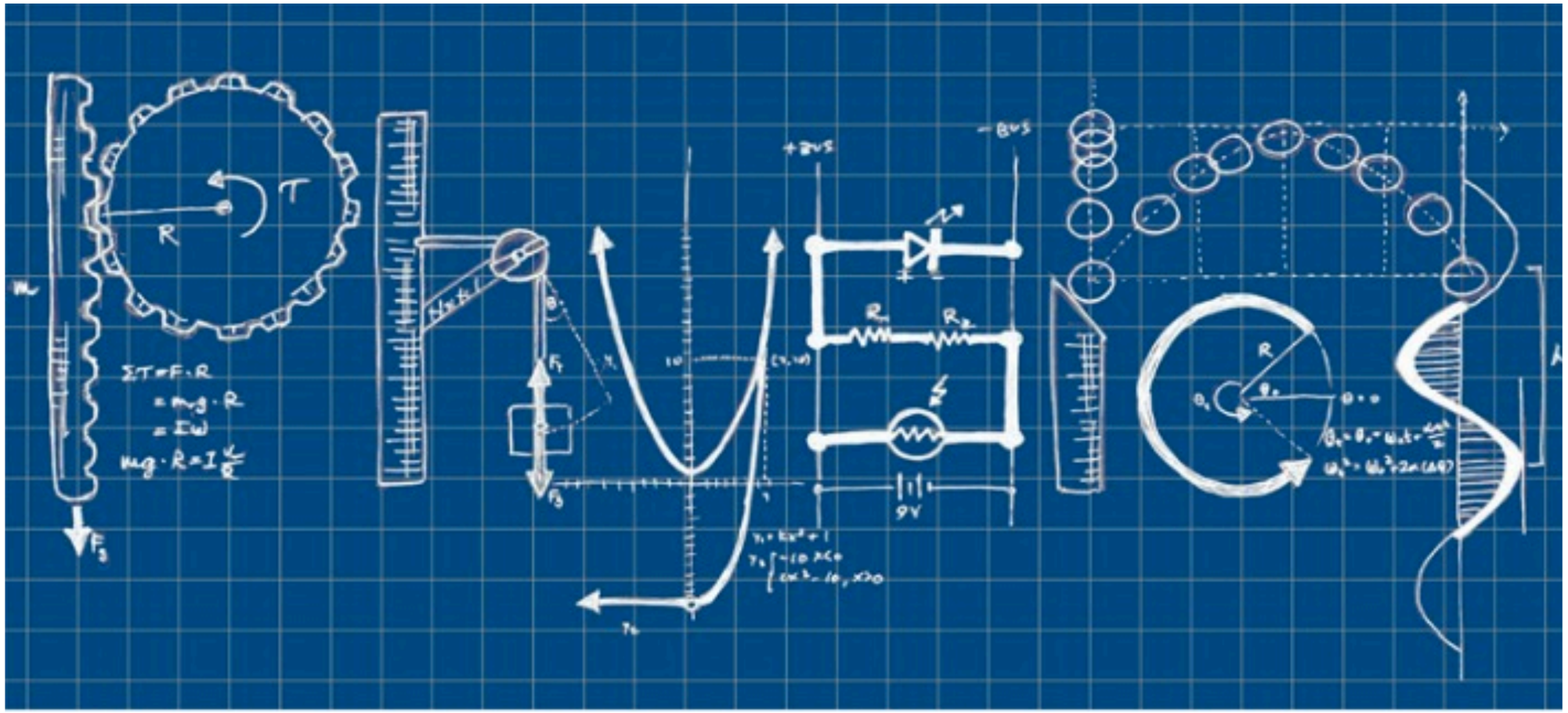
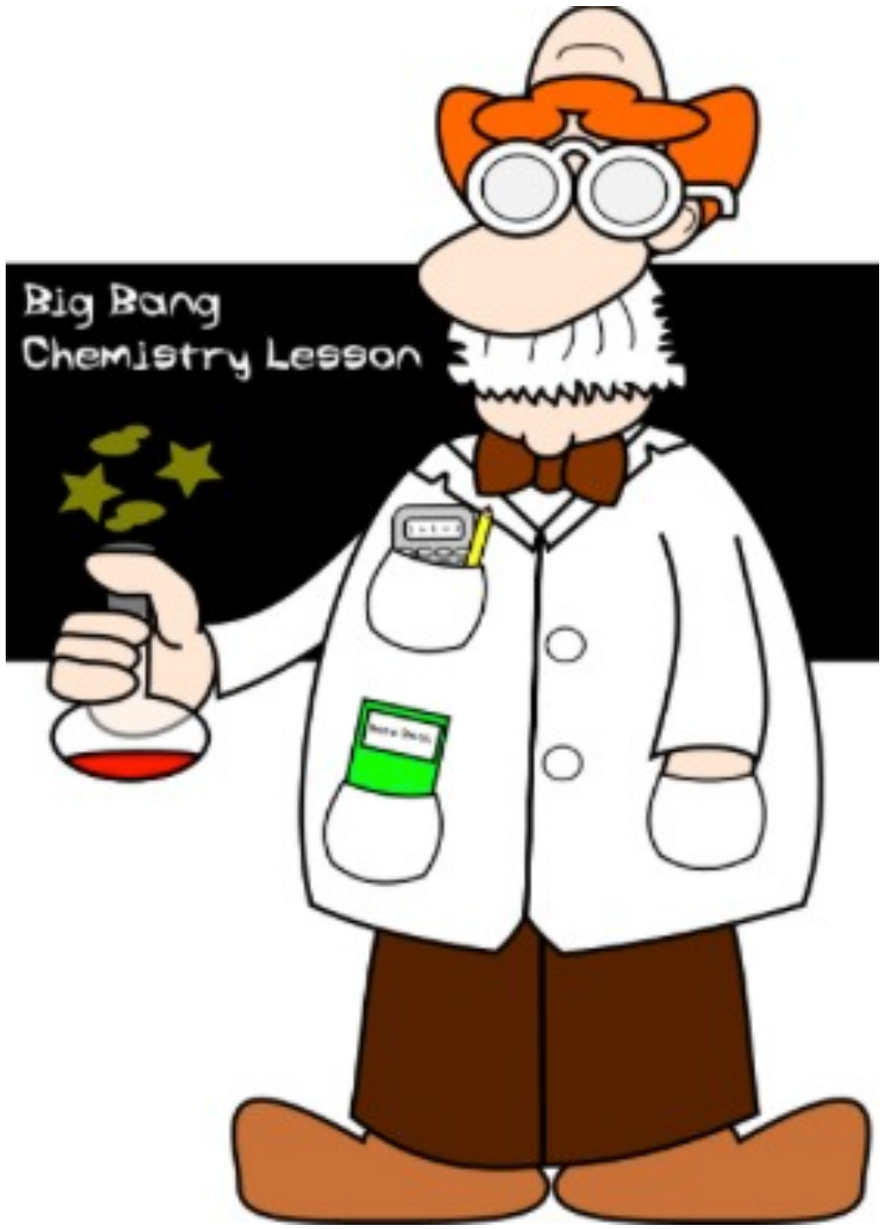
Hello!

- Find a seat.
- Take out your notebook, a pencil, and a calculator.
- Please put cell phones in a place where they can not be seen.



Welcome!



Greet the Creature

Interest Survey

- Please fill out the survey to the best of your ability.
- You will be sharing an item or two with your new lab partner tomorrow during class.
- You will not have to show your lab partner your survey, though I will collect it to get to know you better.

Interest Survey

- Interview your lab partner. Find out two items from their survey that they want you to know about them.
- You will introduce your partner to the class along with one thing about them that they would like the class to know.

What is Physics?

- Making sense of our physical environment.
- Describing how matter, energy and motion interact.
- The behavior of the universe.

What happening?

5 Fun Physics Phenomena

Math Pre-test

- You will need a calculator, a pencil, and a calculator.
- You will have the rest of the period to complete the quiz. Finish overnight if you need to.
- I will be collecting it.
- There is no benefit to sharing answers.

Pre-test Notes

- Redraw the line for number 1. The line should go through the five corners.
- This will affect your answers.

Do Now

- Take out your math pretest.
- Take out a pen or pencil and your notebook.

