6. [13 points] Values of a function $g(x)$ and some of its derivatives at $x = 2$ are given in the table below. Use this information for some of the problems below.

$g(2)$	$g'(2)$	$g''(2)$	$g'''(2)$	$g^{(4)}(2)$
1	2	-4	0	4

a. [4 points] Find the first 4 nonzero terms of the Taylor series of $g(x)$ about $x = 2$. Write your final answer as a polynomial $P(x)$ in the blank below.

$P(x) =$ _____

b. [4 points] Using known Taylor series, find the first 3 nonzero terms of the Taylor series of $f(x) = (x-2)\ln\left(\frac{x}{2}\right)$ about $x = 2$. Write your final answer as a polynomial $Q(x)$ in the blank below. (*Hint:* $f(x) = (x-2)\ln\left(1 + \frac{(x-2)}{2}\right)$)

$Q(x) =$ _____

c. [5 points] Let $H(x) = 1 + \int_2^x f(t) + g(t)dt$. Find the first 4 nonzero terms of the Taylor series of H about $x = 2$. Write your final answer as a polynomial $R(x)$ in the blank below. Partial credit may be given for finding the appropriate terms of $\int_2^x f(t)dt$ or $\int_2^x g(t)dt$.

$R(x) =$ _____