Exam 1 # TMath 115 Autumn 2015

NAME:

1. [7] 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 $\frac{3}{a} + \frac{4}{a^2} = \frac{3}{a} + \frac{\sqrt{4}}{\sqrt{a^2}} = \frac{5}{a}$

   T F $x^2 + 8x + 15 = (x+3)(x+5)$

   T F $(x+2)^2 = x^2 + 4$

   T F The domain of $a(x) = \sqrt{x-4}$ is $(4, \infty)$

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

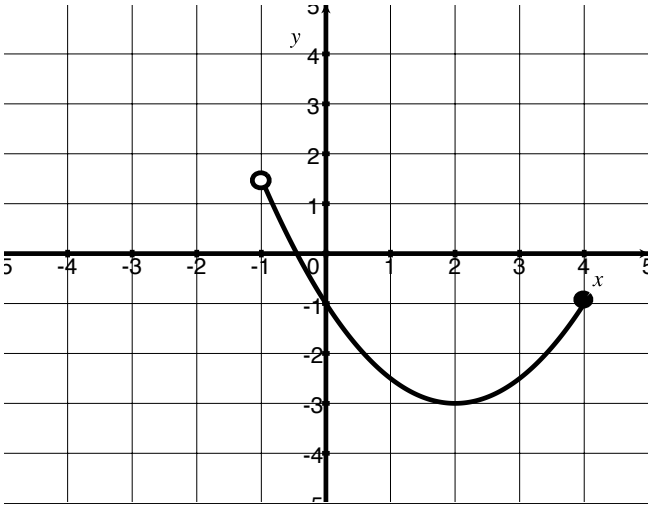
   T F If 1kg=2.2lbs, then 4kg equals 1.8lbs

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

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

2. [3] (PracticeExamWks #1) Find $\dfrac{\frac{2}{x^2} - x}{x-2} + \dfrac{3x-5}{(x+4)(x-4)}$

3. Let f be the parabola with a restricted domain that is shown below:



(a) [2] (WebHW3 #19)
Find the domain of f

(b) [4] (WebHW3 #16 & WebHW6 #17)
Estimate the following *if* possible:

i. $f(3)$

ii. $(f \circ f)\left(\frac{1}{2}\right)$

iii. $3f(2)$

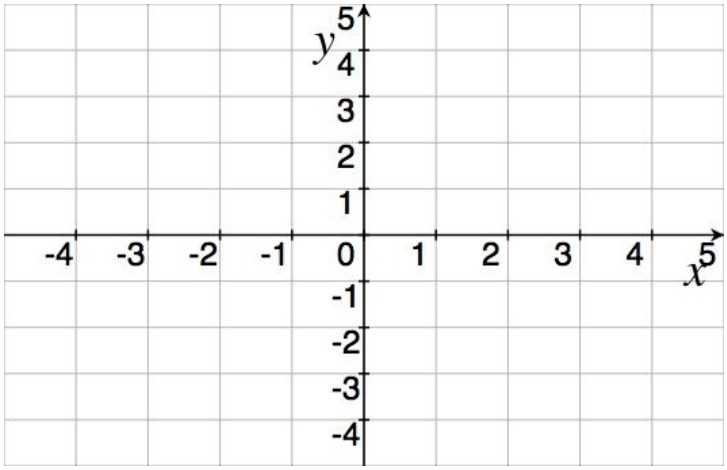
(c) [2] (GraphTransformation2 #2) Estimate x so that $f(x) = -2$.

(d) [3] (Quiz2 #3) Draw the graph of g if $g(x) = -\frac{1}{2}f(x) - 1$.

(e) [1] (§1.1 #48) Identify the y intercept of f.

(f) [3] (§2.1 #32) Find the equation for f.

4. Let $h(x) = \begin{cases} x - 1 & -3 < x \leq 2 \\ 2x - 3 & 2 < x \leq 4 \end{cases}$



(a) [2] (WebHW3 #17 & WebHW6 #17)
Estimate the following *if* possible:

i. $h(0)$

ii. $(h + h)(3)$

(b) [3] (WebHW3 #18)
Graph h.

(c) [2] (Quiz2 #3)
What is the range of h?

5. [2] (WebHW7 #16) Divide $\dfrac{3i}{9 - 6i}$

6. [3] (Quiz1 #4) The distance that a spring will stretch varies directly as the force applied to the spring. A force of 70 pounds is needed to stretch a spring 6 inches. What force is required to stretch the spring 20 inches?

7. Let $p(x) = (x+3)^2 + 1$

   (a) [1] (§1.3 #32) Find $p(2+k)$.

   (b) [2] (§2.1 #92b) Find the real or complex roots of $p(x)$.

8. [5] You have a 375g block of iron ore and want to know how much iron is in it. You take a 100 gram sample of iron ore and found it contained 34g of iron. About how many grams of iron are in the original 375g block? Write a function whose output gives you the percentage (in decimal form) of iron as a function of how how many grams of pure iron are added to it (which can be done when you melt the iron ore down).