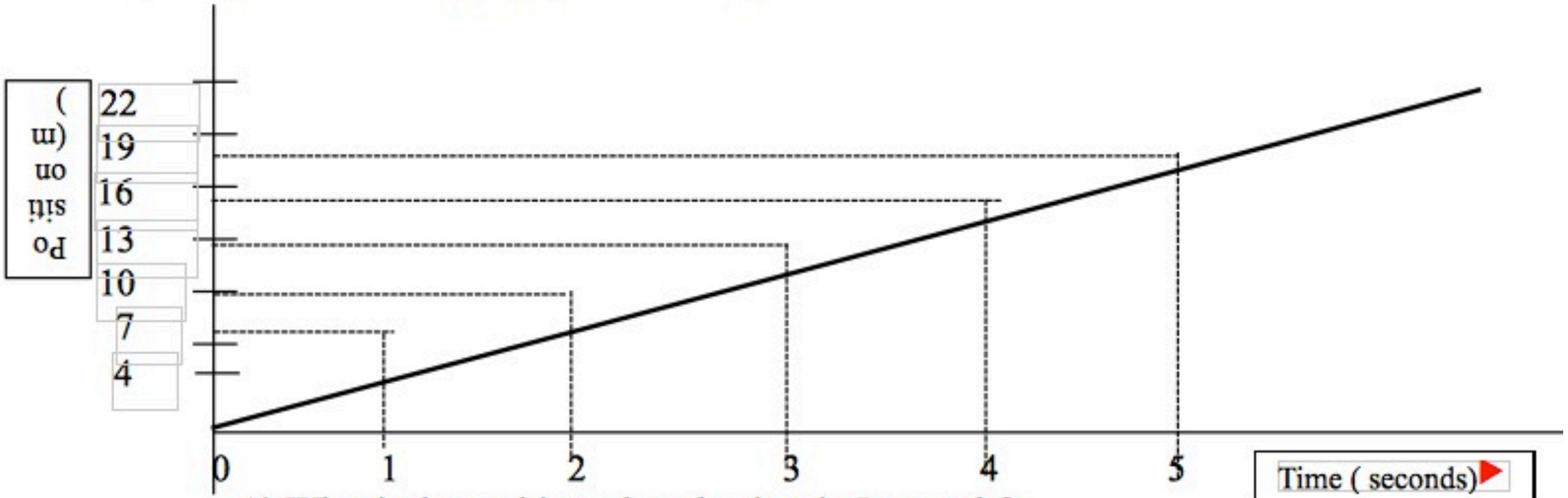
Math Pre-test Review

- I will ask for volunteers to help me answer questions.

- We will go through first side of the pre-test, then you will be changing into your new, assigned seats. We will continue the quiz until be are finished.

Honors Physics Math Pre-Test

1) Using the following graph, answer the questions that follow:



_____ A) What is the position when the time is 5 seconds?

_____ B) When is the object at position 7 meters?

_____ C) What is the value of the slope?

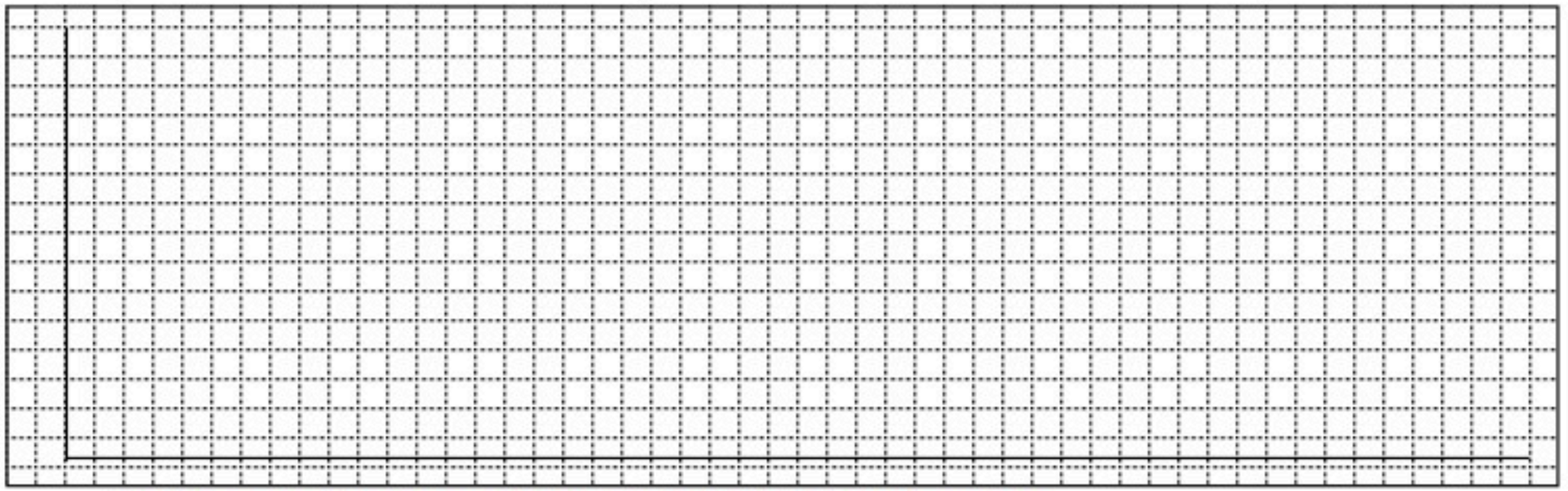
_____ D) What is the y (position) intercept?

E) Write a specific equation that describes the line shown on the graph. Use the symbol x for position and t for time.

2)

A) Plot the points and label the graph for a baseball player who does not use human growth hormone:

x (number of years experience)	y (cumulative number of homeruns)
1	35
2	72
3	112
4	137
5	175
6	210



B) Using a ruler, draw a LINE OF BEST FIT on the graph.

_____C) Using the line of best fit, predict the cumulative number of homeruns that will be hit by season 7.

A) $v = v_0 + at$, where $v_0 = 5$, $a = 7$, $t = 3$, $v = ?$

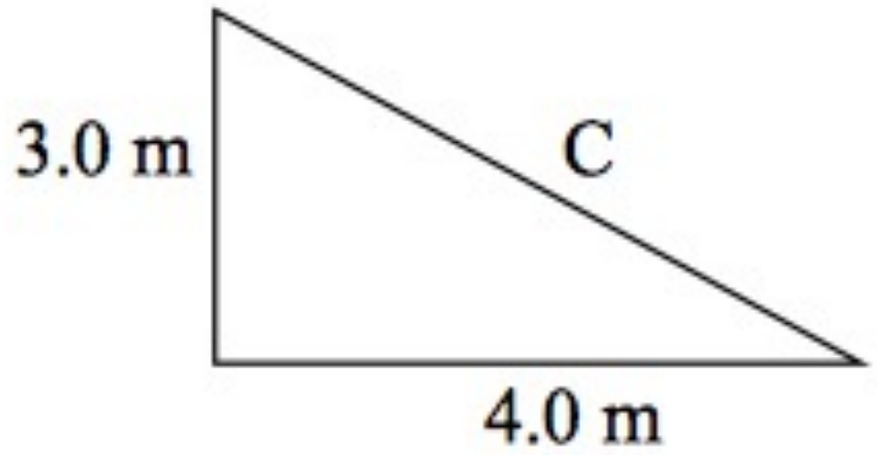
B) $v^2 = v_0^2 + 2a\Delta x$, where $v = 7$, $a = 4$, $\Delta x = 3$, $v_0 = ?$

$\Delta x = v_0 t + 0.5at^2$, where $\Delta x = 72$, $a = 7$, $t = 4$,
$v_0 = ?$

A) $v = v_0 + at$, solve for a.

B) $v^2 = v_0^2 + 2a\Delta x$, solve for a.

C) $a = F/m$, solve for m.



a) Determine the size of side **C**.

b) Determine the size of the angle in the lower right (in degrees).

http://www.ted.com/talks/michael_specter_the_danger_of_science_denial

You Can Be Logical

Answer the Following

- What is science?
- Why are there many people that do not trust the scientific method?
- Why is science important to our society?

6) Given the equation: $90 = 5 + 2\mathbf{t} + 3\mathbf{t}^2$,find all solutions for **t.**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

6) Given the equation: $90 = 5 + 2\mathbf{t} + 3\mathbf{t}^2$,find all solutions for **t.**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

7) Given the equations: $X = 10 + 2t^2$ and $X = 100 + 3t - 4t^2$ find all solutions for **x** and **t**.

Le Systeme International d'Unites

- SI Units: the standard for measurement (metric).

- Length: meter [m]
- Mass: kilogram [kg]
- Time: second [s]

SI vs British Engineering

- meter
- kilogram
- second
- newton
- Celsius

- foot
- pound
- second
- foot-pound
- Fahrenheit

Unit Prefixes

- Kilo [k] 10^3
- Mega [M] 10^6
- Giga [G] 10^9
- Tera [T] 10^12
- Centi [c] 10^-2
- Milli [m] 10^-3
- Micro [μ] 10^-6
- Nano [n] 10^-9
- Pico [p] 10^-12

Convert into Scientific Notation

- 301,000
- 0.000074
- 4,000
- 0.0200

Significant Figures

- The number of digits in a number that refer to the precision of a value.

- 301,000
- 0.000074
- 4,000
- 0.0200
- 0100.27

Significant Figures

- 301,000
- 0.000074
- 4,000
- 0.0200

Dimensional Analysis

- The role of units in problem solving.
- Dimensional analysis allows us to properly convert units by "canceling" out conversion factors.
- This is a good way to check your work. If you use DA properly, you should arrive at the proper units.

How many inches are in a meter?

Many meters are in a mile?

1 mile = 5,280 ft. 1 in = 2.54 cm.

