

# Day 3: Slope

Friday, September 20, 2013 9:32 AM



**AW Math 11**

Name: \_\_\_\_\_

## DAY 3 *Slope class notes*

**Rise** The vertical distance between  
2 points

**Run** The horizontal distance between  
2 points

**Slope** Comparison of vertical change (rise)  
to your horizontal change (run)  
Fraction:  $\frac{1}{5}$  or decimal:  $\frac{1}{5} = 0.20$

$$\text{Slope (m)} = \frac{\text{rise}}{\text{run}}$$

### EXAMPLE 1 Completing a Slope Table *⊗ Fractions in lowest terms*

Rise	Run	Slope ("m")	
		Fraction	Decimal
5 ft	20 ft	$\frac{5}{20} = \frac{1}{4}$	0.25
10 cm	40	$\frac{1}{4}$	0.25
153.6	24 in	$\frac{32}{5}$	6.4
<u>21.5 ft</u>	28.7	$\frac{3}{4}$	0.75

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

↓

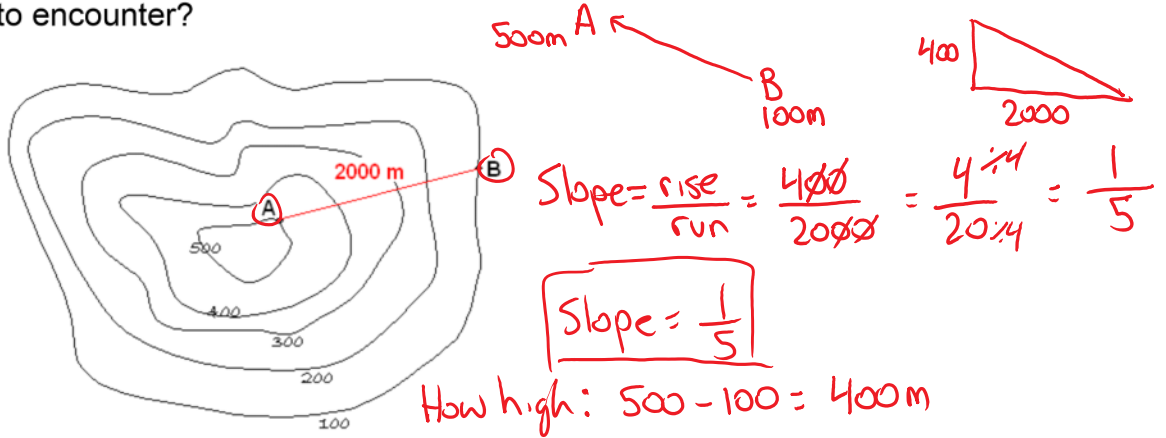
$\frac{325}{5} \rightarrow \frac{21.5}{4}$

$\frac{3}{4} \rightarrow \frac{21.5}{4}$

**EXAMPLE 2**

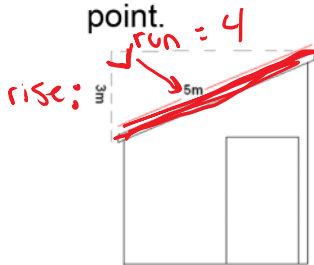
Topographical maps showing elevation of land (how high above the sea level areas are) use contour lines joining points of equal elevation.

In this contour map the contour lines indicate height above sea level in meters. The distance on the map scale between points A and B is 2000 m. If a hiker is at point B heading for point A, what is the average slope she is to encounter?



**EXAMPLE 3**

The side view of a shed is shown in the next drawing. The slanted iron roofing measures 5 m and the lowest point is 3 m lower than the highest point.



Slope =  $\frac{\text{rise}}{\text{run}}$  need to find run:

$$c^2 - b^2 = a^2$$

$$5^2 - 3^2 = x^2$$

$$25 - 9 = x^2$$

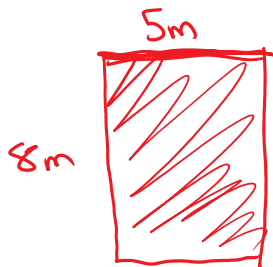
$$\sqrt{16} = x$$

$x = 4$

What is the slope of the roof? State as a fraction and decimal value.

Slope =  $\frac{\text{rise}}{\text{run}} = \frac{3}{4} = 0.75$

If the roof is 8 m long (recall, its width is 5 m) and the iron roofing costs \$6.50/m<sup>2</sup>, how much will the iron roofing cost?



Area =  $L \times W$   
 $= 8 \times 5$   
 Area =  $40 \text{ m}^2$

$\$6.50 \times 40 = \$260$

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**DAY 3** *Slope assignment*

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1. Calculate the slope as a fraction in the simplest form and as a decimal. Round decimals to the tenth.

Rise	Run	Slope	
		As a fraction	As a decimal
18 m	63 m		
21 m	49 m		
1.2 cm	0.6 cm		
300 ft	900 ft		

2. Use the information given to complete the table. Show your proportion below.

Rise	Run	Slope
15 ft		$\frac{1}{4}$
12 cm		0.375
	42 in	$\frac{32}{7}$
63 m		3.0
19.5 ft		0.25

3. A ski jump rises 3 feet over a run of 7 feet.

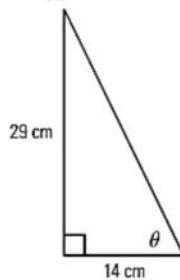
a. What is the slope of the ski jump?

Note that key gives answers in decimals only. Show the fractional slope, then change to decimal.

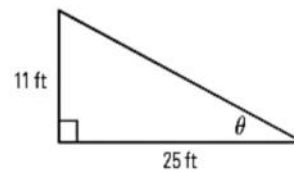
b. What is the length of the surface of the jump?

4. Calculate the *marked angle* and the *slope* of the hypotenuse for each triangle.

a.



b.



5. A driveway rises 2.2 m from the street level to the carport, which is a horizontal distance of 5.8 m from the street.

a. How long is the driveway? (Driveway length is the hypotenuse. Draw triangle!)

b. What is the angle between the driveway and the horizontal? Write trig equation, and solve for unknown angle.

6. One of the steepest railways in the world is the Lisbon tram in Portugal. In one section, it has a slope of 0.135.
- Express this slope as a fraction.
  - Calculate the angle between the railway and the horizontal.
  - What is the rise for a run of 15 m? Draw again! Use angle from (b) and a trig equation.
7. So that water will drain properly, a patio attached to a house should drop downward about two and a half inches for every 10 feet of run. Calculate the slope. (12 inches = 1 foot) Draw! *Change all values to inches.*
8. 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 **slope** of this section? (1000 m = 1 km) Draw! *Change everything to metres.*
9. What is the pitch of the roof of an A-frame building if its height is 3.6 m and its width is 5.4 m? (Consider only one side of the roof.)

