Sample Exam I

MAT 1375 Fall 2017

NAME:

Part I. Absolute value equations. Solve. Be sure to check your solution(s).

1. $\{-1,\ 14/4\}$

2. $\{1,\ 7/3\}$

Part II. Absolute value inequalities. Solve the inequality and express your solution as an inequality, in interval notation and graphically on the number line.

1. $(4,\ 8)$ or $\{x \mid 4 < x < 8\}$ (or graphically)

2. $(-\infty, -11/20] \cup [-1/4, +\infty)$ or $\{x \mid x \leq -11/20 \text{ or } x \geq -1/4\}$ (or graphically)

Part III. Lines.

1. Find the slope and the y-intercept of the line whose equation is $4x + 3y = 5$.

   Slope $m = -4/3$ and y-intercept $(0\ ,\ 5/3)$.

2. Find the slope and the y-intercept of the line whose equation is $3x - 2y + 6 = 0$. Use this information to graph the equation.

   Slope $m = 3/2$ and y-intercept $(0, 3)$, now graph.

Part IV. Graphs. Use a maximum/minimum finder to determine the highest and lowest point on the graph in the given window.

$y = .07x^5 - .3x^3 + 1.5x^2 - 2$ in the window $(-3 \leq x \leq 2)$ and $(-6 \leq y \leq 6)$

Max: $(-2.46, 5.24)$ and Min: $(0.00000141, -2)$

Part V. Solving equations graphically.

1. Use graphical approximation (a root finder or an intersection finder) to find a solution of the equation $x^5 + 5 = 3x^4 + x$ on the interval $(2, \infty)$.

   $(3, 0)$

2. Use graphical approximation (a root finder or an intersection finder) to find a solution of the equation $6x^3 - 5x^2 + 3x - 2 = 0$.

   $(.76, 0)$

Part VI. Functions.

1. Determine whether the equation defines y as a function of x or defines x as a function of y.
   $$y = 3x^2 - 12$$
   y as a function of x only.

2. $f(x) = \dfrac{x-3}{x^2+4}$. Find a) $f(-1)$ b) $f(0)$ c) $f(2)$

   a) $f(-1) = -0.8$ b) $f(0) = -0.75$ c) $f(2) = -0.125$

3. Assume $h \neq 0$. Compute and simplify the difference quotient $\dfrac{f(x+h) - f(x)}{h}$ for $f(x) = x - x^2$.

   $1 - 2x - h$

4. What is the natural domain of the function $g(u) = \dfrac{u^2+1}{u^2 - u - 6}$?

   $\mathbb{R} - \{-2, 3\}$ or $(-\infty, -2) \cup (-2, 3) \cup (3, +\infty)$