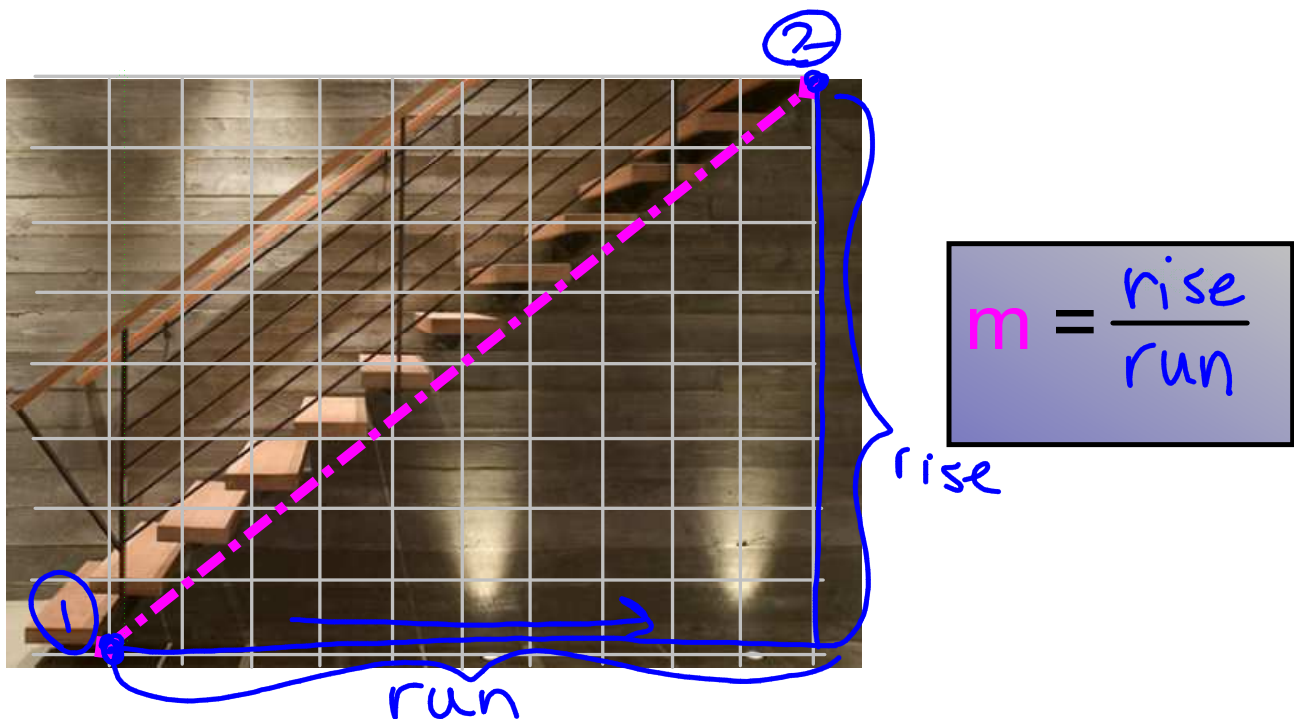*Oct 18, 2016*

Unit 2: Linear Relations

Day 1: Slope as Rate of Change

Today we will....

1. Connect the rate of change of a linear relation to the slope of the line.

2. Define the slope of a line.

3. Determine the slopes of lines.

The Slope of a Line:

The slope is the ___"steepness"___ of a line.

②

①

rise

run

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

Why "m" for slope? from the French verb *monter* ("to go up")

Units for Slope:

In the last example, we didn't specify what units we were measuring the line.

