Objective

The student will be able to:

find the slope of a line given 2 points and a graph.
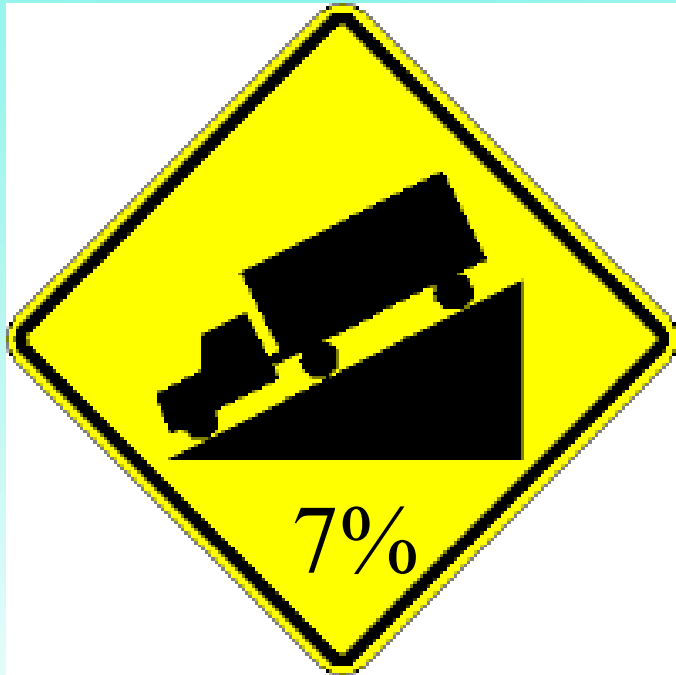
SOL: A.6a

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What is the meaning of this sign?

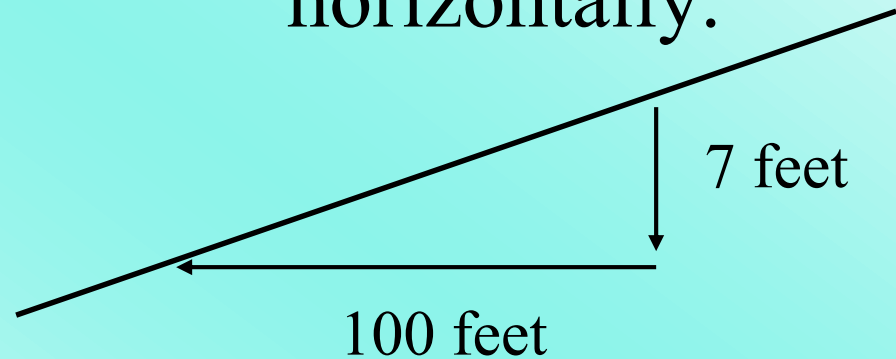
1. Icy Road Ahead
2. ✓ Steep Road Ahead
3. Curvy Road Ahead
4. Trucks Entering Highway Ahead

What does the 7% mean?

7% is the slope of the road. It means the road drops 7 feet vertically for every 100 feet horizontally.
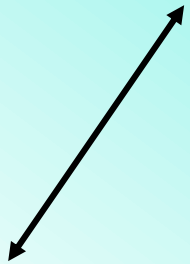
7 feet

100 feet

So, what is slope???
Slope is the steepness of a line.

Slope can be expressed different ways:

