

## GROUP WORK 4, SECTION 3.3

### Sparse Data

Assume that  $f(x)$  and  $g(x)$  are differentiable functions about which we know very little. In fact, assume that all we know about these functions is the following table of data:

$x$	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
-2	3	1	-5	8
-1	-9	7	4	1
0	5	9	9	-3
1	3	-3	2	6
2	-5	3	8	?

This isn't a lot of information. For example, we can't compute  $f'(3)$  with any degree of accuracy. But we are still able to figure some things out, using the rules of differentiation.

1. Let  $h(x) = (\sqrt[3]{x})^4 f(x)$ . What is  $h'(0)$ ?

2. Let  $j(x) = -4f(x)g(x)$ . What is  $j'(1)$ ?

3. Let  $k(x) = \frac{xf(x)}{g(x)}$ . What is  $k'(-2)$ ?

4. Let  $l(x) = x^3g(x)$ . If  $l'(2) = -48$ , what is  $g'(2)$ ?

5. Let  $m(x) = \frac{1}{f(x)}$ . What is  $m'(1)$ ?