

NAME: _____

The Luge & Linear Algebra

1. The Luge is a Winter Olympic Sport where an athlete rides a sled downhill, feet first. The person with the fastest time is the overall winner.

Watch <https://youtu.be/qovhV-uBVqo> or <https://youtu.be/Myweh2AWvCI>

2. All luge starting ramps are different with a 20-25% gradient. As such, athletes must be able to adapt very quickly to the different tracks.

(Source: <https://www.fil-luge.org/cdn/uploads/iro-2018-english-complete-pdf-10092018.pdf>)

- i. If the vertical rise of a luge ramp is 7 meters and the horizontal distance of the ramp is 28 meters, determine the slope of the starting ramp (also known as slope gradient) of each track.



- ii. Calculate the slope percentage of the given ramp by dividing the rise and run and multiplying the result by 100. (Source: <https://www.archtoolbox.com/representation/geometry/slope.html>)

3. Watch <https://youtu.be/V2oOdWo3pXs>

Two straight sections of two different luge tracks are modeled on a computer as follows:

Luge Track AB goes thru A (30, 0) and B (-30,5)

Luge Track CD goes thru C (30, -15) and D (-30, 6)

- i. Find the slope (also known as slope gradient) of each track.
- ii. Calculate the slope percentage of each track by dividing the rise and run and multiplying the result by 100. (Source: <https://www.archtoolbox.com/representation/geometry/slope.html>)
- iii. The average slope percentage of the luge track used in the Olympics is 8 to 11 percent (Source: <https://adventure.howstuffworks.com/outdoor-activities/snow-sports/luge1.htm>). As such, which track simulated on the computer is a more realistic representation of an Olympic Luge track?

4. Write the equation that models track AB as described in #3.
Then, test your equation using <https://www.desmos.com/calculator/vwmktzjnd6>

5. Write the equation that models track CD as described in #3.
Then, test your equation using <https://www.desmos.com/calculator/yrfmestahx>

6. Watch https://youtu.be/xs04Pq_eYZI
If you have ever been interested in making it to the Olympics, the Luge may be your ticket! The USA Luge Team is searching for more Luge athletes (also known as Luge Sliders). The Luge team travels around the country to cities such as Las Vegas, Indianapolis, Chicago, etc. How does the Luge Team recruit around the country when there are only 2 artificial tracks in the United States (one in Park City, Utah and one in Lake Placid New York)?

7. Who makes a successful Luge Athlete? (Give 3 characteristics)
Check out: https://www.teamusa.org/-/media/USA_Luge/Documents/15GoodAthlete.pdf?la=en&hash=4D43279A81E87AA5B7DFA0F52E3F5B2F364B6CA3