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)} = \frac{rise}{run} = \frac{\text{vertical change}}{\text{horizontal change}}$$
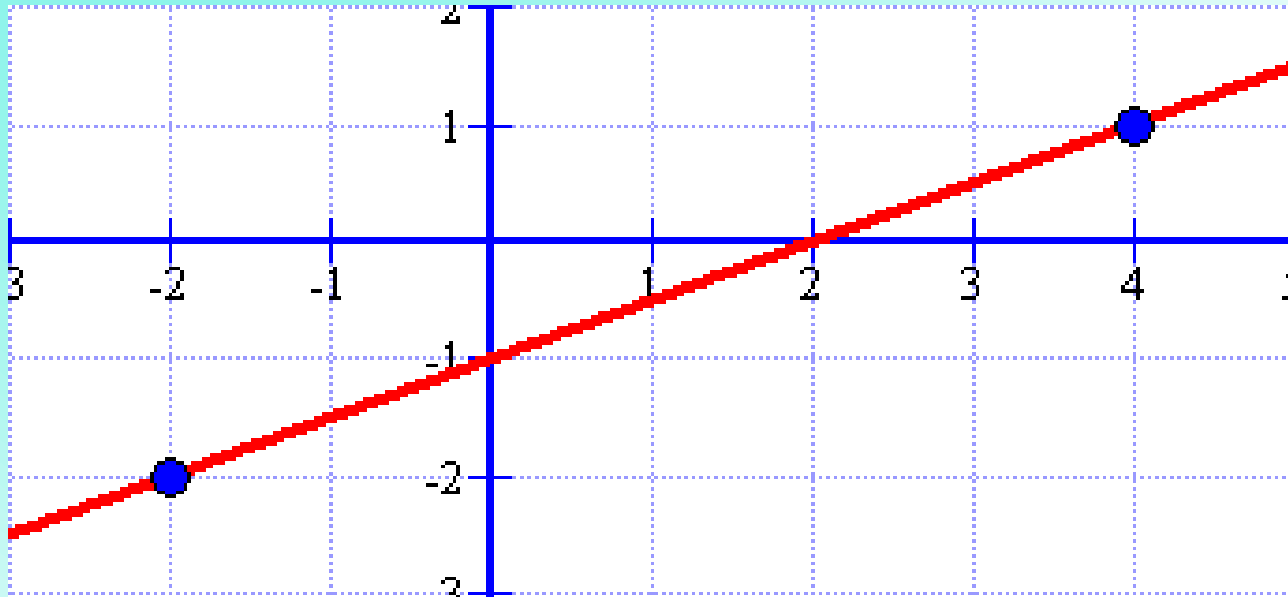
A line has a positive slope if it is going <u>uphill from left to right</u>.

A line has a negative slope if it is going <u>downhill from left to right</u>.
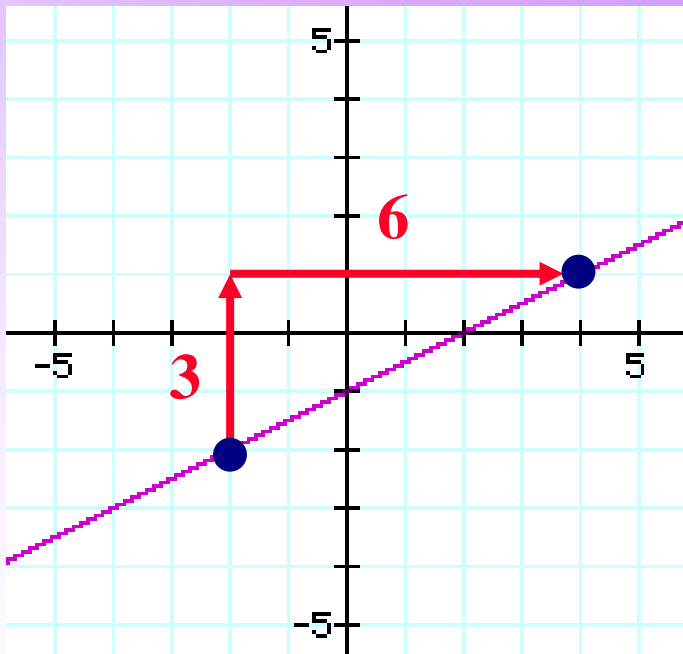
1) Determine the slope of the line.

When given the graph, it is easier to apply "**rise over run**".

Determine the slope of the line.

Start with the lower point and count how much you rise and run to get to the other point!

$$\frac{\text{rise}}{\text{run}} = \frac{3}{6} = \frac{1}{2}$$

Notice the slope is positive AND the line increases!

2) Find the slope of the line that passes through the points (-2, -2) and (4, 1).
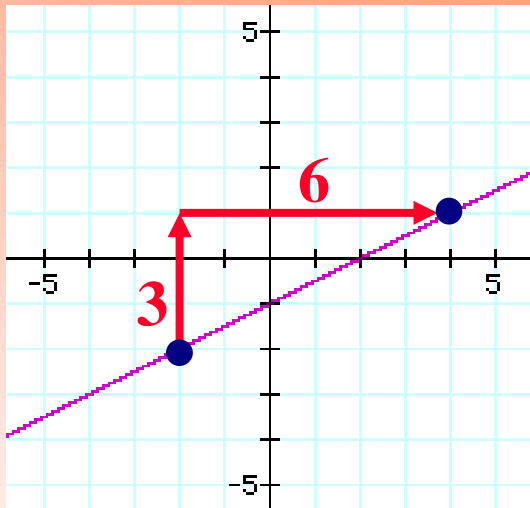
When given points, it is easier to use the formula!

