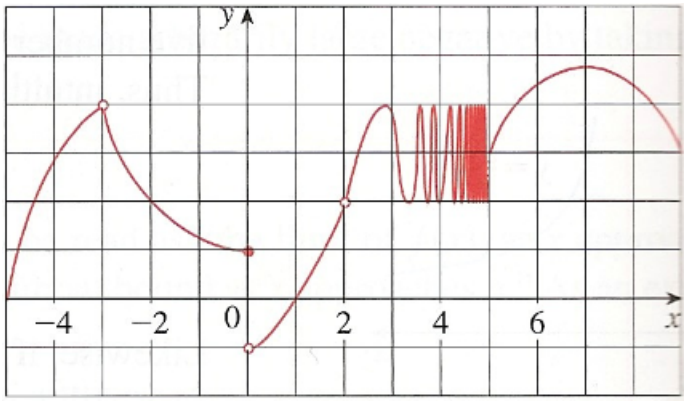
Math 1271 Quiz 1 Solutions

1. (*8 points; 1 point each*) For the function h whose graph is given below, state the value of each quantity, if it exists. If it does not exist, briefly **explain why**.



(a) $\lim_{x \to -3^-} h(x) = 4$

(b) $\lim_{x \to -3^+} h(x) = 4$

(c) $\lim_{x \to -3} h(x) = 4$

(d) $\lim_{x \to 5^+} h(x) = 3$

(e) $\lim_{x \to 5^-} h(x)$ does not exist: rapid oscillation.

(f) $\lim_{x \to 0^+} h(x) = -1$

(g) $\lim_{x \to 0^-} h(x) = 1$

(h) $\lim_{x \to 0} h(x)$ does not exist: left-hand and right-hand limits don't agree.

2. (*4 points*) Determine the infinite limit (be sure to show your work/explain your answer):

$$\lim_{x \to 1} \frac{2 - x}{(x - 1)^2}$$

When x is near 1, the numerator, $2 - x$, is near 1; the denominator, $(x - 1)^2$, is a small *positive* number. Therefore the limit is $+\infty$.