GEOMETRY IN ENGINEERING:

K3EN

KENTUCKY ENGINEERING EXPOSURE NETWORK

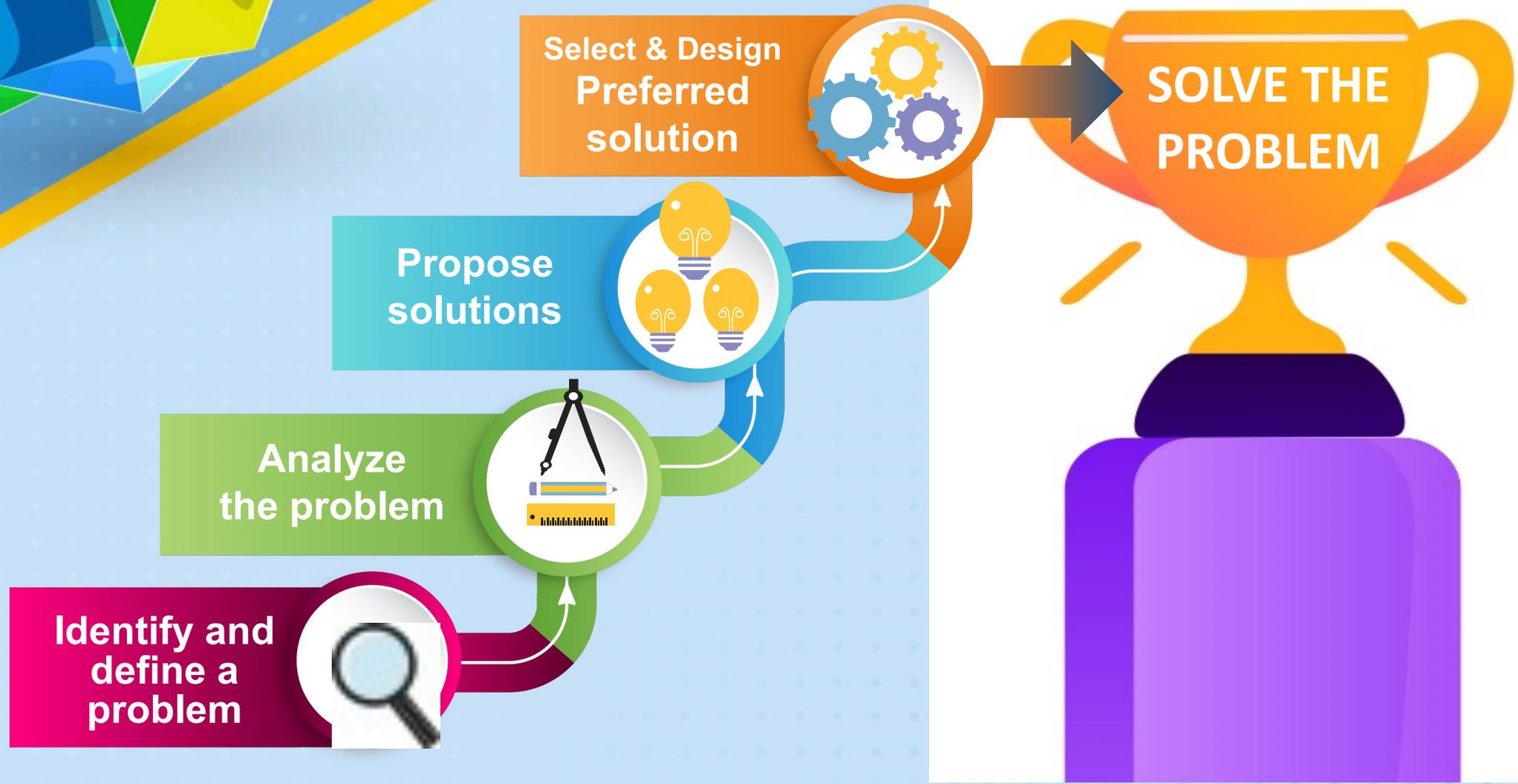**An education initiative by the Kentucky Transportation Cabinet**

Engineers are
PROBLEM SOLVERS

❑ Use technology to solve problems

❑ Rely on creativity and academic skills

❑ Use math, science, and computers

Even though the tasks can be different from each other, engineers use common methods to solve their problems.