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

y_2 is the y coordinate of the 2nd ordered pair ($y_2 = 1$)

y_1 is the y coordinate of the 1st ordered pair ($y_1 = -2$)

$$m = \frac{(1 - (-2))}{(4 - (-2))} = \frac{(1 + 2)}{(4 + 2)} = \frac{3}{6} = \frac{1}{2}$$

Did you notice that Example #1 and Example #2 were the same problem written differently?

(-2, -2) and (4, 1)

$$slope = \frac{1}{2}$$

You can do the problems either way! Which one do you think is easiest?

Find the slope of the line that passes through (3, 5) and (-1, 4).

1. 4
2. -4
3. ¼
4. - ¼

3) Find the slope of the line that goes through the points (-5, 3) and (2, 1).

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{1-3}{2+5}$$
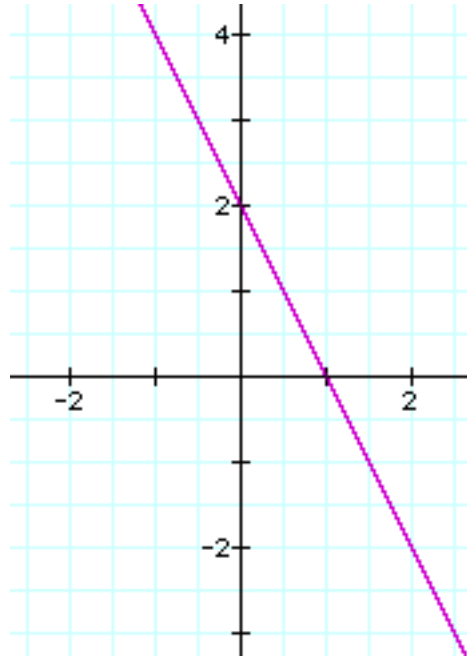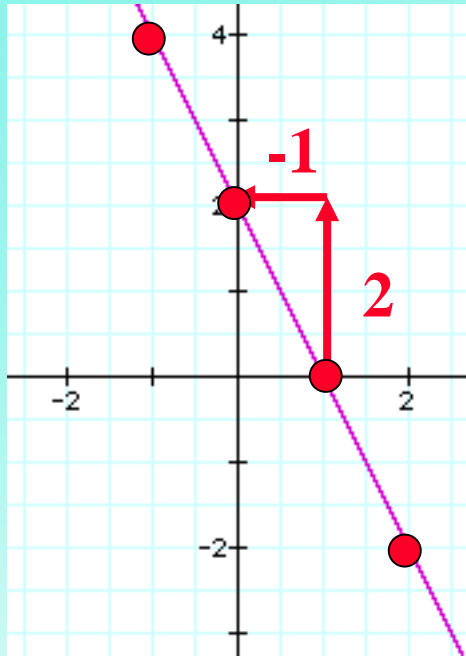
$$m = \frac{1-3}{2-(-5)}$$

$$\boxed{m = \frac{-2}{7}}$$

Determine the slope of the line shown.
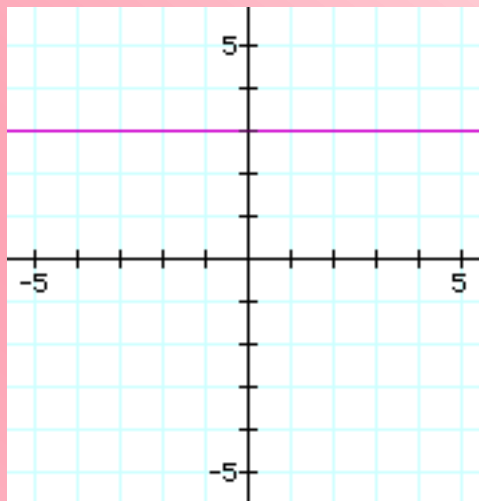
✔ 1. -2

2. -½

3. ½

4. 2

Determine the slope of the line.