Let's say we were using feet.

$$m = \frac{8 \text{ feet}}{10 \text{ feet}} \quad \rightarrow rise$$
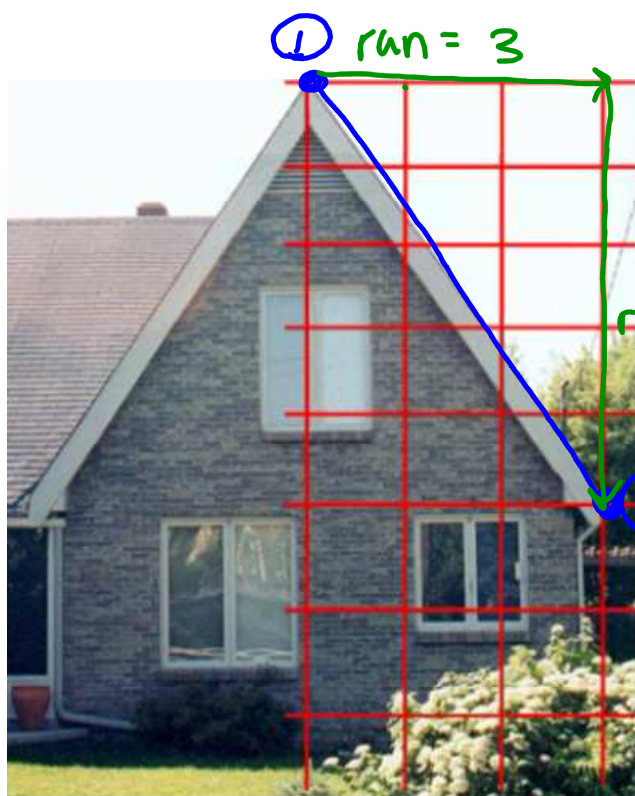$$\rightarrow run$$

Thus slope has __no__ units (when "rise" and "run" are measured in the same units).

We will always leave the slope as a fraction (not a decimal)

→ It's a lot easier to find values for rise and run if we keep it as a fraction.

$$m = \frac{8}{10} \quad \rightarrow rise$$
$$\rightarrow run$$

$$m = 0.8$$

① run = 3

rise
= -5

②

Ex. 1 The slope of a roof is called the *pitch*. What is the pitch of this house's roof?

