TMath 115

NAME:

1. [6] 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   If 1 ft is about 30.5 cm, then 2 cubic feet is about 1860.5 cm^2

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

   T   F   If $f(x) = 2x$ and $g(x) = \dfrac{1}{2x}$, then $f(g(x)) = x$.

   T   F   Circle T if you would like a free point!
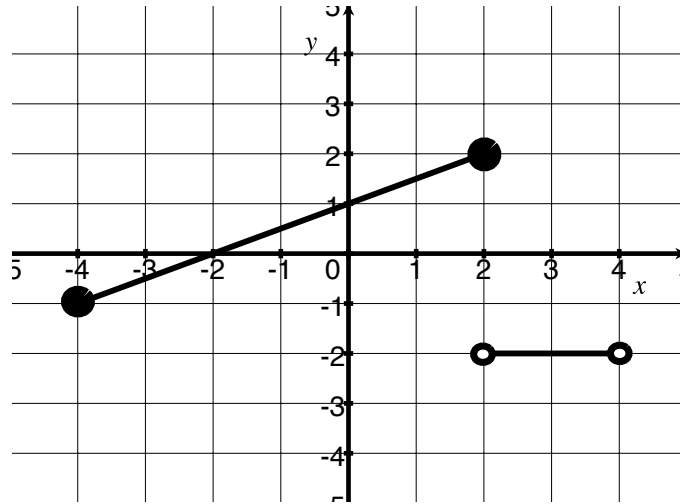
   T   F $\sqrt{i} = -1$

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

   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] (Exam1Review#1) Perform the indicated operation $\dfrac{-2}{x+2} - \dfrac{x-2}{x} + \dfrac{x}{x+2}$

3. Let f be the piece-wise defined graph shown below:

(a) [2] (TranformWks #5b)
Find the range of f

(b) [4] (WebHW3 #16 &
tranformWks#5d)
Estimate the following
if possible:

　i. $f(2)$

　ii. $f(3) + 1$

　iii. $(f(f(-2))$

(c) [2] (Transformation2 #2) Estimate x so that $f(x) = -1$.

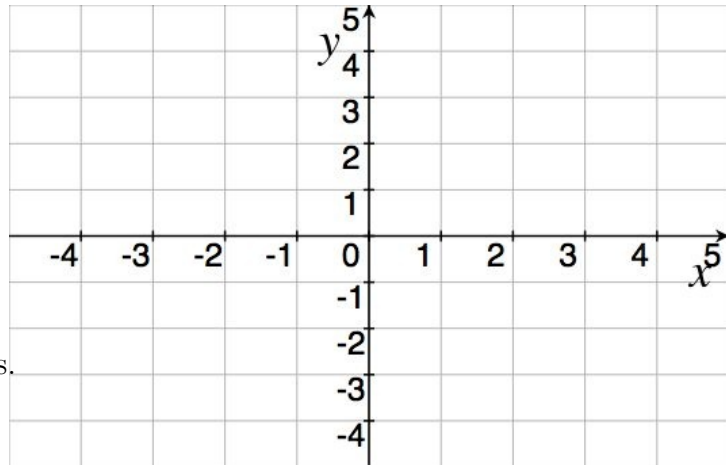(d) [3] (§2.1 #44) Draw the graph of g if $g(x) = -2f(x+1)$.

(e) [3] (Quiz2 #3) Write an equation for the function
$$f(x) = \begin{cases} & \text{if } -4 \le x \le 2 \\ & \text{if } 2 < x < 4 \end{cases}$$

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4. Let $h(x) = (x+2)^2 + 1$

(a) [2] (QuadWks #9)
   Find the vertex of h.

(b) [3] (WebHW8 #8)
   Graph h.
   Consider identifying
   any graph transformations.

(c) [3] (§2.1 #92b)
   Find the real or complex x-intercepts.

5. (WebHW7 #14) A company that sells radios has yearly fixed cost of \$500,000. It costs the company \$40 to produce each radio. Each radio will sell for \$65.

(a) [3] Write a function that represents the total costs as a function of radios produced. Label the function C.

(b) [2] Let $R(x) = 65x$ which models the revenue collected when producing x radios. Find and interpret $(R - C)(10,000)$.

6. (§2.6 #56) [3] The current I in an electric circuit varies directly as the voltage V and inversely as the resistance R. If the resistance is increased by 10%, what percent increase must occur in the voltage to increase the current by 20%?

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) The water level in a reservoir must be lowered by 4 ft. Opening one spillway will lower the water level 1 ft in 3 hours whereas another spillway will lower the water level 2 ft in 3 hours. If both spillways are open, how long will it take the water level to lower 4 feet?

   (b) You have $5,500 in a Roth IRA retirement fund and would like to divide your money into two investments so that you make a return of 5%. There are CDs which provide an annual rate of 2.55% and index funds that return on average 8.2%. How much money do you relegate to a CD and how much money do you put in an index fund?