Math 2215 - Calculus 1

Quiz #3 - 2011.01.26

Solutions

Compute the following limit:

$$\begin{aligned}
\lim_{x\to-\infty}\frac{3x^3+6x^2-8x+1}{\sqrt{14x^6+45x^5-x^4+32x^3+23x^2+x-1}} &= \lim_{x\to-\infty}\frac{3x^3+6x^2-8x+1}{\sqrt{14x^6+45x^5-x^4+32x^3+23x^2+x-1}}\frac{\frac{1}{x^3}}{\frac{1}{x^3}} \\
&= \lim_{x\to-\infty}\frac{3+\frac{6}{x}-\frac{8}{x^2}+\frac{1}{x^3}}{\frac{1}{x^3}\sqrt{14x^6+45x^5-x^4+32x^3+23x^2+x-1}} \\
&= \lim_{x\to-\infty}\frac{3+\frac{6}{x}-\frac{8}{x^2}+\frac{1}{x^3}}{-\sqrt{\frac{1}{x^6}}\sqrt{14x^6+45x^5-x^4+32x^3+23x^2+x-1}} \\
&= \lim_{x\to-\infty}\frac{3+\frac{6}{x}-\frac{8}{x^2}+\frac{1}{x^3}}{-\sqrt{14+\frac{45}{x}-\frac{1}{x^2}+\frac{32}{x^3}+\frac{23}{x^4}+\frac{1}{x^5}-\frac{1}{x^6}}} \\
&= -\frac{3}{\sqrt{14}}
\end{aligned}$$