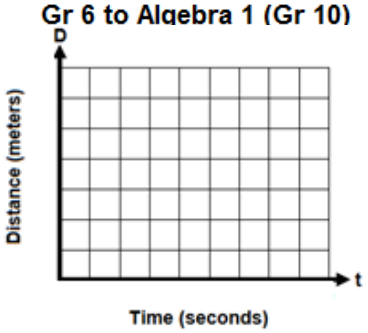
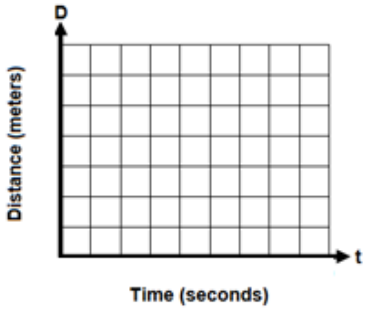
On the Heels of Jackrabbit on Slopes at the Ski Marathon

Gr 6 to Algebra 1 (Gr 10)





Description: In February 1982, Jackrabbit skied onto the trail wearing bib number 107, commemorating the number of years of his life. We will choose strategies and articulate ideas with the help of online resources and tiered three-part lessons on **Slope** and **Linear Relations** as we pit man against nature in the 160 km (100 mi) Ski Marathon by Jackrabbit Johnassen. Access will be given to online resources and lessons for you and your students. Participants are invited to bring a laptop to model a variety of learning environments.

Preliminary Information: The CSM challenge is held annually in February just north of the Ottawa River between the regions of Montreal and Ottawa covering a distance of 160 km over 2 days. The CSM is a ski tour, not a race. Participants challenge not each other, but themselves by choosing a level of difficulty and trying to accomplish that goal.

The "bobsled" is a long, somewhat dangerous downhill, usually icy run in section 3 of 10 of the CSM.

Trail #1: 16 km or 10 miles between Marelan to Pointe-au-Chene; part of the bobsled run; drop of 0.8 km

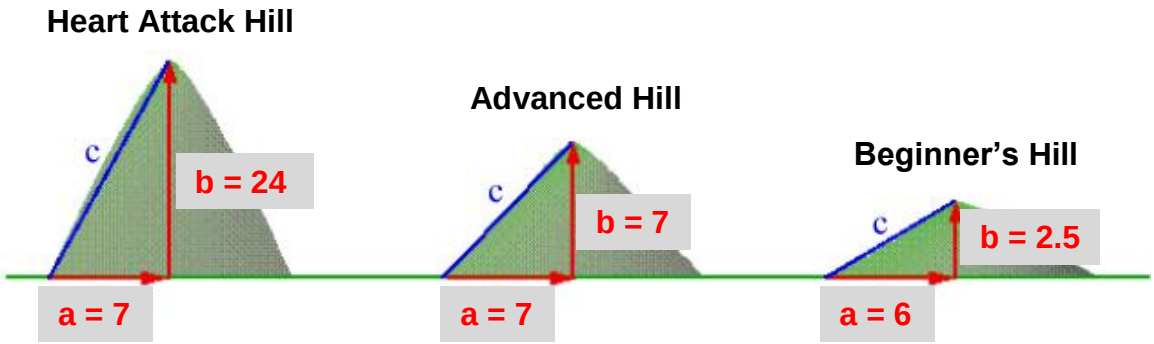
Trail #2: 8 km between Chateau Montebello to the gym floor in Papineauville High School; level terrain

Trail #3: 9 km home stretch from the Gatineau Park past the ice sculptures on the Rideau Canal to Ottawa

Preliminary Exercise:
Work through part of the Framework ***Slope in the Real World*** below with a partner.

You are welcome to see www.umathx.com for the full framework for you and your class .. pg 2 problems
Partner 1 navigates through lessons on the computer as Partner 2 records on the Framework.
Calculate the value of **c** for each hill using the Pythagorean Theorem.
Then **complete** the remainder of the table.
Round all answers to the nearest tenth.

In this section the computer will give you some of the calculations.
You will be given access in the session.



	a	b	c	$\frac{b}{a}$	$\frac{b}{c}$	$\frac{a}{b}$
Heart Attack Hill						
Advanced Hill						
Beginner's Hill						

Slope is defined as: _____

Calculate the slope of Trail #1.

Slope of Trail #1: _____

Your Task:
You are given 2 scenarios .. Wendy and Walter .. & .. Skiers Rudy and Chuck.

The numbers and questions are given for Scenario #1 .. Wendy and Walter. On the page provided, solve the problem with your partner using only the paper. You are also able to use the computer to help you. We will give access in the session. We will refer to 3 tiered lessons.

Please use numbers in the data for Scenario #2 which makes the problem relatively reasonable to solve.
Set up questions for Scenario #2 .. Rudy and Chuck. Then give your question to a partner.

