Read each question carefully and be sure to SHOW ALL WORK. Correct answer without proper justification will not receive a "Complete" grade. Paç fat! Good luck!

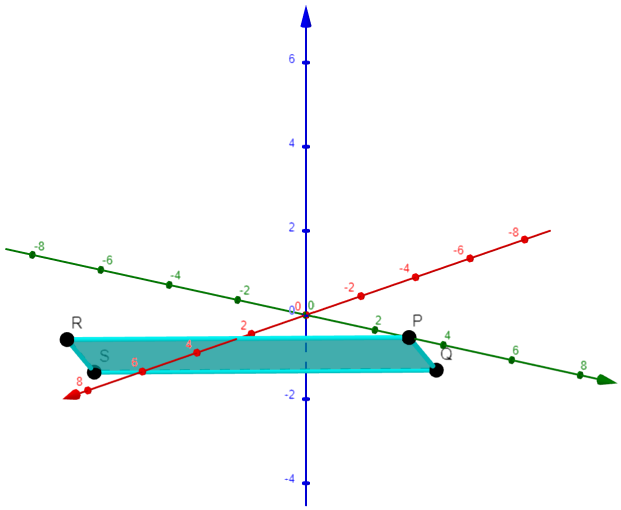
Name: _____

LO 2. Dot and Cross Products. I can calculate and interpret the dot and cross products in various contexts.

Criteria for Success: I can

- calculate the dot product of two vectors given by various representations both geometrically and symbolically
- use the dot product to solve various application questions such as finding the angle between two vectors, the projection of one onto the other, and work
- calculate the cross product of two vectors given by various representations both geometrically and symbolically
- use the cross product to solve various application questions such as finding a vector perpendicular to two given vectors, finding the area of the parallelogram determined by two vectors in 3 dimensions, and torque

Question: Let PQRS be the parallelogram below formed by the points P= $(0, 3, 0)$, Q= $(-1, 3, -1)$, R= $(5, -3, 0)$, and S= $(4, -3, -1)$. Answer the following questions.



(a) Find its area.

(b) Find the equation of the plane containing it.

LO 4. Sequences Convergence [CORE]. I can tell when a sequence converges or diverges.

Criteria for Success: I can

- use Calculus 1 techniques such as L'Hospital's Rule and Squeeze Theorem to find limits of sequences
- determine convergence or divergence of a sequence numerically and graphically
- given a bound ($\epsilon > 0$) for the difference between the terms of a convergent sequence and its limit, determine the minimal index that achieves that bound

Question: Consider the sequence given by $a_n = \dfrac{(-1)^n 4n}{2n-1}$ for $n \geq 1$.

(a) Look at its graph and the numerical pattern of its terms to determine its limit as n tends to ∞ or conclude that it does not exist. Listing terms and/or a sketch of a graph here are appropriate justifications.

(b) Confirm your observation by using Calculus 1 limit properties and theorems. Note that heuristic arguments derived by looking at the degrees of the numerator and denominator, while very valuable for intuition, are not good enough justification here. **Hint:** Consider the limits when n values are even or odd seperately.

(c) If the answer to part (b) above is that the limit does not exist, or is $\pm\infty$, then you don't need to answer this part. Otherwise, let L be the limit you found above, and find the minimal index N so that for $n \geq N$, we have $|a_n - L| < 0.06$.