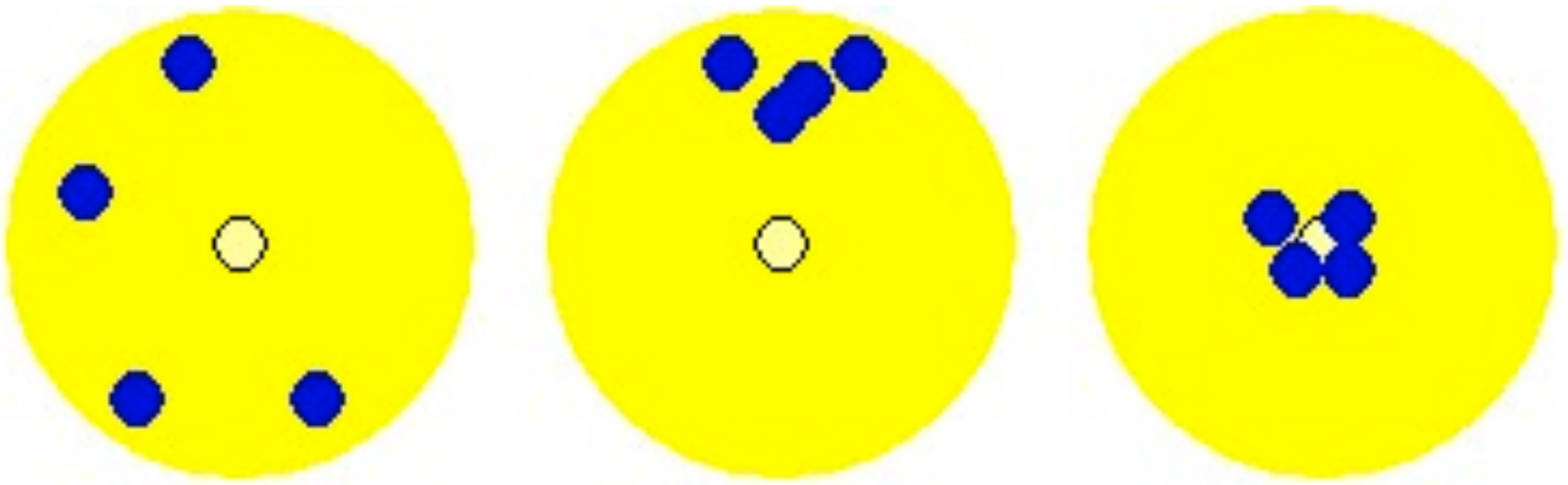
How many cubic inches in a cubic yard?

How many cubic centimeters in a cubic meter?

A car is traveling at 65 mi/hr. How fast is it traveling in m/s?

Accuracy and Precision

- Accuracy: How close a measurement is to the true value.
- Precision: How close measured values are to each other.



Not accurate,
Not precise

Not accurate,
Precise

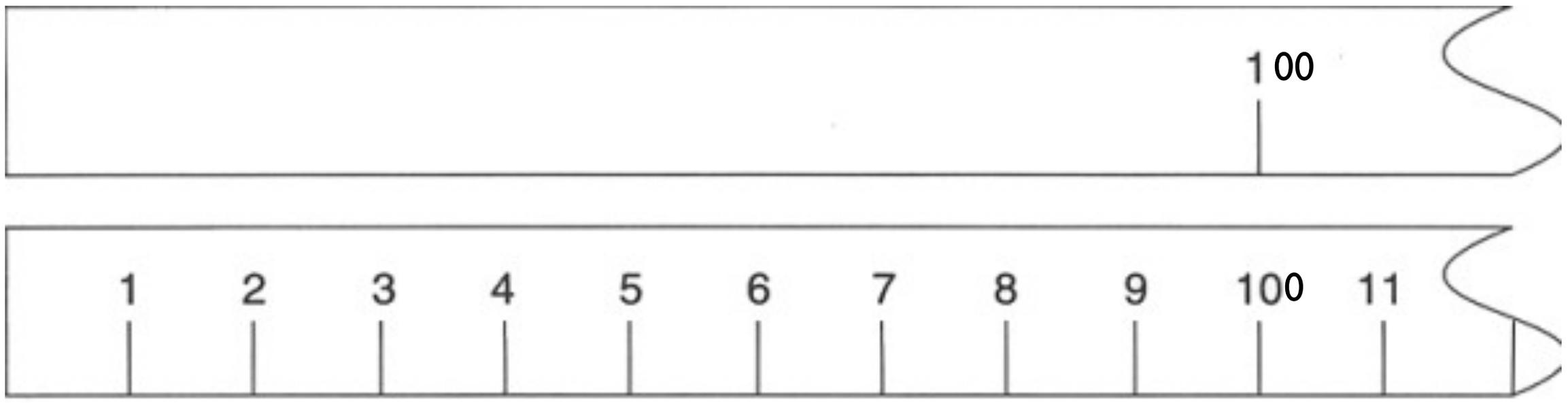
Accurate,
Precise

Precision vs Accuracy

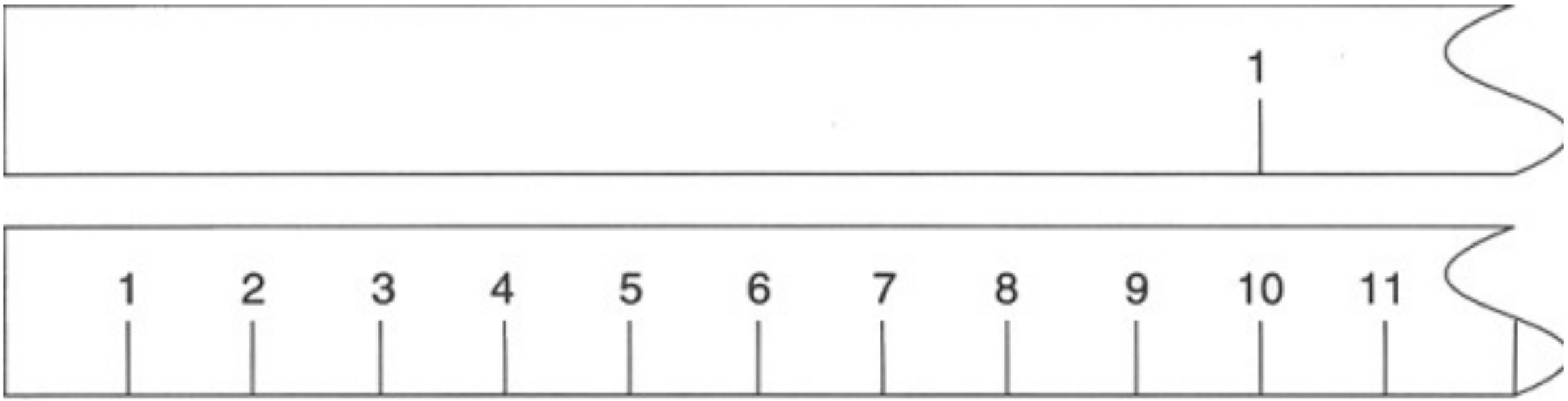
Accurate, Precise or Both?

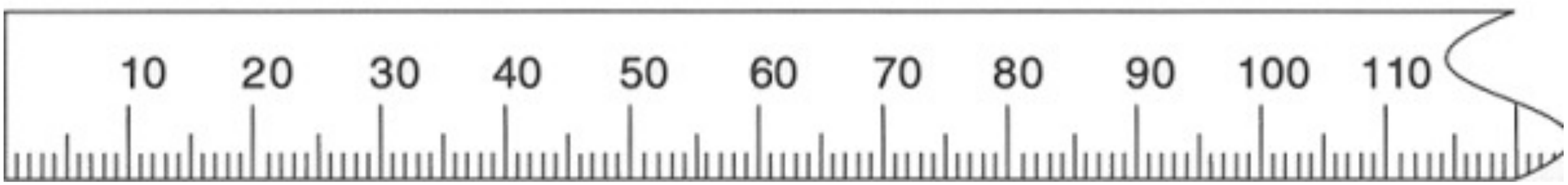
- Pi = 22/7
- Pi = 3.14159
- We are in Doylestown
- The text book has a mass of 2kg
- Three darts 1cm apart on the edge of the dart board.

