7. (5 points) For \(-\frac{\sqrt{\pi}}{2} \leq x \leq \frac{\sqrt{\pi}}{2}\), let \(A(x)\) be the area of the region bounded by the curves \(\cos(t^2)\), \(\sin(t^2)\), and the vertical lines \(t = -\frac{\sqrt{\pi}}{2}\) and \(t = x\). See the figure below.

(a) Sketch on the figure an area that represents \(\Delta A = A(x + \Delta x) - A(x)\) for a small number \(\Delta x\).

(b) Find a formula for the derivative \(A'(x)\).

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**ANSWER:** \(A'(x) = \ldots\).

8. (6 points) For what values of the positive number \(p\) does the infinite series \(\sum_{n=1}^{\infty} \frac{n^3 - 4n^2}{n^p + 5}\) converge? Explain the reason for your answer.

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**ANSWER:** \ldots