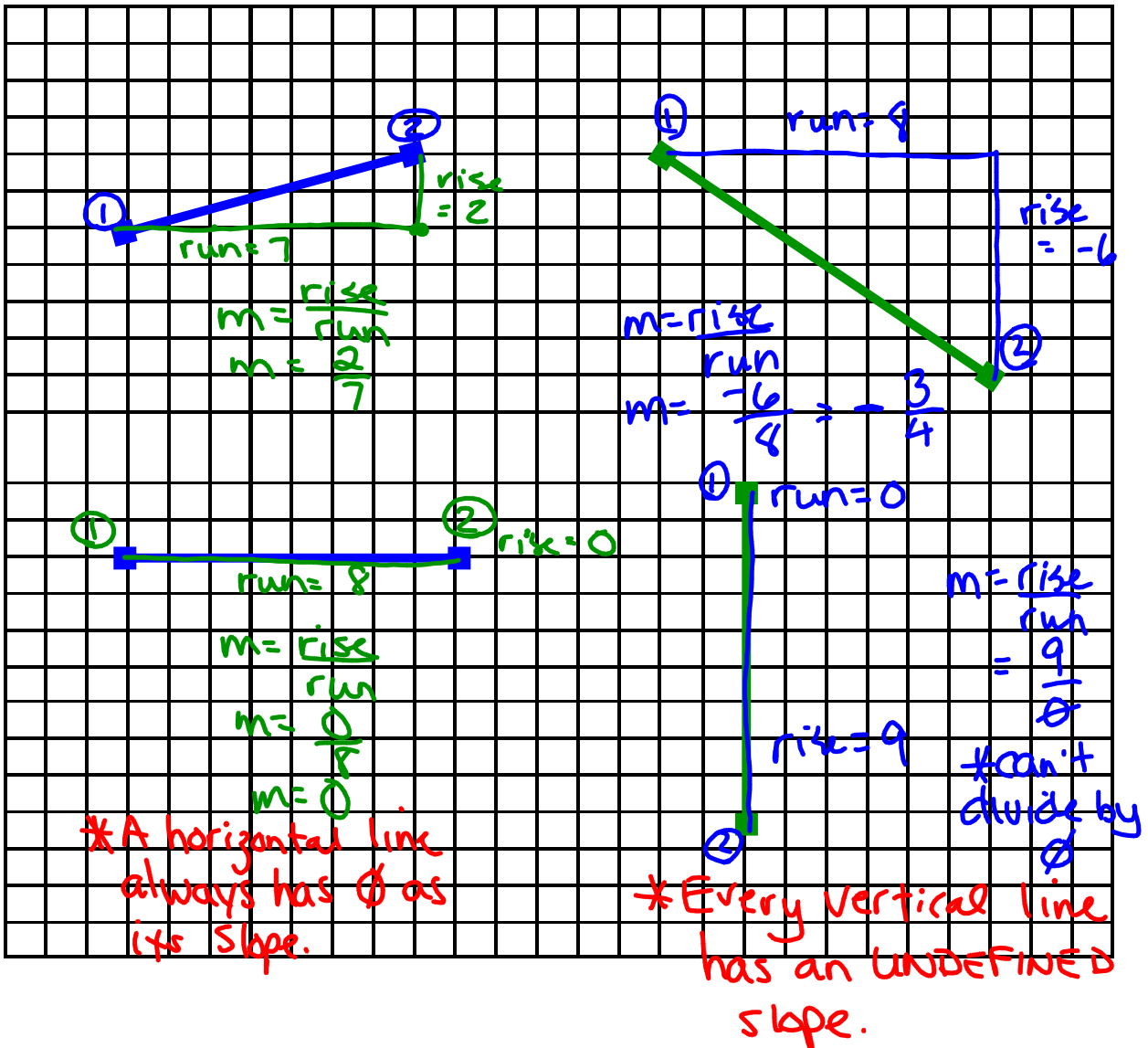$$m = \frac{rise}{run}$$

$$m = \frac{-5}{3}$$

$$m = -\frac{5}{3}$$

Why would a house need a roof with a very steep pitch?

snow

Ex. 2 Determine the slopes of these line segments?
- always consider the line from the left-most point to the right-most point!

①

②

rise
= 2

run = 7

$m = \dfrac{rise}{run}$

$m = \dfrac{2}{7}$

①

run = 8

②

rise = 0

$m = \dfrac{rise}{run}$

$m = \dfrac{0}{8}$

$m = 0$

*A horizontal line always has 0 as its slope.

①

run = 8

rise = -6

②

$m = \dfrac{rise}{run}$

$m = \dfrac{-6}{8} = -\dfrac{3}{4}$

①

run = 0

rise = 9

②

$m = \dfrac{rise}{run}$

$= \dfrac{9}{0}$

*can't divide by 0

*Every vertical line has an UNDEFINED slope.

For the next 10 minutes, work on ......

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#1, 7

Anything not done in 10 minutes, must
be completed for homework.

Ex. 3 Determine the slope given a table of values.

run   rise

x	y
① 1	-2
2	0
3	2
4	4
② 5	6

run → from 1 to 5 → 5 - 1 = 4
rise → from -2 to 6 → 6 - (-2) = 6 + 2 = 8

$m = \dfrac{rise}{run}$

$m = \dfrac{8}{4}$

$m = 2$

Ex. 4 For each linear relation, create a table of values and determine the rate of change in the *y*-values.

a) y = 3x - 5

You calculate these values

you → pick these values

x	y
① 1	-2
2	1
3	4
4	7
② 5	10

Y = 3x - 5
Y = 3(1) - 5
Y = 3 - 5
Y = -2

Y = 3x - 5
Y = 3(2) - 5
Y = 6 - 5
Y = 1

$m = \dfrac{rise}{run}$

$m = \dfrac{10 - (-2)}{5 - 1}$

$m = \dfrac{10 + 2}{4}$

$m = \dfrac{12}{4}$

$m = 3$

b) y = -2x + 5

run   rise

x	y
① 1	3
② 2	1
3	-1
4	-3
5	-5

Y = -2(1) + 5
= -2 + 5
= 3

$m = \dfrac{rise}{run}$

$m = \dfrac{1 - 3}{2 - 1}$

$m = \dfrac{-2}{1}$

$m = -2$

Skill Practice/Homework:

Pg. 106
#1, 2, 3(a, c), 4(a, c), 6(a, c), 7, 9
Note: the red questions should
already be done!!

Full solutions to all practice questions due at the
beginning of next class.