MATH 143 – Review Sheet for Test #2 – 10/26/05

Last update: Tue Oct 25 17:36:00 MDT 2005

1. This list is now in final final form.

2. Test #2 is

   Wednesday
   10/26/05

3. There will be a with-calculator part of this exam. So have some batteries in your calculator. And bring it to the test.

4. The test will cover the material of Assignments #15 – #29 roughly.

5. Be sure you can

   (a) Do function substitutions correctly:

      (i) The assignment-#18 answer key is posted.
      (ii) On the old, 12/18/02, final exam: problems 7 and 9.
      (iii) On assignment #18 we had $NQ, TI, SYM,$ and $ANT$. Now we have $QQ$:

            \[ QQ = \frac{f(x + 2h) - f(x - 3h)}{5h}. \]

      If you compute and simplify $QQ$ for the function

            \[ f(x) = 5 - 3x - 2x^2, \]

      it simplifies to $-3 - 4x + 2h$.

   (b) Draw graphs at least 25 times as big as your routine capital letters.

   (c) Distinguish the equation-graph pairs, page 164, line, circle, and parabola problems

   (d) Recognize that an equation has a circle graph (or that it doesn’t), and then draw the graph of the equation labeled with salient features:

      (i) center
      (ii) radius
      (iii) intercepts

      These labels need to be right up on their subjects.

   (e) Ungraph. That is, suss out the equation of a given graph:
(i) Problem 79, page 103
(ii) Problems 1 and 4 in the old test #1 for 9/27/02.

(f) Recognize the page-164 Friendly-Faces List which we enhanced with the upper half of a circle

(g) The section-2.5 moves:
   (i) Problem 9 in the old test #1 for 9/27/02.
   (ii) Shifts horizontally and vertically
   (iii) Stretch/Squeeze
   (iv) Reflections through coordinate axes ($y = \sqrt{4 - x}$ is the reflection of $y = \sqrt{x}$ over the vertical line $x = 2$, right?)

(h) Graphing and ungraphing straight lines.
   (i) Detecting straight-line formulas in stories about demand for a product, ticket prices, tree yields.
   (ii) Slope
   (iii) Forms: point-slope, slope-intercept
   (iv) The relation for the equation of $L_1$ to the equation $L_2$ for the cases:
      (A) $L_1$ is parallel to $L_2$
      (B) $L_1$ is perpendicular to $L_2$

(i) A max-min story problem is in the works.

(j) Be sure you know how the graphs of $f$ and $f^{-1}$ are related.

(k) Be able to do the algebra to compute an inverse of a function.

6 Some common errors, aka “howlers”:

(a) Not [this (click here)] kind of howler.

(b) On assignment #29, many students have done problem 30 using the notorious Square-Root Howler, use of the bogus equations:

\[ \sqrt{A + B} = \sqrt{A} + \sqrt{B} \quad \sqrt{A - B} = \sqrt{A} - \sqrt{B} \]

to do $\sqrt{4 - x^2} = \sqrt{4} - \sqrt{x^2} = 2 - \sqrt{x^2}$, which Mama Nature does not LIKE.
(c) Another corporate difficulty shows up when we try to do something like evaluating $-B$ when $B$ is a complicated expression. Here’s an example:

\[ A = (3x - y)^2 (2x + 3y)^2 \quad \text{and} \quad B = (3x - y)^2 (2x - 3y)^2 \]

yields \( A - B = 216x^3y - 144x^2y^2 + 24xy^3 \).

(d) If \( f(x) = \sqrt{9 - x^2} \) and \( g(x) = \sqrt{4 - x^2} \), then \((f \circ g)(x) = \sqrt{5 + x^2}\) and \((g \circ f)(x) = \sqrt{x^2 - 5}\).

7 Old, but still-live, business: be able to

(a) **PEMDAS**: Google gets you the Elko Public Schools, and a more-advanced Purplemath discussion. This is important for correctly directing computers (check problem 2, test #1), as well doing algebra correctly.

(b) Add algebraic fractions using the **Least Common Denominator**

(c) Parse a quadratic-in-\(x\)-and-\(y\) equation to see whether it’s a circle.

(d) Add algebraic fractions using the **Least Common Denominator**

(e) Decode **negative exponents** in expressions.

(f) Decode **fractional exponents** in expressions.

8 Purple-page end-of-chapter problems with all the answers BOB!

(A) For Chapter 1, page 133: problems 19, 20, 21

(B) For Chapter 2, page 244-245: all except problem 3.