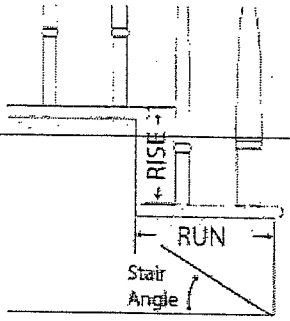
Does RSS Meet Code?

Name: _____ Block: _____

Stairs and ramps must be designed according to regulations set out by the National Building Code of Canada (NBC). We are going to verify that some of the stairs and a ramp at RSS meet code. According to the NBC, the stairs in our building should follow this code:



- have a **rise in the range of 12.5 - 20.0 cm**
- have a **run in the range of 21.0 - 35.5 cm**

What is the **minimum slope** (to 3 decimal places) and **grade** (to one decimal place) that is allowed for stairs given these values?

Minimum stair slope: _____

Minimum stair grade: _____

What is the **maximum slope** (to 3 decimal places) and **grade** (to one decimal place) that is allowed for stairs given these values?

Maximum stair slope: _____

Maximum stair grade: _____

$$slope = \frac{rise}{run}$$

$$grade = slope \times 100\%$$

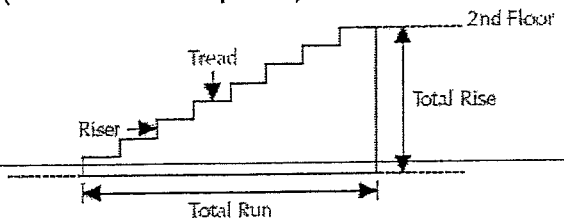
Ramps have a different code. They should have a slope between 1 : 12 and 1 : 10. Assume that anything less than 1 : 12 is not considered a ramp. A slope of 1 : 8 for a ramp is too steep and is strictly prohibited.

Minimum ramp slope: 1 : 12 = _____ = _____
as a decimal, to 3 decimal places; grade (%), to one decimal place

Maximum ramp slope: 1 : 10 = _____ = _____
as a decimal, to 3 decimal places; grade (%), to one decimal place

Measuring Stairs

Stairs are made up of a **tread** and a **riser**. You will use a tape measure to obtain these values to find the **slope** (also known as **pitch**) of the stairs.



1. Measure the rise (riser) and run (tread) of **one step** in the staircase by room 2009. Calculate the slope to three decimal places and also find the grade of the stairs. Decide whether each meets code.

Stairs by room 2009 (one step only)	Does it meet code? Y/N
Rise (cm):	
Run (cm):	
Slope:	
Grade (%):	

2. Find a way to measure the **total rise** and **total run** of the entire top or bottom portion of the staircase.

Stairs by room 2009 (whole staircase)	Does it meet code? Y/N
Total rise (cm):	
Total run (cm):	
Slope of whole staircase:	
Grade of whole staircase (%):	

3. What do you notice about this slope and grade compared to the single step? **Why is this?**

4. Now go to the stairs that lead into the forum. Complete the same measurements and calculations for **one step** only.

Stairs into forum (one step only)	Does it meet code? Y/N
Rise (cm):	
Run (cm):	
Slope:	
Grade (%):	

Measuring the Ramp

5. Measure the total rise and total run of the ramp that leads into the forum. You will need to use some of the objects and markings around the ramp to help you figure this out. Calculate the slope and grade. Does it meet code?

Ramp into forum	Does it meet code? Y/N
Rise (cm):	N/A
Run (cm):	N/A
Slope:	
Grade (%):	

Problems

6. An architect must design a staircase for a building. There is a 3 m horizontal area in which the staircase can be built but it must reach up to a height of 2.9 m.

   (a) What is the **smallest** slope a straight staircase could have given these constraints?

   (b) Does this slope meet code?

   (c) What could the architect do to overcome this problem? Hint: think of the staircases at RSS.

7. This same architect must also design a ramp that allows a person to climb 1 meter. What is the shortest horizontal length (run) this ramp could have to meet code? (Sketch this out below)

8. **Summary Question:**

a) Why are ramps important? (2)

b) Why is it important to stay within the building code (see 1st page) when building ramps? (2)