Measure Your Arm

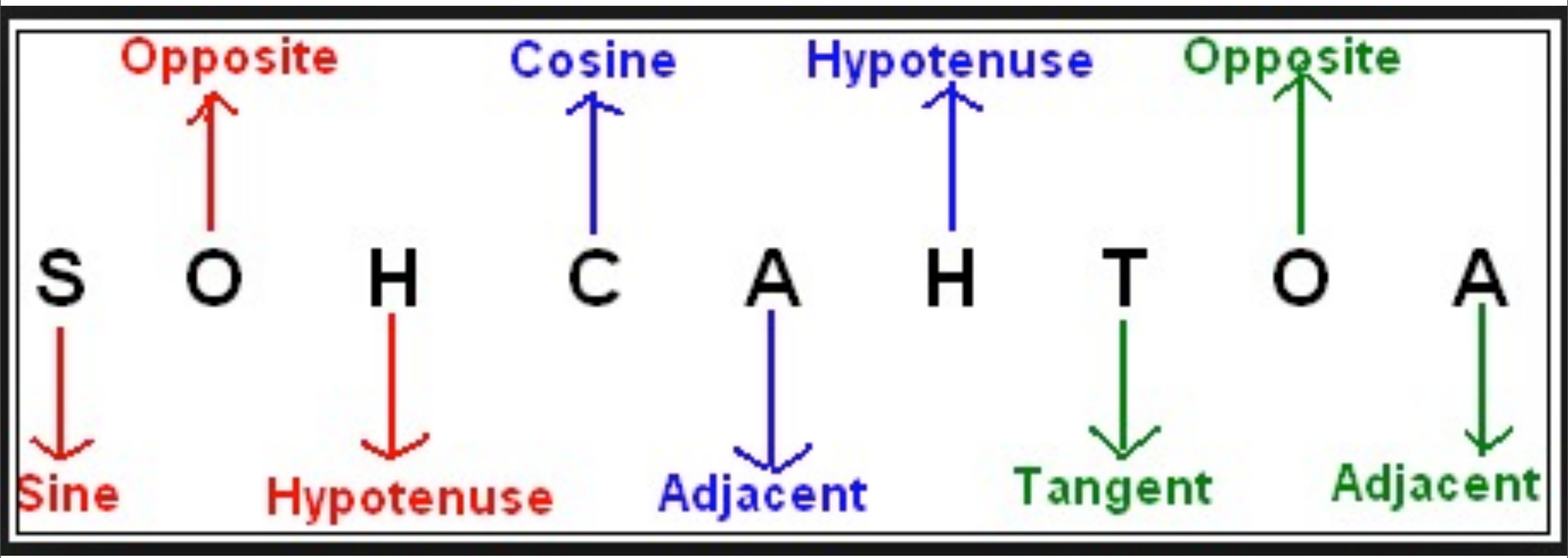


Measure Your Arm





Measure Your Arm



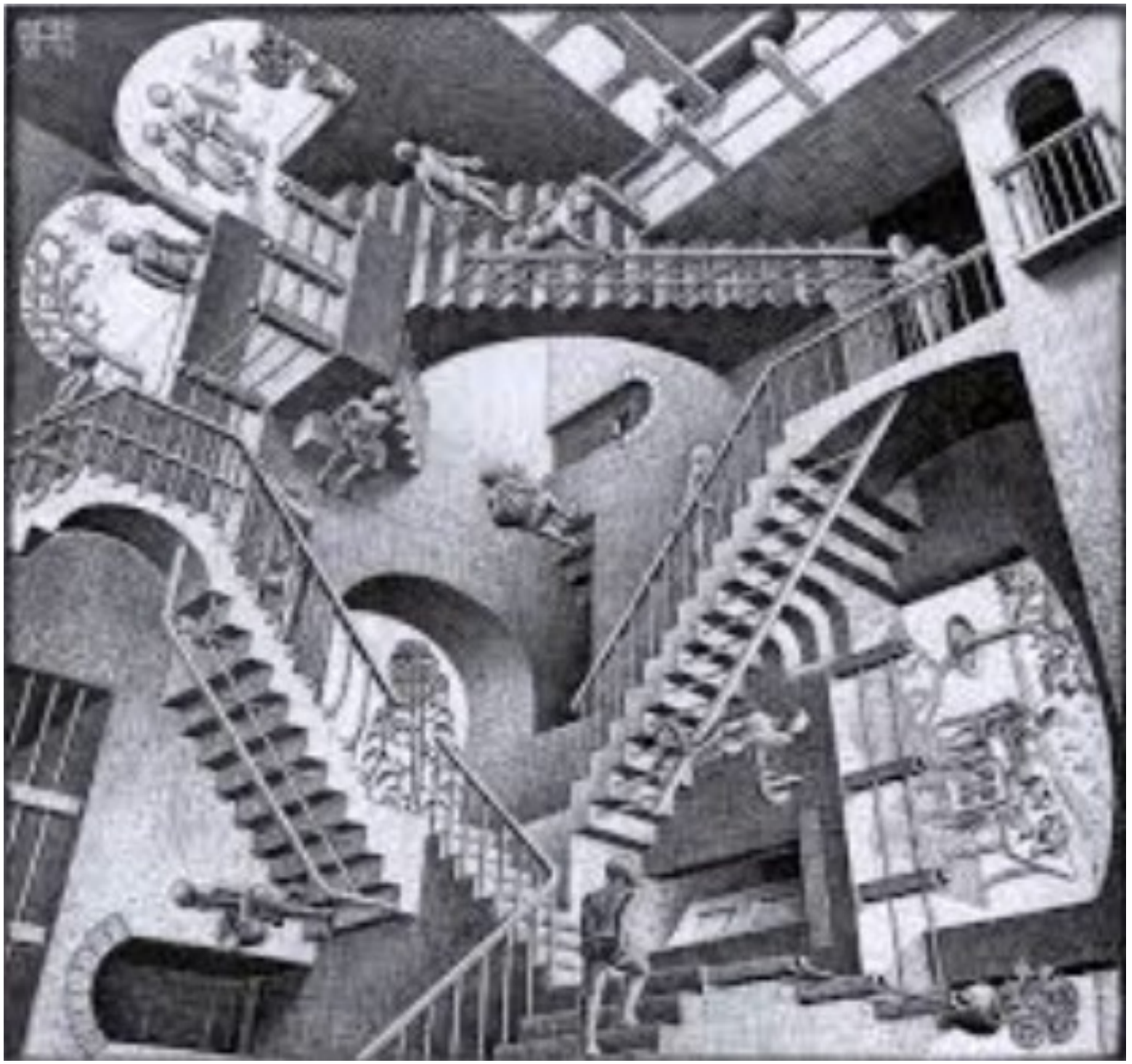
Trigonometry

$$\sin\Theta = \frac{\text{Opposite}}{\text{Hypotenuse}} \qquad \csc\Theta = \frac{1}{\sin\Theta}$$

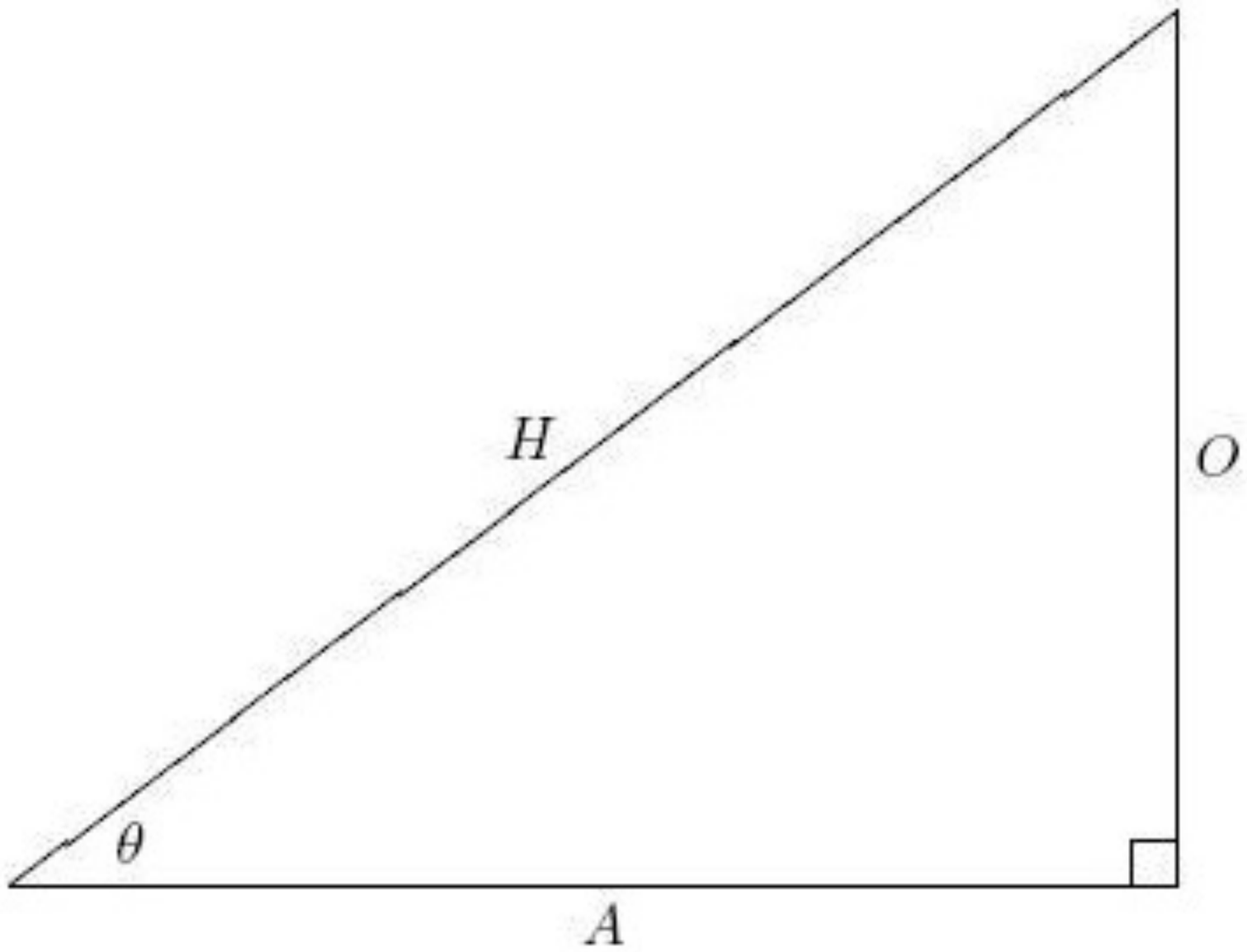
$$\cos\Theta = \frac{\text{Adjacent}}{\text{Hypotenuse}} \qquad \sec\Theta = \frac{1}{\cos\Theta}$$

$$\tan\Theta = \frac{\text{Opposite}}{\text{Adjacent}} \qquad \cot\Theta = \frac{1}{\tan\Theta}$$

