Exam 1 # TMath 120 Autumn 2015

NAME:

1. TRUE/FALSE: Circle T in each of the following cases if the statement is *always* true. Otherwise, circle F. Let f be a function, and x, y, and z be real numbers with $z \neq 0$.

   T F $\frac{2}{a} + \frac{1}{a+1} = \frac{2+1}{a+1} + \frac{1}{a+1} = \frac{4}{a+1}$

   T F $f(x+1) = f(x) + 1$

   T F $(x+3)^2 = x^2 + 9$

   T F $\sqrt{-1} = i$

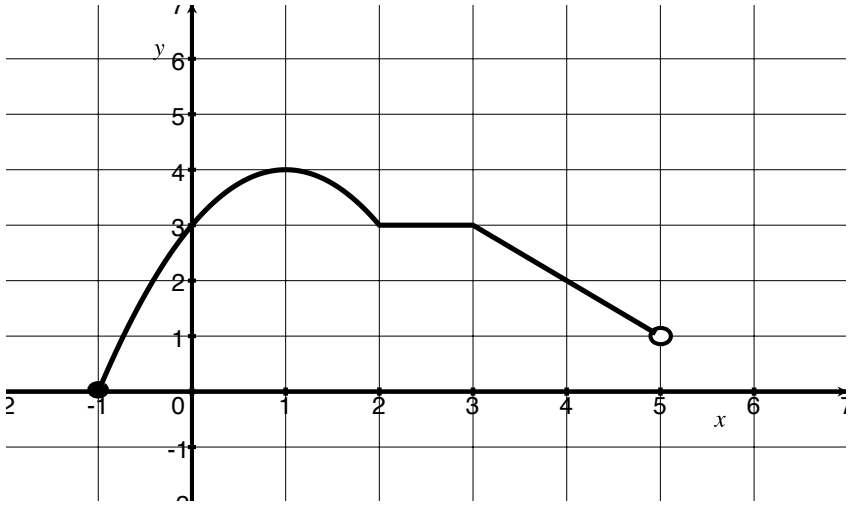
   T F $(2+3i)(1-i) = 2*1 + 3*(-1)i = 2 - 3i$

   T F A fifth degree polynomial always has five complex roots.

   Show your work for the following problems. The correct answer with no supporting work will receive NO credit (this includes multiple choice questions).

2. [4] (Practice Exam #2) Find any real or imaginary x such that $\dfrac{3}{x+1} - \dfrac{x}{x+1} = \dfrac{4}{x}$.

3. Let f be the function comprised of two lines and a parabola that has only been shifted (not vertically stretched) and whose graph is below:



(a) [4] (PracticeExam1 #3) Estimate the following *if* possible:

i. $f(4)$

ii. $\dfrac{6}{f(0)} + 3$

iii. $(f \circ f)(-1)$

(b) [3] (§1.5 #18) Draw the graph of g if $g(x) = f(x-1) + 2$.

(c) [1] (§1.1 #48) Identify the y intercept.

(d) [2] (Quiz2 #3) Find the average rate of change of f from $x = -1$ to $x = 2$

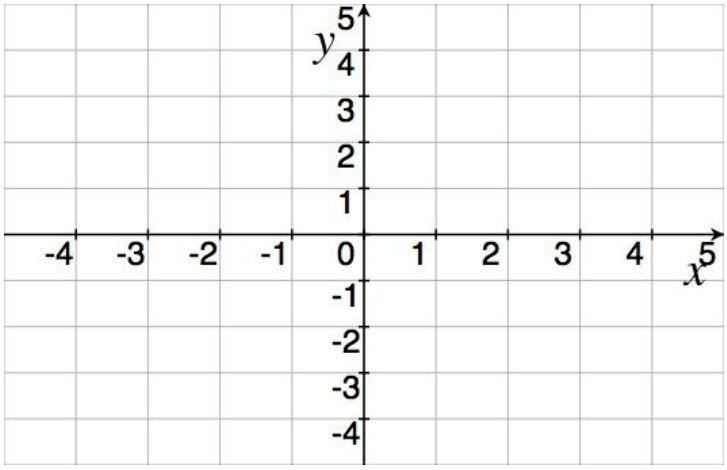
(e) [4] (PracticeExam#4) Find the piece-wise defined rule of f in the indicated form.

$$f(x) = \begin{cases} & \text{if } -1 \geq x < 2 \\ & \text{if } 2 \geq x < 3 \\ & \text{if } 3 \geq x < 5 \end{cases}$$

4. Let h be piece-wise defined by:

$$h(x) = \begin{cases} x - 1 & -3 < x \leq 1 \\ (x-3)^2 & 2 < x \leq 5 \end{cases}$$

(a) [3] (WebHW1 #19) Graph h.



(b) [2] (WebHW2 #11) Is h a function? Why or why not?

(c) [2] (TransformationWks #5) Find the domain of h.

(d) [2] (§1.1 #48) Identify the x-intercept(s).

(e) [1] (Quiz1 #3) Find all possible input(s) so that $h(x) = -2$.

5. (Exam1 Aut2013 #6) Let $\alpha(x) = \dfrac{x}{x+2}$ and $\beta(x) = 2 - \sqrt{x+1}$. Both α and β have inverses that exist.

(a) [4] (§1.7 #56) Find $(\alpha^{-1})(x)$

(b) [2] (§1.6 #38) $(\alpha \circ \beta)(x)$.

(c) [1] (§1.7 #26) $(\alpha \circ \alpha^{-1})(\pi)$.

6. [4] (PracticeExam #11) A rectangular box with a volume of 60 ft^3 has a square base. Find a function that models its surface area S in terms of the length x of one side of its base.

7. [5] Choose *ONE* of the following. Clearly identify which of the two you are answering and what work you want to be considered for credit.
No, doing both questions will not earn you extra credit.

   (a) Zoe is going to check the accuracy of the speedometer in her car. Zoe turns on cruise control to 65 miles per hour. Zoe then uses a stop watch and determines it takes her 2 minutes to get from mile post 166 to 169. Is Zoe's speedometer correct? If not, is the speedometer over reporting or under reporting her actual speed?

   (b) Leonard McCoy is in this course and during the seventh week he logged into MyMathLab and computed the average of his WebAssign, WrittenHW's, Quizzes, and Exams. The numbers are reported below.

   McCoy's work did not change drastically in the remaining 3 weeks of the course and ultimately he earned a 3.0 in the course. What grade did he earn on the final exam to earn a 3.0 for the course? In case you don't remember, the weights specified in the syllabus and the graph of the function f that takes your class percentage x and returns your score

	weight	McCoy's a
Mini-Quizzes	5%	95%
WebAssign	10%	100%
WrittenHW	15%	95%
Quizzes	15%	65%
2 Exams	30%	70%
Final	25%	?