

1. (16 points) Use the information given below to answer the following questions. Show work where appropriate.

x	0	1	2	3	4
$f(x)$	0.5	2	2.5	0	-4
$f'(x)$	1.5	0.5	-1	-3	-3.5

(a) If $g(x) = Ax^2$ for some constant A , find $h'(2)$ where $h(x) = g(x) + f(2x)$. Your answer may involve the constant A .

(b) Suppose $k(x) = 4^{f(x)}$. Find $k'(1)$.

(c) Suppose $l(x)$ is a linear function of x , $l(4) = 0$, and $l'(4) < f'(4)$. Which of the following is true about $l(x)$? (Circle all that apply; you need not justify your answer):

(i) $l(x) > 0$ for $x > 4$.

(ii) $l(x) < 0$ for $x > 4$.

(iii) $l(x)$ is increasing for all x .

(iv) $l(x)$ is decreasing for all x .

(d) Suppose $j(x)$ is an exponential function and that $j(0) = 1$. Let $h(x) = j(x)f(x)$. If $h'(0) = 7$, find a formula for $j(x)$.