GIỚI HẠN KHI x TIẾN TỚI VÔ CỰC

Câu 1: Tìm các giới hạn sau:

a). $\lim\limits_{x\to-\infty}\frac{3x^2-x+7}{2x^3-1}$ b). $\lim\limits_{x\to+\infty}\frac{(4x^2+1)(7x-1)}{(2x^3-1)(x+3)}$ c). $\lim\limits_{x\to+\infty}\frac{x\sqrt{x}+3}{x^2-x+2}$

d). $\lim\limits_{x\to+\infty}\left[(x+1)\sqrt{\frac{x}{2x^4+x^2+1}}\right]$ e). $\lim\limits_{x\to-\infty}x\sqrt{\frac{2x^3+x}{x^5-x^2+3}}$.

LỜI GIẢI

a). $\lim\limits_{x\to-\infty}\frac{3x^2-x+7}{2x^3-1}=\lim\limits_{x\to-\infty}\frac{x^2\left(3-\frac{1}{x}+\frac{7}{x^2}\right)}{x^3\left(2-\frac{1}{x^3}\right)}=\lim\limits_{x\to-\infty}\frac{3-\frac{1}{x}+\frac{7}{x^2}}{x\left(2-\frac{1}{x^3}\right)}=\lim\limits_{x\to-\infty}\frac{3}{2x}=0$

b). $\lim\limits_{x\to+\infty}\frac{(4x^2+1)(7x-1)}{(2x^3-1)(x+3)}=\lim\limits_{x\to+\infty}\frac{x^2\left(4+\frac{1}{x^2}\right)x\left(7-\frac{1}{x}\right)}{x^3\left(2-\frac{1}{x^3}\right)x\left(1+\frac{3}{x}\right)}=\lim\limits_{x\to+\infty}\frac{\left(4+\frac{1}{x^2}\right)\left(7-\frac{1}{x}\right)}{x\left(2-\frac{1}{x^3}\right)\left(1+\frac{3}{x}\right)}=\lim\limits_{x\to+\infty}\frac{28}{2x}=0$

c). $\lim\limits_{x\to+\infty}\frac{x\sqrt{x}+3}{x^2-x+2}=\lim\limits_{x\to+\infty}\frac{x\sqrt{x}\left(1+\frac{3}{x\sqrt{x}}\right)}{x^2\left(1-\frac{1}{x}+\frac{2}{x^2}\right)}=\lim\limits_{x\to+\infty}\frac{1+\frac{3}{x\sqrt{x}}}{\sqrt{x}\left(1-\frac{1}{x}+\frac{2}{x^2}\right)}=\lim\limits_{x\to+\infty}\frac{1}{\sqrt{x}}=0$.

d). $\lim\limits_{x\to+\infty}\left[(x+1)\sqrt{\frac{x}{2x^4+x^2+1}}\right]=\lim\limits_{x\to+\infty}\left[(x+1)\sqrt{\frac{x}{x^4\left(2+\frac{1}{x^2}+\frac{1}{x^4}\right)}}\right]$

$=\lim\limits_{x\to+\infty}\left[(x+1)\sqrt{\frac{1}{2x^3}}\right]=\lim\limits_{x\to+\infty}\left[(x+1)\frac{1}{x\sqrt{x}\sqrt{2}}\right]=\lim\limits_{x\to+\infty}\left[x\left(1+\frac{1}{x}\right)\frac{1}{x\sqrt{x}\sqrt{2}}\right]=0$

e). $\lim\limits_{x\to-\infty}x\sqrt{\frac{2x^3+x}{x^5-x^2+3}}=\lim\limits_{x\to-\infty}x\sqrt{\frac{x^3\left(x+\frac{1}{x^2}\right)}{x^5\left(1-\frac{1}{x^3}+\frac{3}{x^5}\right)}}=\lim\limits_{x\to-\infty}x\frac{\sqrt{2}}{\sqrt{x^2}}=\lim\limits_{x\to-\infty}x\frac{\sqrt{2}}{|x|}=\lim\limits_{x\to-\infty}x\frac{\sqrt{2}}{-x}=-\sqrt{2}$