THE ENGINEERING PROCESS:

Select & Design
Preferred solution

Propose solutions

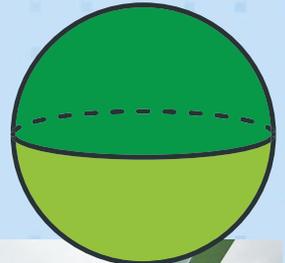**Analyze the problem**

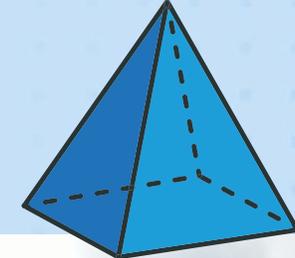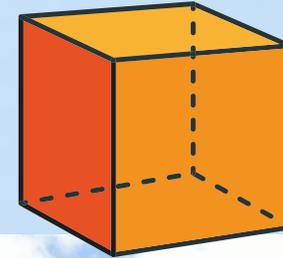**Identify and define a problem**
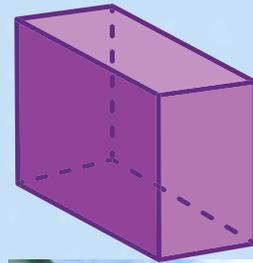
SOLVE THE PROBLEM

M A T H !!!

Geometry in Engineering & in the Real World

Geometry

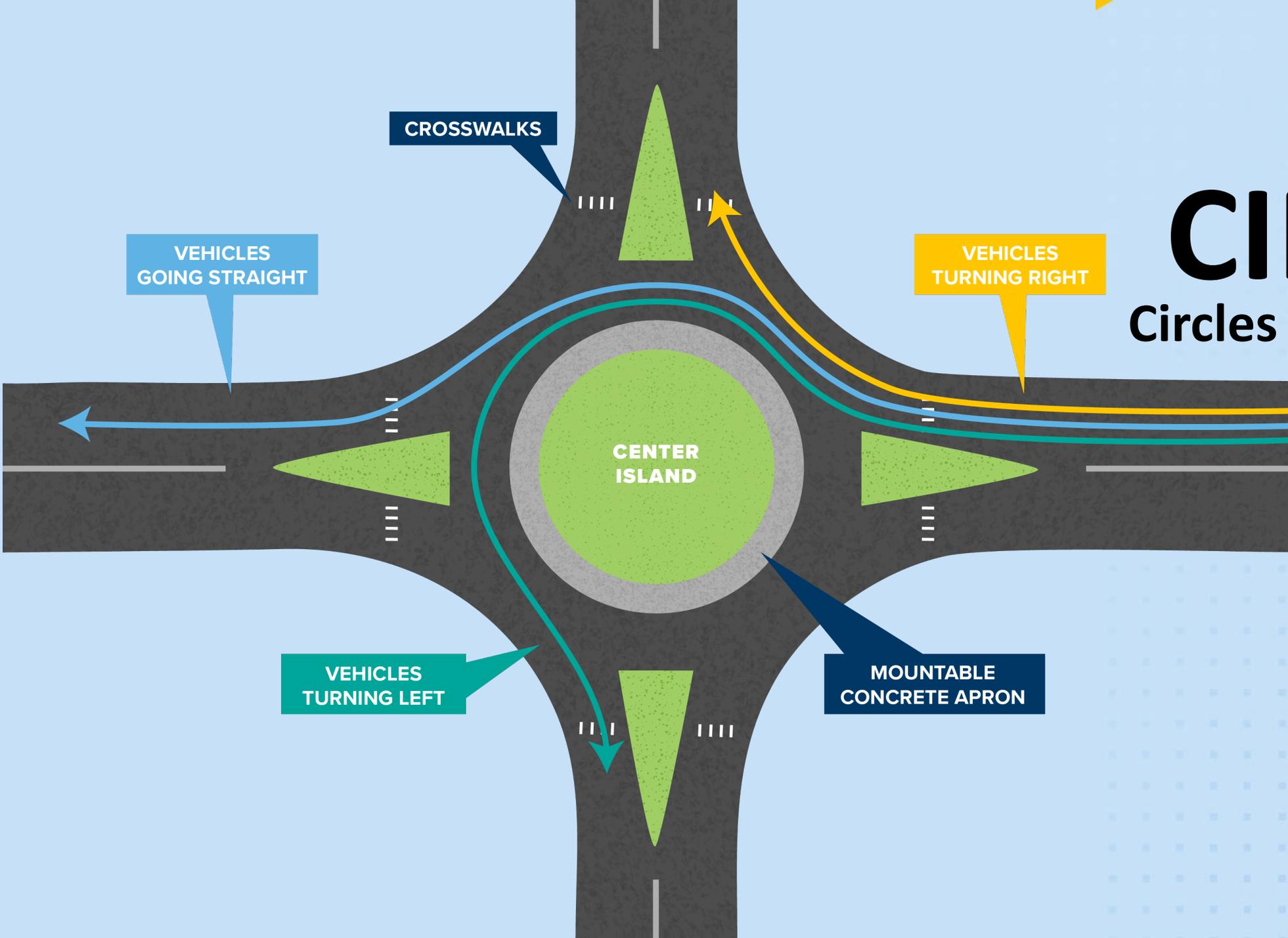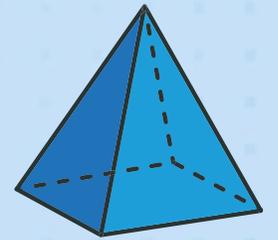## The Mathematical Study of Shapes

