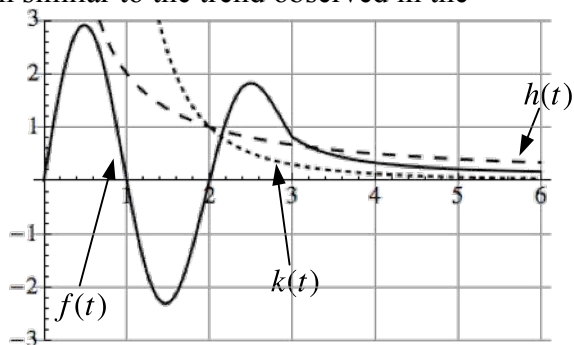


2. (30 points) The graphs of  $f(t)$ ,  $h(t)$ , and  $k(t)$  are shown below. You may assume that as  $t \rightarrow \infty$ , the graphs of  $f$ ,  $h$ , and  $k$  continue in a fashion similar to the trend observed in the

graph on the right. We define  $g(x) = \int_1^{x^2} f(t) dt$ .

- a. What's  $g'(2)$ ?



- b. What, if anything, could you say about  $\lim_{x \rightarrow \infty} g(x) = \int_1^{\infty} f(t) dt$  if you knew that

$h(t) < \frac{1}{t\sqrt{t}}$  for  $t \geq 6$ ? Explain your answer.

- c. What, if anything, could you say about  $\lim_{x \rightarrow \infty} g(x) = \int_1^{\infty} f(t) dt$  if you were to instead assume

that  $\int_{100}^{\infty} k(t) dt = 16$ ? Explain your answer.