Find points on the graph.
Use two of them and
apply rise over run.

$$\frac{rise}{run} = \frac{2}{-1} = -2$$

The line is decreasing (slope is negative).

What is the slope of a horizontal line?
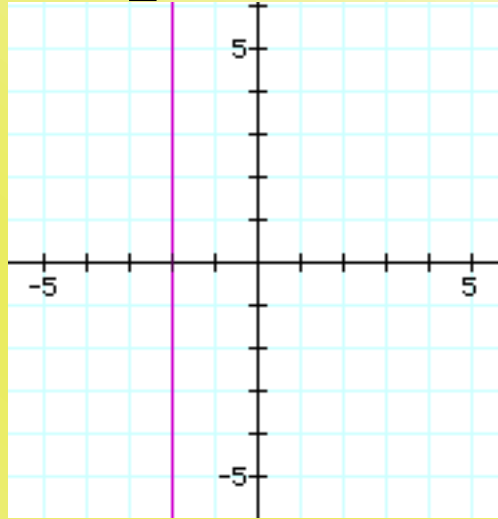

The line doesn't rise!

$$m = \frac{0}{number} = 0$$

All horizontal lines have a slope of 0.

What is the slope of a vertical line?

The line doesn't run!

$$m = \frac{number}{0} = undefined$$

All vertical lines have an undefined slope.

Remember the word "VUXHOY"
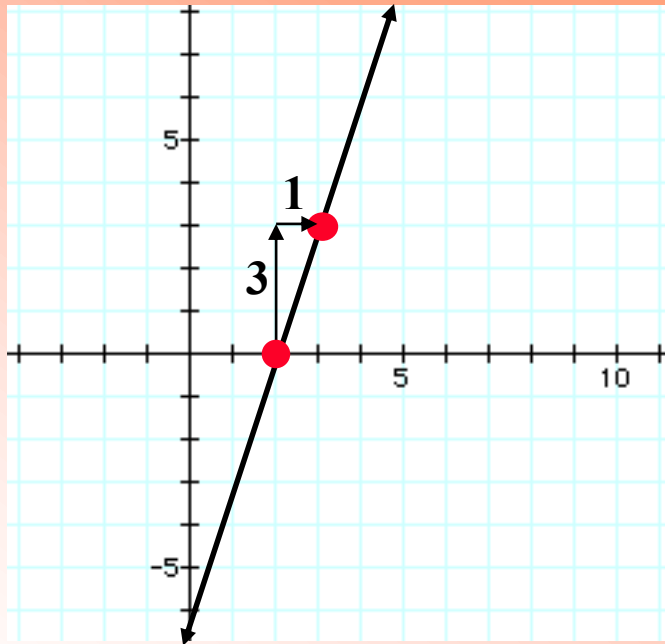
Vertical lines

Undefined slope

X = number; This is the equation of the line.

Horizontal lines

O - zero is the slope

Y = number; This is the equation of the line.

Draw a line through the point (2,0) that has a slope of 3.

1. Graph the ordered pair (2, 0).
2. From (2, 0), apply rise over run (write 3 as a fraction).
3. Plot a point at this location.
4. Draw a straight line through the points.

The slope of a line that goes through the points (r, 6) and (4, 2) is 4. Find r.
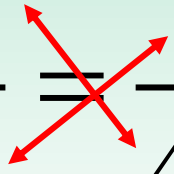
To solve this, plug the given information into the formula

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}.$$

$$4 = \frac{2 - 6}{4 - r}$$

To solve for r, simplify and write as a proportion.

$$4 = \frac{2 - 6}{4 - r}$$

$$\Rightarrow \qquad \frac{4}{1} = \frac{-4}{4 - r}$$

Cross multiply.

$$\frac{4}{1} \diagup\hspace{-1.2em}= \frac{-4}{4 - r}$$

$$1(-4) = 4(4 - r)$$

Simplify and solve the equation.

$$1(-4) = 4(4 - r)$$

$$-4 = 16 - 4r$$

$$\underline{-16 \quad -16}$$

$$\frac{-20}{-4} = \frac{-4r}{-4}$$

$$5 = r$$

The ordered pairs are (5, 6) and (4, 2)