CROSSWALKS

VEHICLES
GOING STRAIGHT

VEHICLES
TURNING RIGHT
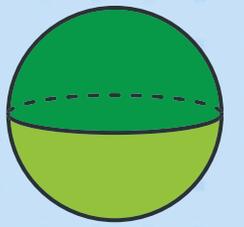
CIRCLES
Circles in Engineering
Roundabouts

CENTER
ISLAND

VEHICLES
TURNING LEFT

MOUNTABLE
CONCRETE APRON

TRIANGLES

Triangles in Engineering - Roundabouts

PURPLE PEOPLE BRIDGE –

Newport, KY - Cincinnati, OH
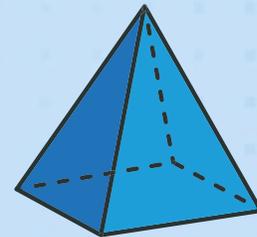
2,670 ft pedestrian only built in 1872

TRIANGLES

## Triangles in Engineering - Roundabouts

PYRAMIDS

- The Great Pyramid of Giza is the oldest of the Seven Wonders of the Ancient World that still standing.

- Estimated **20 years** to build by **20,000 to 30,000 people**.

- Angled more than **51 degrees**

- **481 feet tall**

- Perimeter of the base (four sides) = **756 feet**

- Each stone weighs **2.5 (5,000 lbs) to 15 U.S. tons**

- Around **2.3 million stone blocks**

- A **total mass of 6.5 million U.S. tons**

How did they do that?
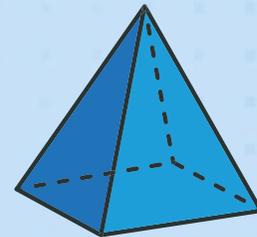
PYRAMIDS
Egyptian Number System

