TMath 115

NAME:

1. [5] 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   The graph of $[[x]] + 2$ is the graph of $[[x]]$ shifted up 2 units.

   T   F $\dfrac{7x^2 + 7x}{x^2 + 2x + 2} = \dfrac{7x}{x + 1}$ where $x \neq -1$

   T   F   Given that 1 foot is about 30.5 cm, we know 2 cubic feet is 61 cubic cm.

   T   F   Given that 1 foot is about 30.5cm, we know 57 cm is about 1.87 feet.

   T   F   To transform $y = x^2 + 5x - 7$ into vertex form, we can add $\frac{25}{4}$ to both sides.

   T   F   To transform $y = 2x^2 + 5x - 7$ into vertex form, we can add $\frac{25}{4}$ to both sides.

   T   F $(3 - 5i) - (3 + 21) = -7i$

   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] (Aut15 Exam1 #2) 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 on the left and g be the piece-wise defined graph on the right.
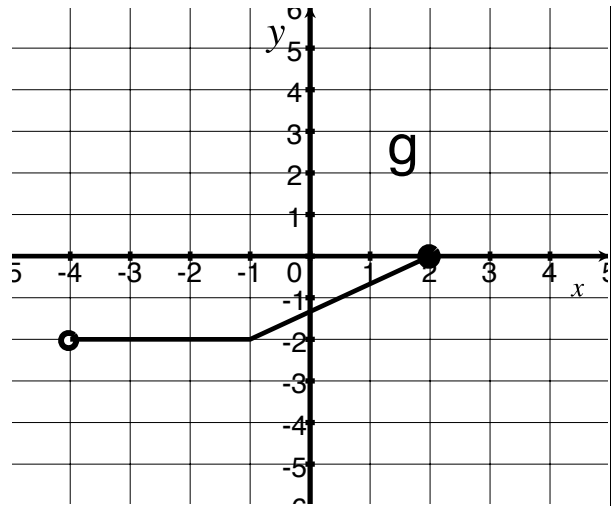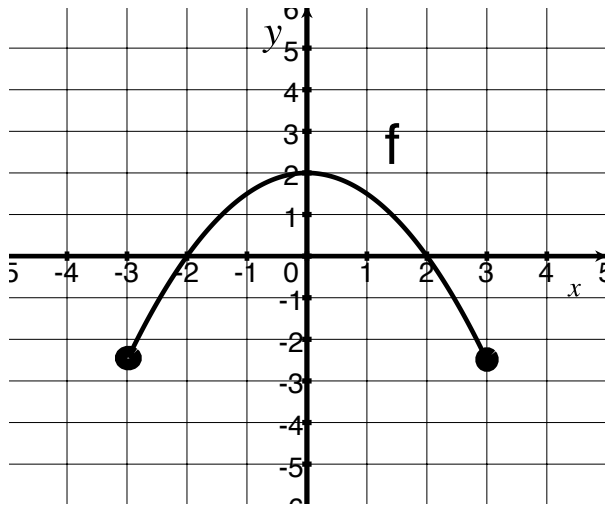
(a) [2] (WebHW3 #19) Find the domain of g

(b) [2] Estimate the range of f.

(c) [2] (CombineWks #2) Estimate $(f - g)(-2)$.

(d) [2] (§1.6 #28) Estimate $(f(g(2)))$.

(e) [3] (WebHW8 #7) Find the equation for f in the indicated form:
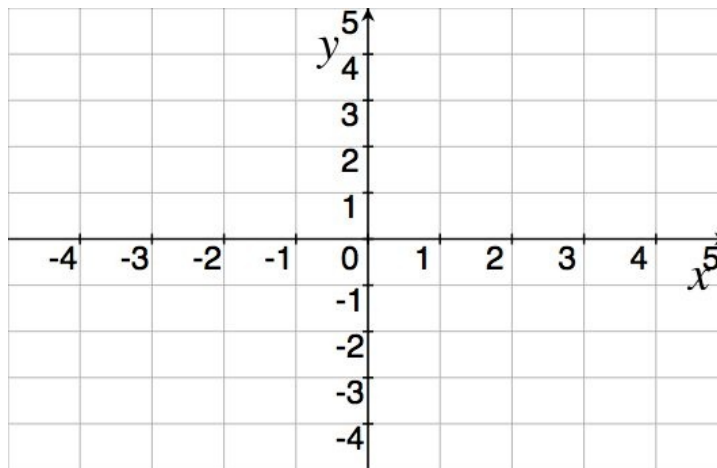$$f(x) = \left\{ \qquad\qquad\quad \text{if } -3 \le x \le 3 \right.$$

(f) [3] (tranformationWks2 #3) Graph $-3g(x - 1)$ on the right axis above.

4. Let $h(x) = \begin{cases} 2(x+1)^2 & x < 0 \\ -3x + 2 & 0 \le x \end{cases}$

(a) [1] (WebHW3 #18)
   Estimate $h(0)$

(b) [5] (Quiz2 #2)
   Graph h.

(c) [1] (§1.1 #44)
   Find the x-intercepts

5. [3] (WebHW7 #3) Let $f(x) = \sqrt{x+1}$ and $g(x) = \frac{x}{3x+1}$. Find the domain of $\left(\frac{f}{g}\right)(x)$.

6. [4] (Quiz1 #4) You have 8 oz of mocha that is 25% espresso sitting in a 16 oz cup. Write a rational expression that returns the percentage (in decimal form) of espresso in the mocha when straight espresso is added.

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

   (a) [1] (§1.3 #32) Find $p(2 + k)$.

   (b) [1] Identify the vertex of $p(x)$.

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

8. [5] (§2.6 & §A.8 #51) The impedance Z varies directly with the voltage V and inversely with the current I. If the impedance is 2, and voltage is 12, then the current can be determined to be 6. If the impedance is $5 - 7i$ and the current is $2 + 5i$, what is the voltage?