

Quiz 1

Name: _____ Section and/or TA: _____

Answer all questions in a clear and concise manner. Unsupported answers will receive *no credit*.

1. (2 points) Consider the region in \mathbb{R}^3 represented by the inequality

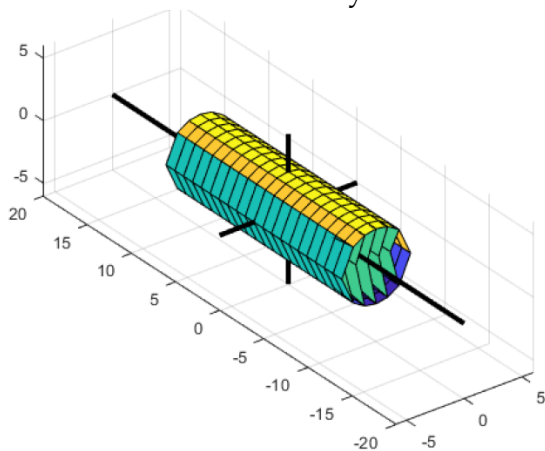
$$x^2 + z^2 \leq 9.$$

- (a) (1 point) Describe this region in words.

Solution: The inequality $x^2 + z^2 \leq 9$ describes all points on or in a circular cylinder of radius 3, centered at the y -axis.

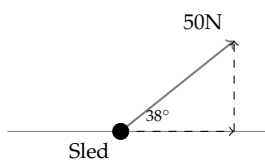
- (b) (1 point) Draw a sketch of the region.

Solution: Note that the cylinder is a full cylinder (not hollow).



2. (3 points) If a child pulls a sled through the snow on a level path with a force of 50N exerted at an angle of 38° above the horizontal, find the horizontal and vertical components of the force and write the force in component form.

Solution:



The horizontal and vertical components of the 50N force are given by the dashed lines in the diagram above. We see from the figure that the horizontal force is given by $50 \cos(38^\circ)$ while the vertical force is given by $50 \sin(38^\circ)$. Therefore, the 50N force can be written in component form as $50 \cos(38^\circ)\mathbf{i} + 50 \sin(38^\circ)\mathbf{j}$.