includes cell phones), notes, or books.
- Don't forget that the **second batch of homework is due at the test**! This includes all of the sections that the test covers: 2.7, 2.8, and 3.1-3.6

Here are <u>some</u> of the basic formulas, equations, and concepts you'll want to know:

- Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- (2.6, 2.7, 3.5) Basic functions: $f(x) = x, \; x^2, \; x^3, \; \sqrt{x}, \; \sqrt[3]{x}, \; |x|, \; [\![x]\!], \; \frac{1}{x}, \; \frac{1}{x^2}$
- (2.7) $f(x) + c$ translates up
  $f(x) - c$ translates down
  $f(x - c)$ translates right
  $f(x + c)$ translates left
  $cf(x)$ stretches vertically (if $c > 1$), or shrinks vertically (if $0 < c < 1$)
  $f(cx)$ stretches horizontally (if $0 < c < 1$), or shrink horizontally (if $c > 1$)
  $-f(x)$ reflects about x-axis
  $f(-x)$ reflects about y-axis
- (2.7) Symmetric about y-axis if replacing x with $-x$ doesn't change the equation.
  Symmetric about x-axis if replacing y with $-y$ doesn't change the equation.
- (2.7) $f(x)$ is even if $f(-x) = f(x)$
  $f(x)$ is odd if $f(-x) = -f(x)$
- (2.8) $(f \pm g)(x) = f(x) \pm g(x)$
  $(fg)(x) = f(x)g(x)$
  $\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$ for $g(x) \neq 0$
  $(g \circ f)(x) = g(f(x))$
- (3.1) How to write quadratic function in form $y = a(x - h)^2 + k$
- (3.1) Vertex formula: $-\frac{b}{2a}$
- (3.2) How to do synthetic division
- (3.2) Remainder Theorem: If polynomial $f(x)$ divided by $x - k$, remainder is $f(k)$
- (3.3) Factor Theorem: $x - k$ is factor if and only if $f(k) = 0$

- (3.3) Rational Zeros Theorem: Rational zeros are always a factor of constant term over a factor of leading coefficient.
- (3.3) Conjugate Zeros Theorem: Complex zeros come in conjugate pairs ($a + bi$, $a - bi$).
- (3.3) Descartes' Rule of Signs:

  \# of positive real zeros is either the \# of variations in sign of f(x), or is less than that by an even \#

  \# of negative real zeros is either the \# of variations in sign of f(-x), or is less than that by an even \#
- (3.4) How multiplicity of zero affects behavior at x-intercept
- (3.4) End behavior of polynomial function
- (3.4, 3.5) How to graph polynomial and rational functions
- (3.4) How to find asymptotes of rational functions
- (3.6) Direct, inverse, joint variation problems
- In general, how to find domain and range of various functions

Extra Credit!

- If you write up the answers to all of the review exercises listed below, and hand them in at the test, you can earn up to 1% extra credit towards your overall grade (depending on neatness and completeness)!
- Review exercises:
  - Chapter 2: p.292 #71-75 odd, 81, 87-95 odd, 99, 101-107 odd, 111-119 odd
  - Chapter 3: p.393 #1, 3, 9, 17-35 odd, 40, 41-45 odd, 53-63 odd, 71-75 odd, 78, 85-91 odd

How to Study

- To study, I'd recommend doing the following in order:
  - Homework (since you'll get credit for this)
  - Review Problems (since you'll get extra credit)
  - Study quizzes
  - Study lecture notes
- That said, while working on the homework and review problems, you might want to refer to the lecture notes and/or book if you get stuck somewhere.
- Finally, please visit my office hours if you need help. If you can't make it to my office hours, then feel free to e-mail me with any questions. For reference, here are my office hours and e-mail address:
  - Location: 61-1626 (Building 61, Room 1626)
  - Mon 1-4pm
  - Tues 4:30-5:30pm
  - Wed 3-4pm
  - Thurs 12-1pm
  - E-mail address: dbeydler@mtsac.edu