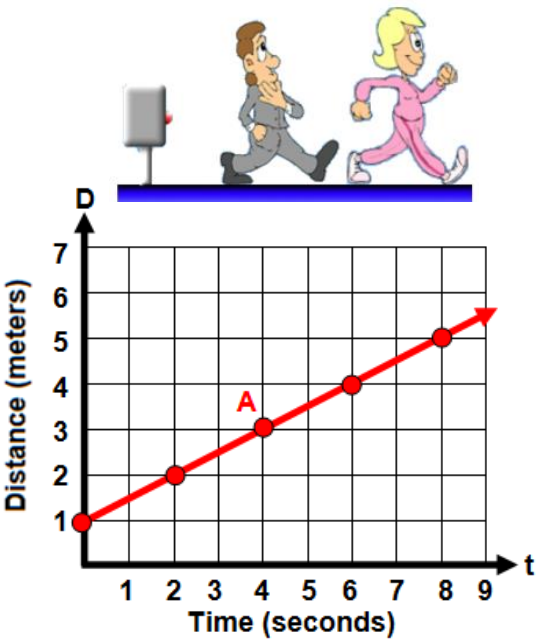
1. **Scenario #1.**
   Complete page 1 only from each of the 3 tiered Frameworks ***Slope and the Line: Walk in the Real World*** -1, -2, -3
   As you and your partner work through the lessons on the computer, record your work/notes on the Framework.
   Note and discuss how the frameworks and different/alike.
   How could you use this for intervention?

Walk in the Real World – 1

Follow the **Content Menu** path:

Graphing > Equation of a Straight Line > Word Problems – Applications > The Walker

As you work through ***Same Speed***, complete the corresponding notes and graph below.



Walter's Walk

The **red line** represents **Walter's walk** away from a motion sensor.

Point **A** with the coordinates (_____, _____) shows that at _____ seconds, **Walter** is _____ meters away from the sensor.

The **D-intercept** of the **red line** is _____ which shows that at _____ seconds **Walter** is _____ meter(s) away from the sensor.

The **slope** of the line is _____ which shows that **Walter** is walking at a **rate** of _____ meter(s) every _____ seconds.

The **equation** of the **red line** is: $D = \frac{\square}{\square} t + \square$

Wendy's Walk

Wendy starts walking 3 meters in front of **Walter**. **Graph** a **blue line** representing **Wendy's walk** in the graph above.

Complete the following using the **blue line** representing **Wendy's walk:**

The **D-intercept** is _____ which shows that at _____ seconds **Wendy** is _____ meter(s) away from the sensor.

The **slope** of the line is _____ which shows that **Wendy** is walking at a **rate** of _____ meter(s) every _____ seconds.

The **equation** of the **blue line** is: $D = \frac{\square}{\square} t + \square$

2. **Scenario #2.**
OnTrail #2, Chuck and Rudy, ski at a constant rate of 5 meters every 2 seconds from the instant that they leave the Chateau. They start at the same time but Chuck starts ___ m from the Chateau and Rudy begins behind Chuck, ___ m from the Chateau. The skiers are discussing the upcoming sprint near the end of the tour.
   - Graph each skier's line of motion on the time-distance graph on the left above for the first 10 seconds.
   - What is the slope of the equation of motion for each skier. (ie distance vs time _____)
   - What is the equation of motion? _____

3. **Scenario #1**
Complete ***Working In It*** on the Framework ***Slope and the Line: Walk in the Real World*** -1 or -2

Working In It:

If **Walter's** speed changed to 1 meter for every 1 second and **Wendy's** speed and distance from the sensor remained the same as the scenario outlined in *Getting Started*, how long would it take **Walter** to catch up to **Wendy**? How far from the sensor will they be when they meet?

Justify your answer by graphing the lines representing **Walter's walk** and **Wendy's walk** below.

Color code the lines--**green** for **Walter's walk** and **blue** for **Wendy's walk**.

Label both lines with the corresponding **equations**.

It would take **Walter** _____ seconds to catch up to **Wendy**. They will be _____ m from the sensor.

I know this because….

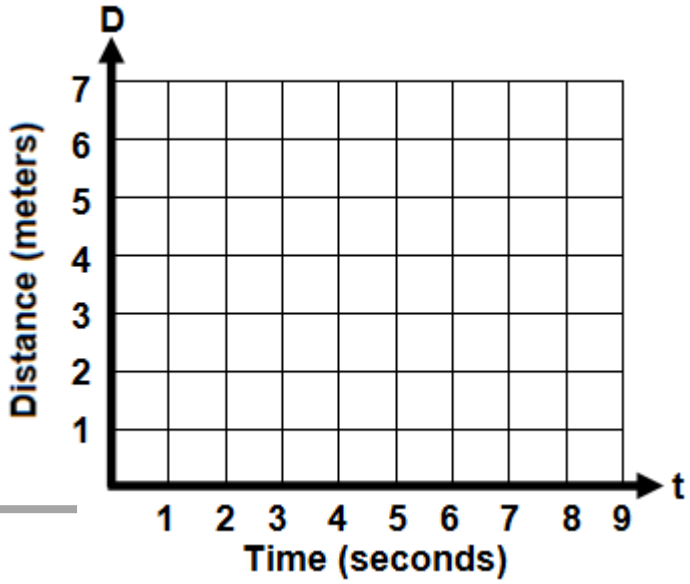
_____

_____

_____

_____

_____



In UMATH X follow the **Content Menu** path:
Graphing > Equation of a Straight Line > Word Problems-Applications > The Walker
Compare your graph and answer above with those in ***Different Speed***. **Correct** any mistakes.

4. **Scenario #2**
On Trail #3, Rudy has slowed down and Chuck is now 10 m ahead of him 100 m from the finish line. S
Rudy increases his rate to ___ m every ___ s while Chuck maintains a constant rate of 5 m per 2 s. B
now heading toward the finish line.

Graph this linear relation for each skier on the distance-time graph on the right above.

What is the slope of the distance-time line for each skier?

What is the equation of motion .. d vs t .. for each skier?

Rudy: _____ Chuck: _____

Does Rudy catch up with Chuck? _____

If yes, at what distance and time does Rudy catch up? Distance: _____ Time: _____

Label this point on the graph.