Math 115 Quiz 1: Up thru § 1.5 **Name:** _____
Mon 20 September 2010

You have 15 minutes to complete this quiz. No calculators allowed. Eyes on your own paper and good luck!

1. **Definitions/Concepts.** (1 pt each) Write down the definition of

   (a) function - a rule that takes certain numbers as inputs and assigns to each a definite output number

   (b) linear function - a function whose rate of change is constant; has the form $y = f(x) = b + mx$ where m is the slope, and b is the y-intercept

2. **Questions/Problems.** (1 pt each)

   Let x be the number of months that a shotput[1] thrower has practiced her sport. Let $f(x)$ be the resulting distance (in meters) she can throw the shotput. (We assume that this distance is a function only of x, and ignore factors like innate ability.) For each of these expressions, translate its meaning into nonmathematical terms:

   (a) $f(3)$ "distance (in meters) she can throw the shotput after 3 months of practice"

   (b) $f(20) = 12$ "After 20 months of practice, she can throw the shotput 12 meters."

   (c) $f^{-1}(16)$ "number of months of practice needed to throw the shotput 16 meters"

   Translate each of these wise sayings by Coach Ironarm into a mathematical equation or expression:

   (a) "...twice as far as I can throw the shot, and I've been doing this for ten years!" (how far is this distance, in terms of f?)

   $$2f(120)$$

   (b) "A rookie with no practice can usually throw a good 4 meters."

   $$f(0) = 4$$

3. **Computations/Algebra.** (1 pt each)

   (a) If $m(z) = z^2$, simplify $m(z+h) - m(z)$.

   $$\begin{aligned} m(z+h) - m(h) &= (z+h)^2 - z^2 \\ &= z^2 + 2zh + h^2 - z^2 \\ &= 2zh + z^2 \end{aligned}$$

[1] A *shotput* is a dense metal ball thrown for distance by men and women in athletic competition.

(b) Convert the angle $\frac{\pi}{6}$ to degrees.

$$\begin{aligned} \text{degrees} &= \frac{\pi}{6} \cdot \frac{180 \text{ degrees}}{\pi \text{ radians}} \\ &= \frac{180}{6} \\ &= 30 \end{aligned}$$