Fraction Resolution



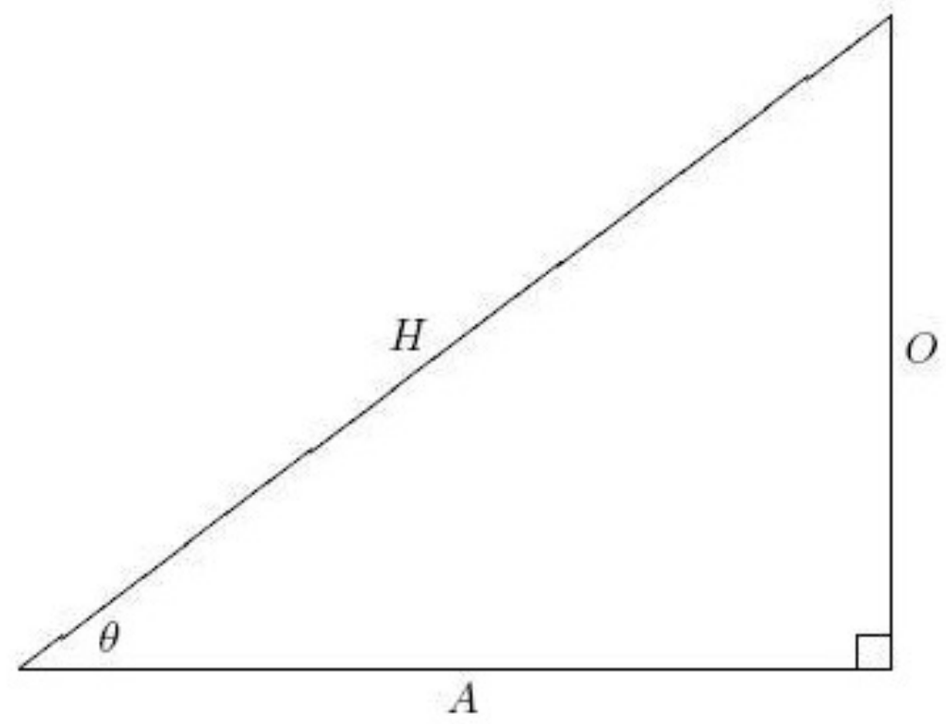
Downstairs, Downstairs = Upstairs, Upstairs

