1. The following table of the position $s$ in furlongs versus time $t$ in fortnights. Find the average velocity between $t = 1$ and $t = 4$, estimate the instantaneous velocity at $t = 3$ (by averaging two average velocities), and give the units of $s'(3)$.

<table>
<thead>
<tr>
<th>$t$</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>$s$</td>
<td>16</td>
<td>64</td>
<td>144</td>
<td>256</td>
</tr>
</tbody>
</table>

2. Copy the graph of $f(x)$ below and on the copy draw its derivative $f'(x)$. Be especially careful about the placement of the zero's of $f'(x)$. What is the $\lim_{x \to -\infty} f(x)$ and $\lim_{x \to -\infty} f'(x)$?

3. Find the limits.

(a) $\lim_{x \to -3} \frac{x^2 - 9}{x^3 - 5x^2 + 6x}$

(b) $\lim_{h \to 0} \frac{\sqrt{x + 5h} - \sqrt{x}}{h}$

4. Using the limit definition of the derivative, find the derivative $f'(2)$ when $f(x) = x^5$. Pascal wants to help you.

Use your answer to find the equation of the tangent line to $f(x)$ at $x = 2$.

There is more test on the other side
5. For the function $g$ whose graph is given below, state the value of each quantity, if it exists. If it does not exist explain why.

(a) $\lim_{x \to -2^-} g(x)$  
(b) $\lim_{x \to -2^+} g(x)$  
(c) $\lim_{x \to -2} g(x)$  
(d) $g(-2)$

(e) $\lim_{x \to 2^-} g(x)$  
(f) $\lim_{x \to 2^+} g(x)$  
(g) $\lim_{x \to 2} g(x)$  
(h) $g(2)$

(i) $\lim_{x \to 4^-} g(x)$  
(j) $\lim_{x \to 4^+} g(x)$  
(k) $\lim_{x \to 0} g(x)$  
(l) $g(0)$