4. [17 points] The following table contains information about the functions $F(x)$, $G(x)$, and $H(x)$. The functions satisfies the following properties:

- $F(x)$ is a power function.
- $G(x)$ is an odd, periodic function with period 7.
- $H(x)$ is a quadratic function with average rate of change -1.5 on $[0, 5]$

Assume that all three functions are defined for all real numbers.

x	2	5	8
$F(x)$	$\frac{3}{5}$	$\frac{75}{8}$	$\frac{192}{5}$
$G(x)$	4	?	11
$H(x)$	0.4	-3.5	-5.6

a. [8 points]
Compute the following values. If it cannot be determined, write NEI. You don't need to show work on this part of the problem, but you could receive partial credit for work shown.

- $F(0) =$ 0
- $G(0) =$ 0
- $G(1) =$ 11
- $G(5) =$ -4
- $G(-8) =$ -11
- $H(0) =$ 4

b. [6 points]
Find a formula for $F(x)$. Circle your answer.

Solution: Using the table, we can choose two points and find the power function through them. For instance, we can use $x = 2$ and $x = 8$. With the general form $F(x) = kx^n$, for k a constant, we have that

$$\frac{F(5)}{F(2)} = \frac{8^n}{2^n} = 4^n = \frac{\frac{192}{5}}{\frac{3}{5}} = 64$$

We solve for n from this, and get $n = 3$. Then putting it back into the equation for $F(2)$, we get

$$F(2) = \frac{3}{5} = k(2)^3$$

so that $k = \frac{3}{40}$. Hence

$$F(x) = \frac{3}{40}x^3$$

c. [3 points]
What is the sign of the leading coefficient of $H(x)$? Give a brief justification of how you determined it.

Solution: Since $H(x)$ is quadratic, the sign leading coefficient can be determined by its concavity. Computing the average rate of change between $H(2)$ and $H(5)$ gives us -1.3, and the average rate of change between $H(5)$ and $H(8)$ is -0.7. Since the average rate of change is increasing, the quadratic is concave up, hence the sign is positive.