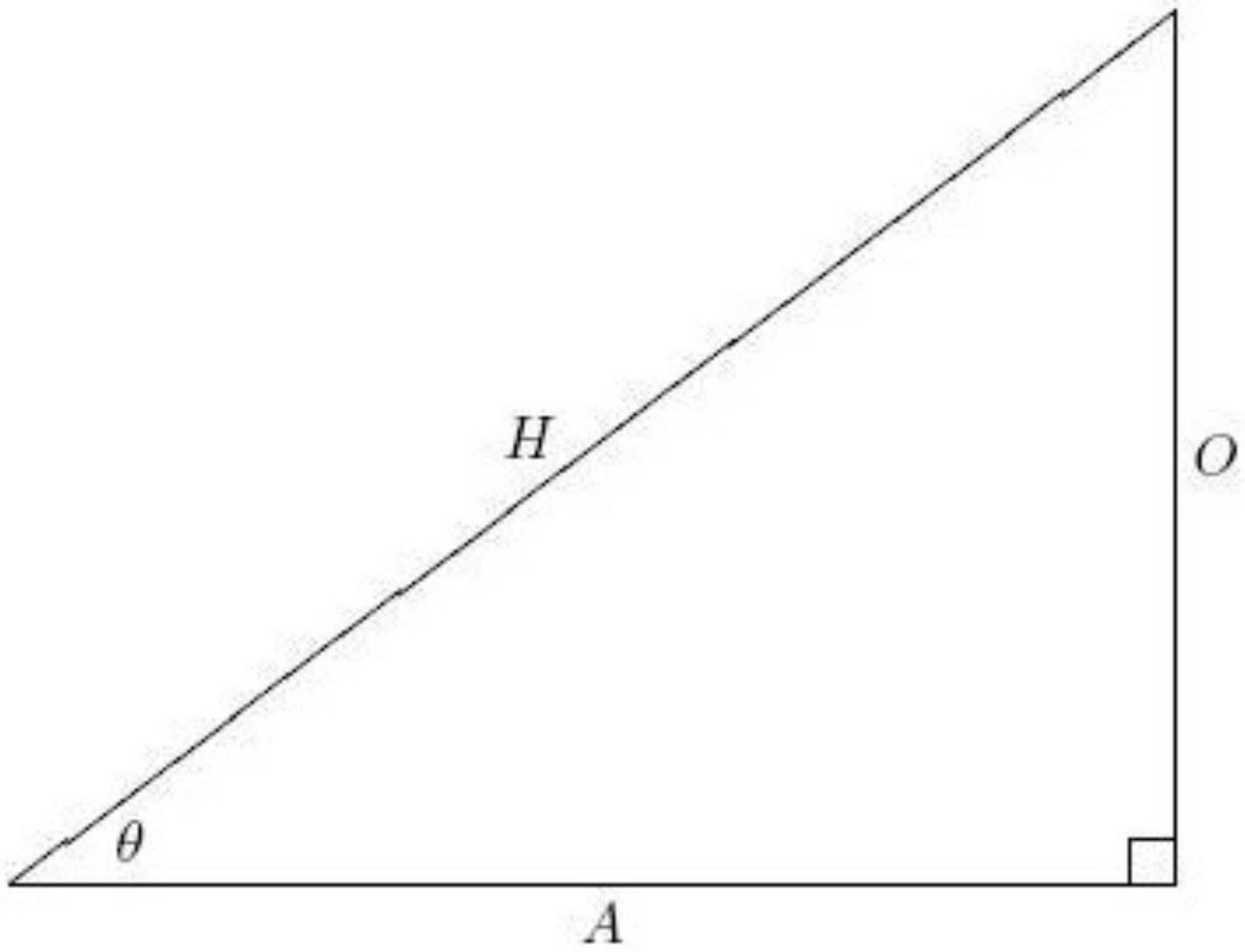


Choose the Function

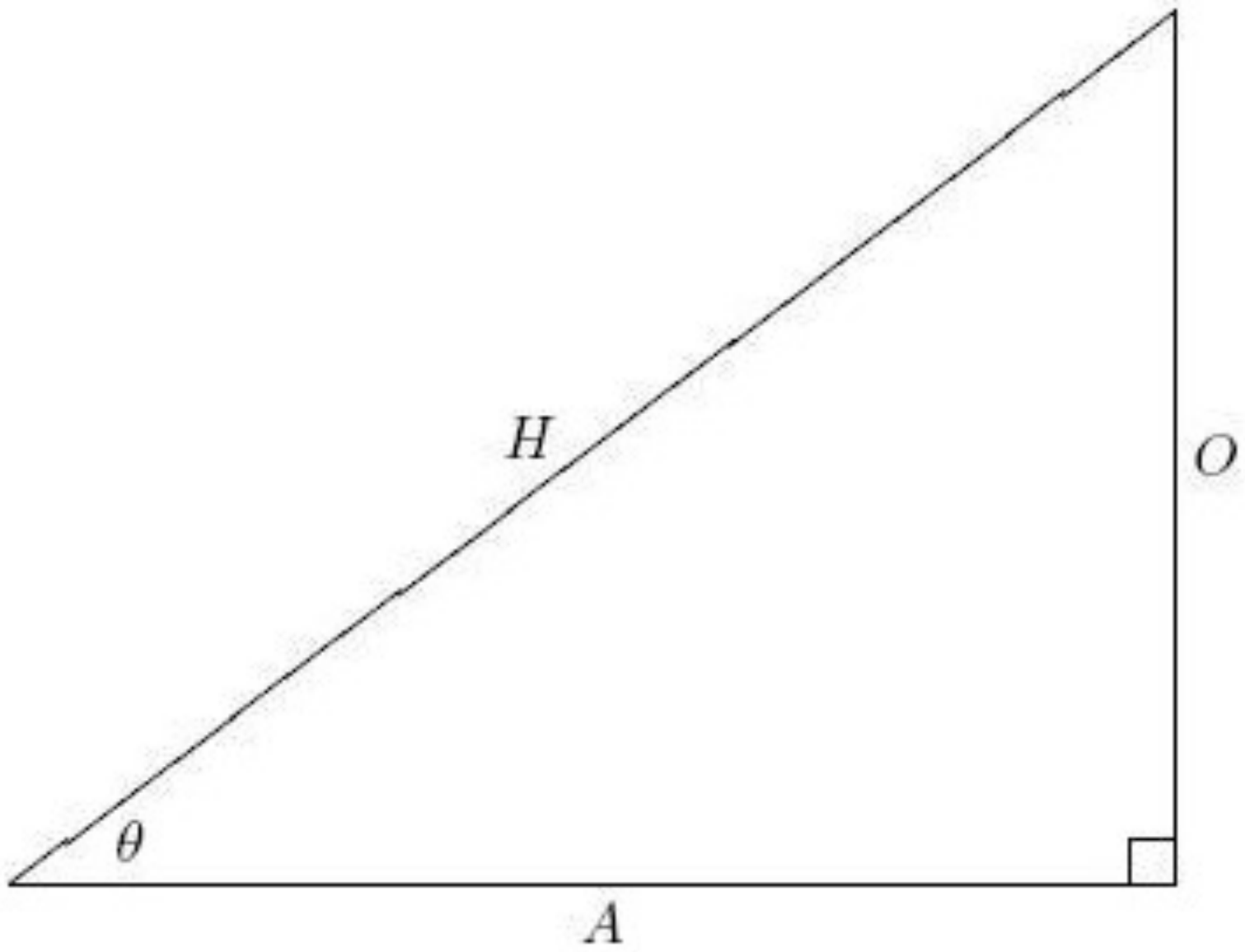
Solve the Following

- Find H if A=3m and θ=25°.
- Find θ if A=2.4m and H=7.3m.
- Find O if θ=73° and H=6.2m.

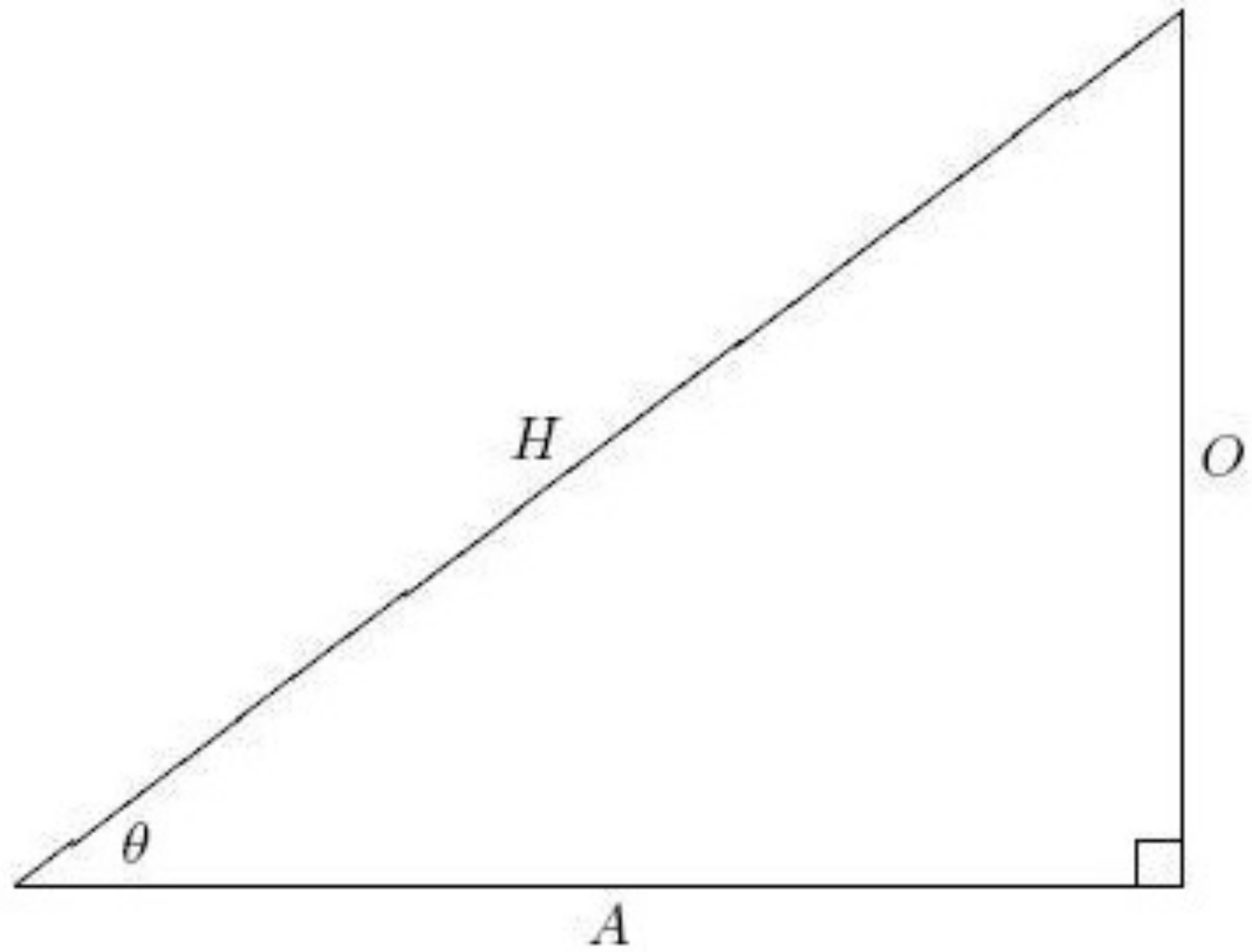




- Find H if A=3m and θ=25°



- Find θ if A=2.4m and H=7.3m.



- Find O if θ=73° and H=6.2m.

Scalers and Vectors

- Scalar: A numerical value for measurement. Ex: 2 km.
- Vector: A numerical value **along** with a direction of measurement. Ex: 2 km northeast.

