6. [13 points] Jared, Katia and Rory run together frequently on their university's track. The number of calories Jared, Katia and Rory each burn in running n laps is given by the functions $J(n)$, $K(n)$ and $R(n)$ respectively. You may assume that all of these functions are invertible.

a. [2 points] Jared always burns exactly as many calories as Katia does when he runs 5 more laps than she does. Write an expression for $J(n)$ involving the function K that represents this fact.

Solution: To burn the same number of calories as Jared does when he runs n laps, Katia needs to only run $n-5$ laps. So we have $J(n) = K(n-5)$.

$J(n) =$ $K(n-5)$

b. [2 points] Rory has recently added a 10 minute bike ride to his workout routine, during which he burns an additional 150 calories. Let $H(n)$ be the total number of calories that Rory burns (both running and biking) if he runs n laps and bikes for 10 minutes afterwards; write an expression for $H(n)$ involving the function R that represents this fact.

Solution: If Rory runs n laps and bikes for 10 minutes, he burns $R(n) + 150$ calories.

$H(n) =$ $R(n) + 150$

c. [3 points] Interpret $J^{-1}(100)$ in practical terms.

Solution: $J^{-1}(100)$ is the number of laps Jared must run to burn 100 calories.

Like most people, Jared bases the length of his run on the average temperature forecast for that day: he decides to run $G(m)$ laps when the projected average temperature is m (in degrees Fahrenheit).

d. [3 points] Interpret $J(G(90))$ in practical terms.

Solution: $J(G(90))$ is the number of calories Jared burns when the temperature is 90 degrees Fahrenheit.

e. [3 points] The graph of the function $y = G(m)$ has a vertical intercept. Interpret this vertical intercept in practical terms.

Solution: The vertical intercept is the number of laps Jared runs when the temperature is 0 degrees Fahrenheit.