Quiz: The First

5 Sep 2014

This test totals 20 points and you get 20 minutes to do it. Good luck!

1. (5 pts) Match the following by drawing clear arrows. Each correct pairing gets you a point. Differentiate between ±∞. [No need to give reasons] (Easy!)

<table>
<thead>
<tr>
<th>Expression</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\lim_{x \to 0^-} \left( \frac{1}{x} \right)$</td>
<td>Does not exist “$\infty$”</td>
</tr>
<tr>
<td>$\lim_{x \to 0^-} \left( \frac{1}{x^2} \right)$</td>
<td>20</td>
</tr>
<tr>
<td>$\lim_{x \to 5} (x^2 - 5)$</td>
<td>$-0.5$</td>
</tr>
<tr>
<td>$\lim_{x \to 0} (</td>
<td>x</td>
</tr>
<tr>
<td>$\lim_{x \to 0} \left[ 0.5 - \left( \frac{\sin x}{x} \right) \right]$</td>
<td>Does not exist “$- \infty$”</td>
</tr>
</tbody>
</table>
2. Find the limit. Write down all your steps clearly. (10 pts) [Hint: Factorize, find common denominator and cancel out factors]

\[
\lim_{x \to -3} \left( \frac{1}{x + 3} + \frac{5}{x^2 + x - 6} \right)
\]
3. Look at the following diagram and fill up the following blanks. No need to give reasons. (Easy!) (5 pts)

(a) \( \lim_{x \to (-8)^+} f(x) : \) _________________________________
(b) \( \lim_{x \to (-2)^-} f(x) : \) _________________________________
(c) \( \lim_{x \to 6} f(x) : \) _________________________________
(d) \( f(6) : \) _________________________________
(e) Three values for \( x \) for which \( f(x) = 0 : \) _________________

4. **Extra credit** (2金色 points!) Solve for \( x \).

\[
x = \sqrt{1 + \sqrt{1 + \sqrt{1 + \ldots}}}
\]