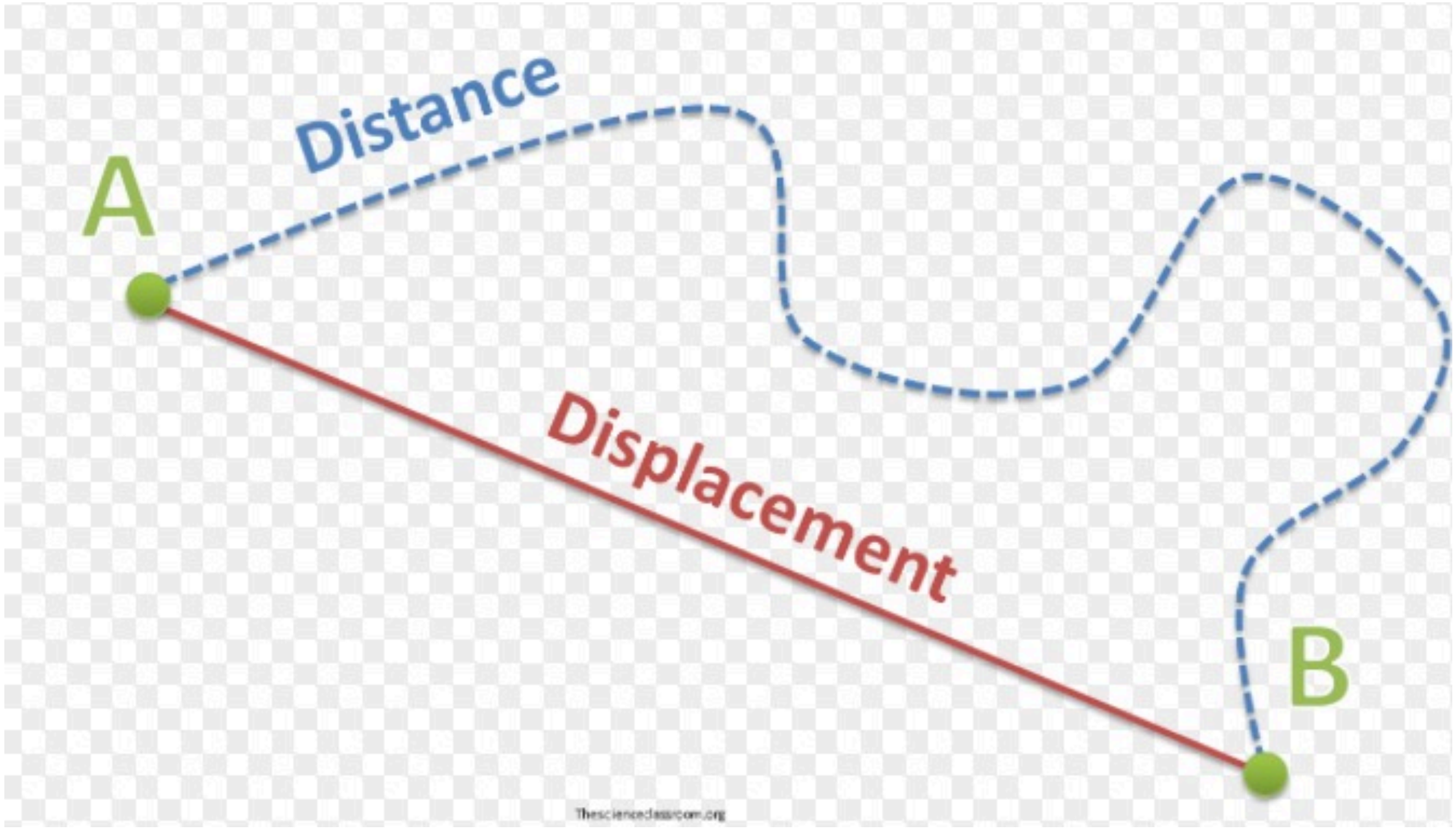
Scalar or Vector

- The temperature increased by 5°C.
- It's 70°C outside.
- I rode my bike 25 miles.
- Upper Dublin HIgh School is 15 miles southwest of Doylestown.

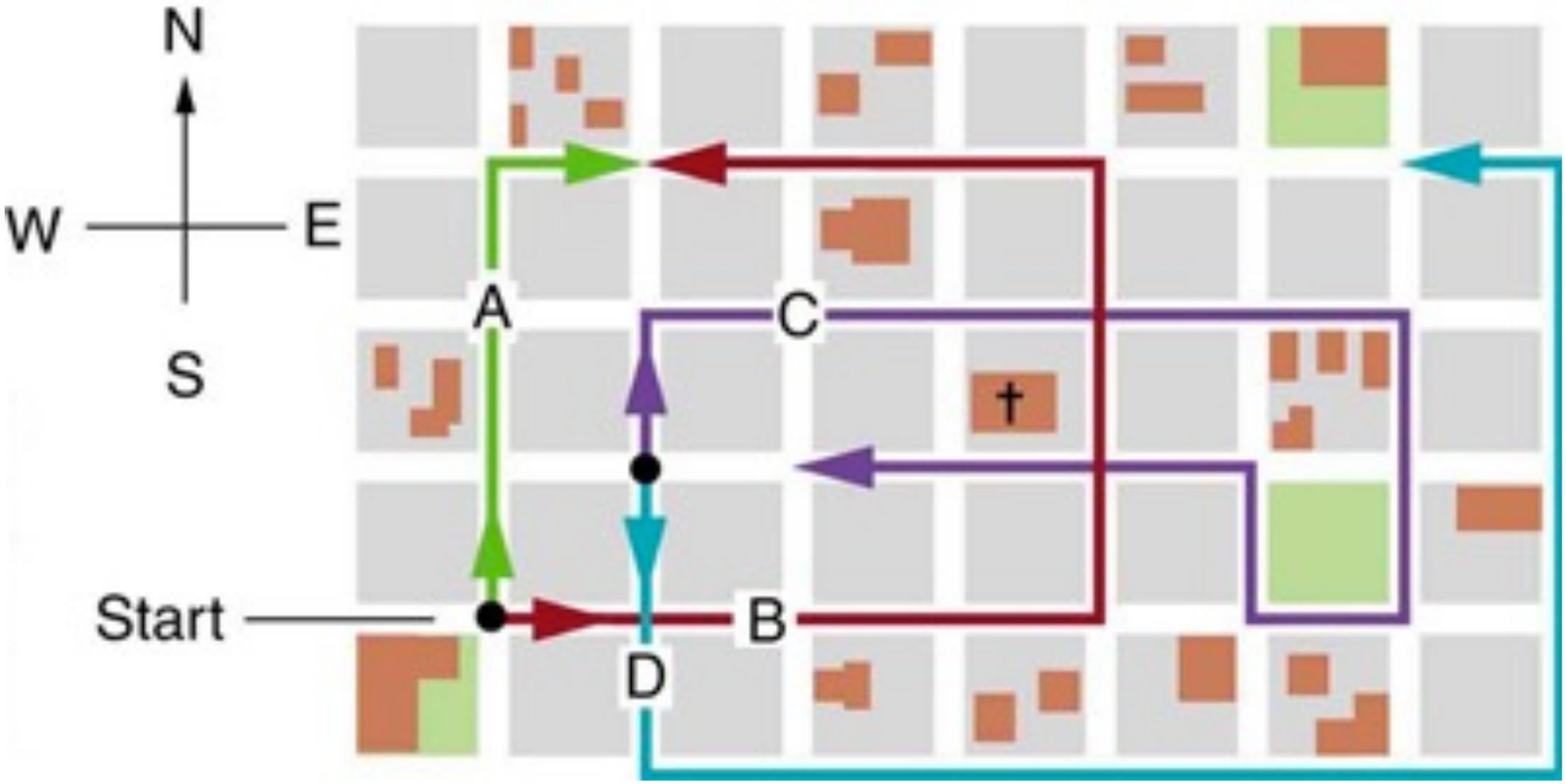
Distance & Displacement

- Distance between the animals?

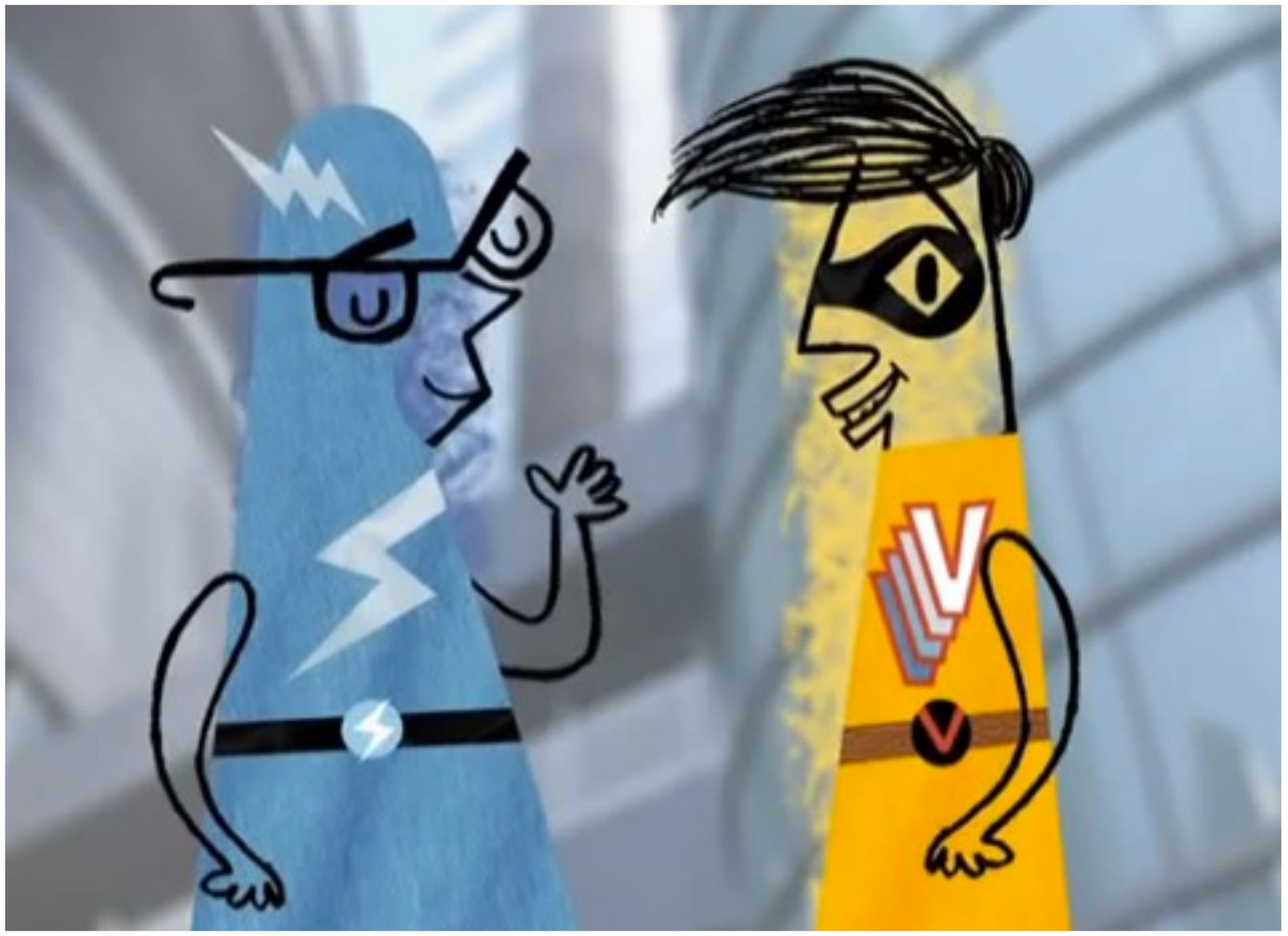
- How far does the cat have to travel to get to the bear?


