12. [8 points] "*Timely Time*" is a local company that builds and sells clocks and watches. Let $C(q)$ be the cost (in dollars) for *Timely Time* to produce q wall clocks

a. [2 points] Write an equation that expresses the statement

"The cost of producing k clocks is m dollars."

Answer: $C(k) = m$

b. [2 points] Write an equation that expresses the fact that doubling the quantity of clocks produced increases *Timely Time's* production costs by 80%.

Answer: $C(2q) = 1.8C(q)$

Let $w(d)$ be the number of watches that can be produced by *Timely Time* for a cost of d dollars. Assume that w is an invertible function.

c. [2 points] Express the total cost for *Timely Time* to produce 15 clocks and 7 watches in terms of C and w.

Answer: $C(15) + w^{-1}(7)$

d. [2 points] Suppose that $w(C(q)) > q$ for all values of q in the domain of $w(C(q))$. Give a practical interpretation of the inequality $w(C(q)) > q$ in the context of this problem.

Solution: $C(q)$ is *Timely Time*'s cost for producing q clocks. So $w(C(q))$ is the number of watches that can be produced by *Timely Time* for the amount that it costs to produce q clocks. Since $w(C(q)) > q$, *Timely Time* can produce more watches than clocks for the same cost. (It costs less for *Timely Time* to produce watches than to produce clocks.)