

Day 4: Grade, Pitch, and Distance

Friday, September 20, 2013 9:32 AM

AW Math 11

Name: _____

DAY 4 *Grade, Pitch and Distance class notes*

Grade • Slope of a physical feature (Ex Hill, roof, Ski slope)
• measured as a %

$$\text{Slope} = \frac{\text{rise}}{\text{run}}$$

$$\text{Percent Grade} = \frac{\text{rise}}{\text{run}} \times 100$$

EXAMPLE 1

Martin is driving his truck on the Trans-Canada Highway. There is a sign indicating a 7% grade. What is the slope of the road, as a fraction?

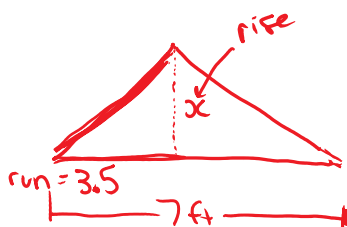
$$\text{Slope} = \frac{7}{100} \text{ (as a fraction)}$$

as a decimal 0.07

Pitch • Slope of a roof
• often stated as a ratio (Ex 1:5 in trades)
↳ slope = $\frac{1}{5}$

EXAMPLE 2

The roof of a tool shed has a pitch of 2:5. If the shed is 7 feet wide, what is the rise of the roof?



$$\text{Slope} = \frac{2}{5}$$

$$\frac{2x}{5} = 3.5$$

$$2 \times 3.5 \div 5$$

$$x = 1.4 \text{ ft}$$

DAY 4 *Grade, Pitch and Distance class notes continued*

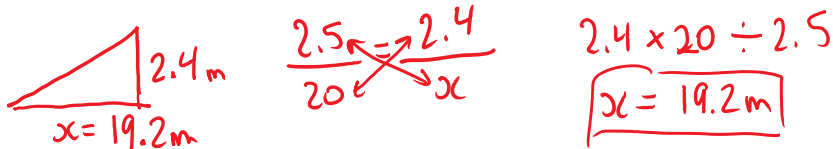
EXAMPLE 3

$\text{Slope} = \frac{\text{rise}}{\text{run}}$

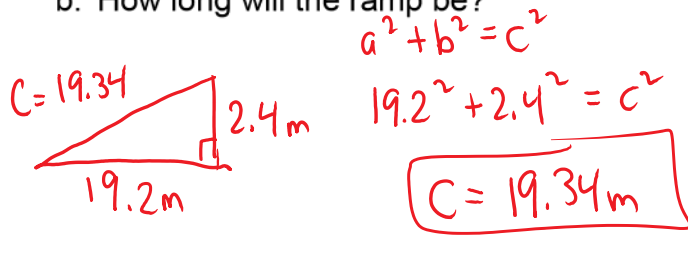
A wheelchair ramp is being built to rise to a landing that is 2.4 m above the ground. Building regulations say that the ramp can have a maximum rise of 2.5 cm per 20 cm of run.

$\text{Slope} = \frac{2.5}{20}$

a. What is the total run for the wheelchair ramp?



b. How long will the ramp be?



1 m = 100 cm
1 km = 1000 m

Assignment pg 18-20

DAY 4 *Grade, Pitch and Distance assignment*

1. Cole is driving his truck on the Trans-Canada Highway. There is a sign indicating a 9% grade.
 - a. What is the slope of the road, as a fraction?

2. A certain section of railroad track rises 6.8 metres for a run of 125.9 metres.
 - a. How long is the section of railroad track?

 - b. What is the percent grade of the road?

3. A ski jump is being built to be 3.5 m high. Olympic regulations state that the ramp must have a rise of 4.5 cm per 15 cm of run.
- What is the total run for the ski jump?
 - How long will the ski jump be?
4. Heckman Pass is a very steep section of highway connecting Anahim Lake and Bella Coola, BC. At its steepest section, it rises 900 m over a run of 5 km. What is the percent grade of this section? *Change all units to metres before starting.*
5. So that water will drain properly, a patio attached to a house should slope downwards about 2.5 inches for every 10 feet of run. Calculate:
- slope
 - percent grade.
6. One of the steepest railways in the world is the Lisbon tram in Portugal. In one section, it has a grade of 13.5%.
- Express this as a slope.

- b. Calculate the angle of elevation.
- c. What is the rise for a run of 20 m?
7. Aurena is installing a pipe for drainage. The system requires a drop of 1.5 cm for every 2.5 m of horizontal distance.
- a. What is the slope of the pipe?
- b. How much drop will she need if the horizontal distance of 12 m?
8. A roof rises 2 feet for every 5 feet of run. What is the pitch of the roof?
9. The roof of one house has a pitch of 4.2 to 12. The roof of a second house has a pitch of 7.8 to 20. Which roof is steeper?
10. One straight section of road rises from an elevation of 1070 m to 1132 m. The run is approximately 1.3 km. What is the percent grade of the road?