Distance
A
Displacement
B

Stephen rides a skateboard 2 blocks north. He turns left and rides 7 blocks. He turns left again and rides 4 blocks. What was the total distance traveled? What was the magnitude and direction of Stephen's displacement?



Find the distance traveled and the displacement of each path.



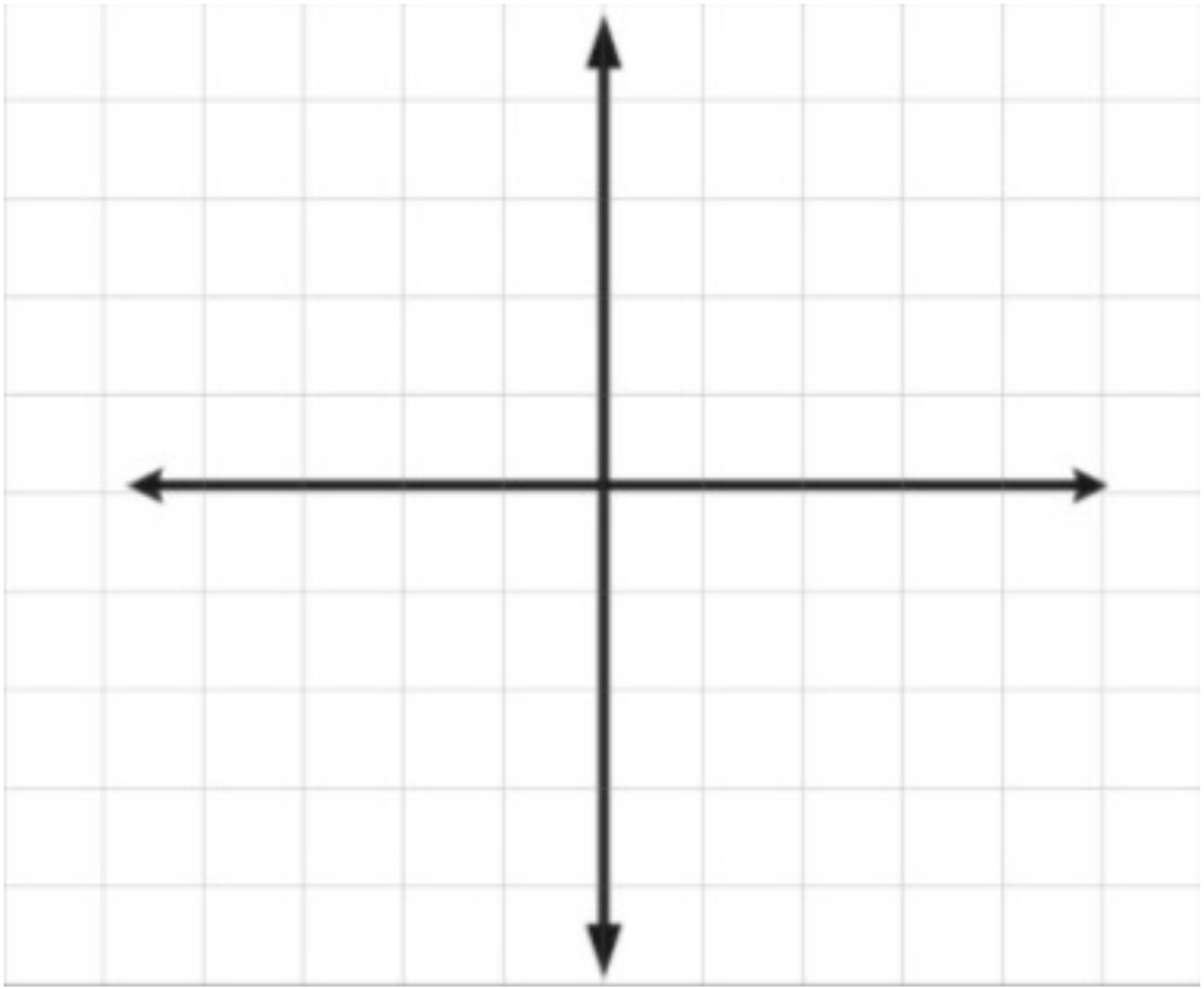
Speed vs Velocity

Average Speed

- The total distance traveled divided by the time needed to complete the journey.
- Distance/time we will generally speak of this in meters per second [m/s].

Average Velocity

- The displacement divided by the time needed to complete the journey.
- This is < or equal to average speed.
- The units are the same [m/s], but there is a direction given or implied.



Focus on the positive

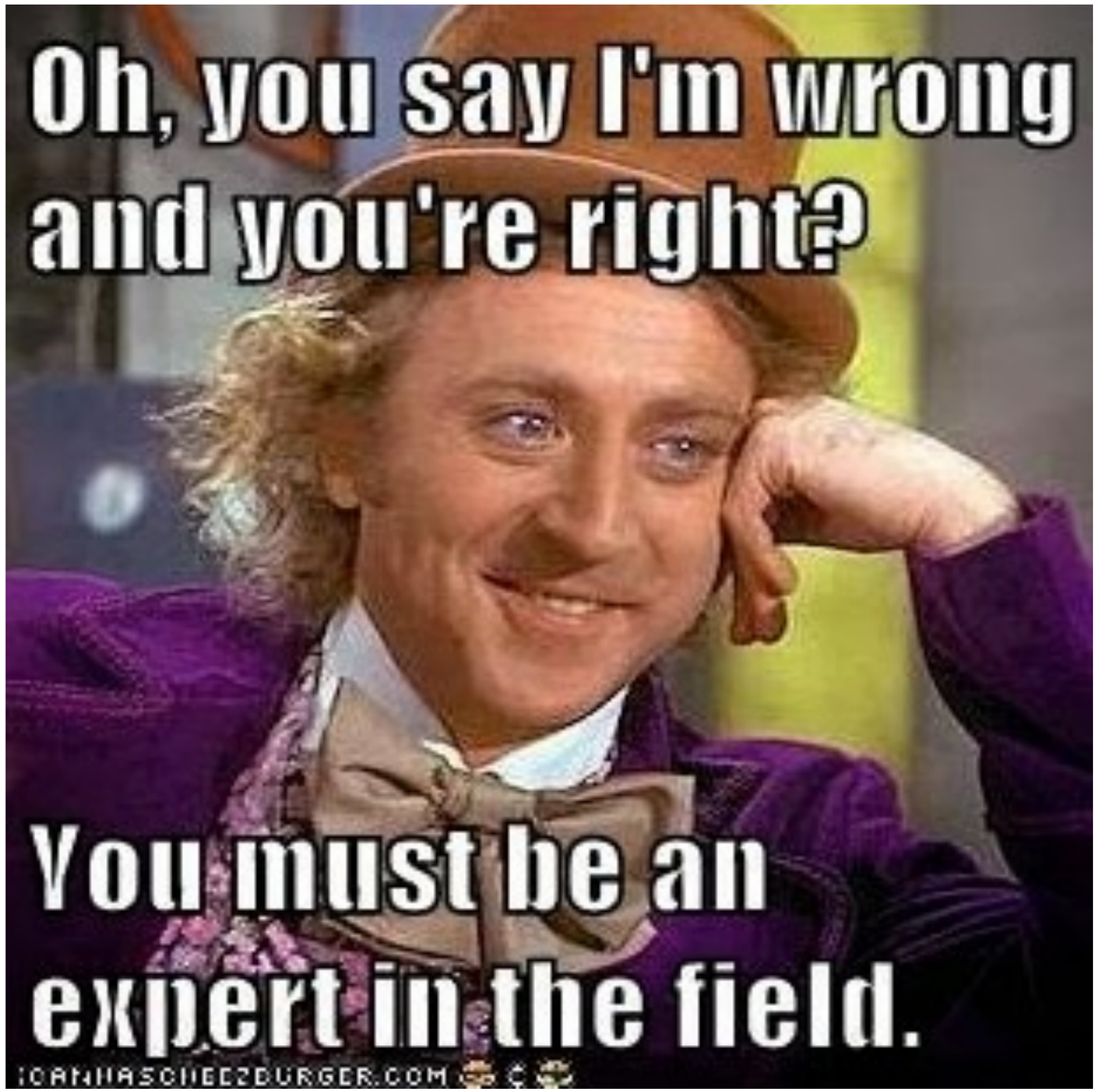
http://www.docstoc.com/docs/75394102/Acceleration

Acceleration

- The change in velocity. What's velocity again?
  - This could be a change in the "speed."
  - Acceleration can also be a change in direction, even if speed remains constant.

What happens to the passenger when a car...

- rapidly increases in speed.
- turns left.
- decreases in speed.
- turns right.



http://theconversation.com/no-youre-not-entitled-to-your-opinion-9978