d. **(5 puntos)** $\lim_{x\to +\infty}\left(\sqrt{x^2+8x+9}-\sqrt{x^2-8x+9}\right)$

$$\lim_{x\to +\infty}\left(\sqrt{x^2+8x+9}-\sqrt{x^2-8x+9}\right)$$

$$=\lim_{x\to +\infty}\left(\sqrt{x^2+8x+9}-\sqrt{x^2-8x+9}\right)\frac{\sqrt{x^2+8x+9}+\sqrt{x^2-8x+9}}{\sqrt{x^2+8x+9}+\sqrt{x^2-8x+9}}$$

$$=\lim_{x\to +\infty}\frac{(x^2+8x+9)-(x^2-8x+9)}{\sqrt{x^2+8x+9}+\sqrt{x^2-8x+9}}$$

$$=\lim_{x\to +\infty}\frac{16x}{\sqrt{x^2+8x+9}+\sqrt{x^2-8x+9}}$$

$$=\lim_{x\to +\infty}\frac{\frac{16x}{x}}{\frac{\sqrt{x^2+8x+9}+\sqrt{x^2-8x+9}}{x}}$$

$$=\lim_{x\to +\infty}\frac{\frac{16x}{x}}{\frac{\sqrt{x^2+8x+9}}{x}+\frac{\sqrt{x^2-8x+9}}{x}}$$

$$=\lim_{x\to +\infty}\frac{\frac{16x}{x}}{\sqrt{\frac{x^2+8x+9}{x^2}}+\sqrt{\frac{x^2-8x+9}{x^2}}}$$

$$=\lim_{x\to +\infty}\frac{16}{\sqrt{1+\frac{8}{x}+\frac{9}{x^2}}+\sqrt{1-\frac{8}{x}+\frac{9}{x^2}}}$$

Por lo tanto:

$$\lim_{x\to +\infty}\left(\sqrt{x^2+8x+9}-\sqrt{x^2-8x+9}\right)=8$$