Egyptian Math

The Egyptians had a decimal system using seven different symbols.
1 is shown by a single stroke.
10 is shown by a drawing of a hobble for cattle.
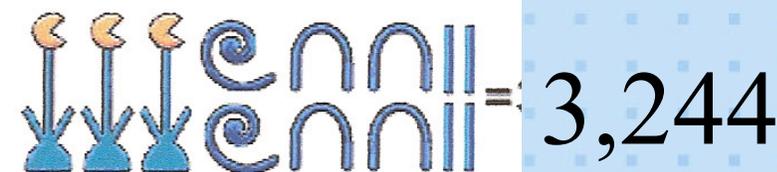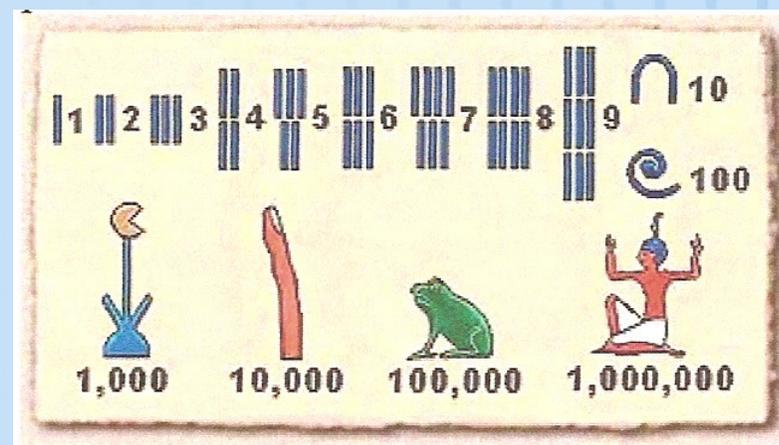100 is represented by a coil of rope.
1,000 is a drawing of a lotus plant.
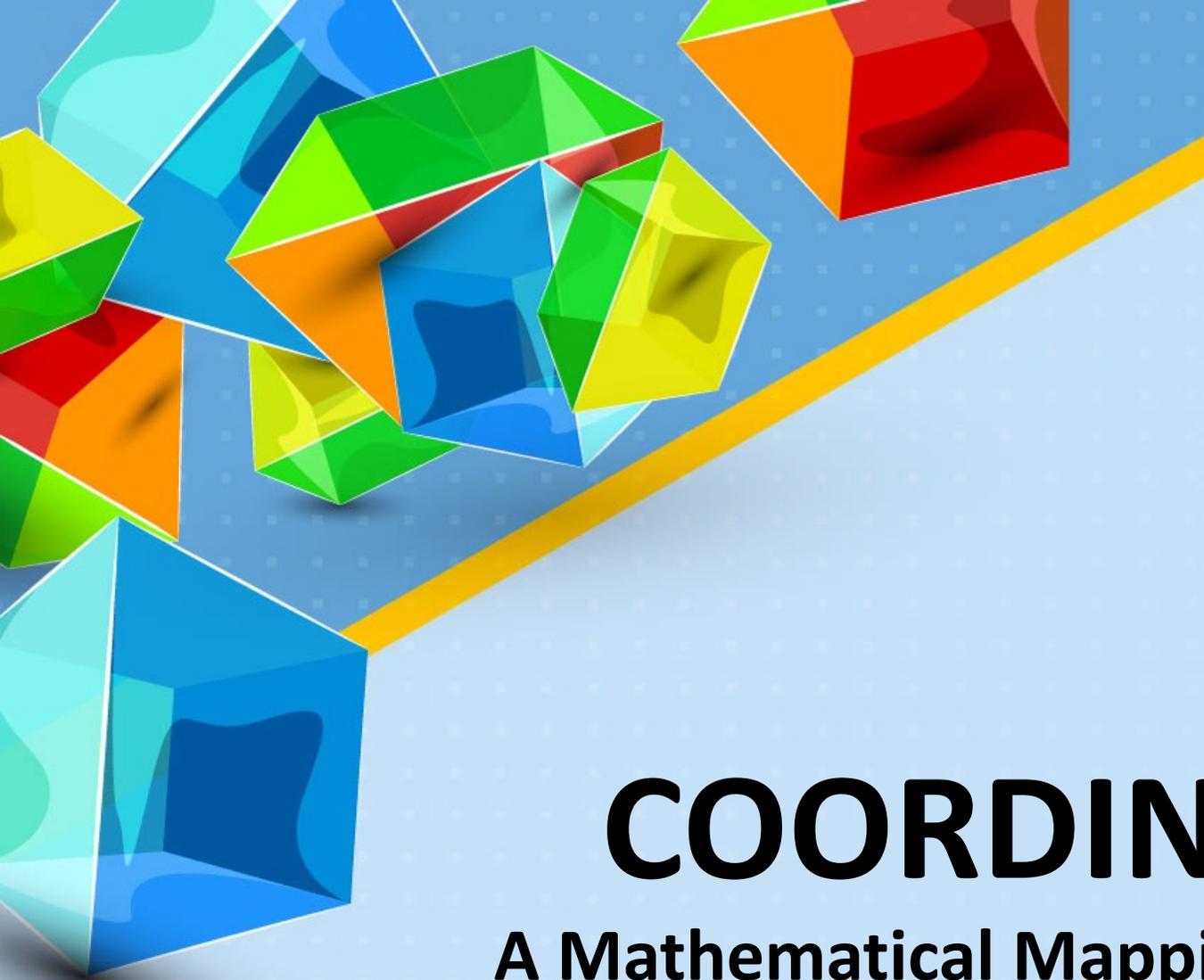10,000 is represented by a finger.
100,000 by a tadpole or frog
1,000,000 is the figure of a god with arms raised above his head.
(Click the image, above, to download Gifs or if your browser does not support image maps use the table left)
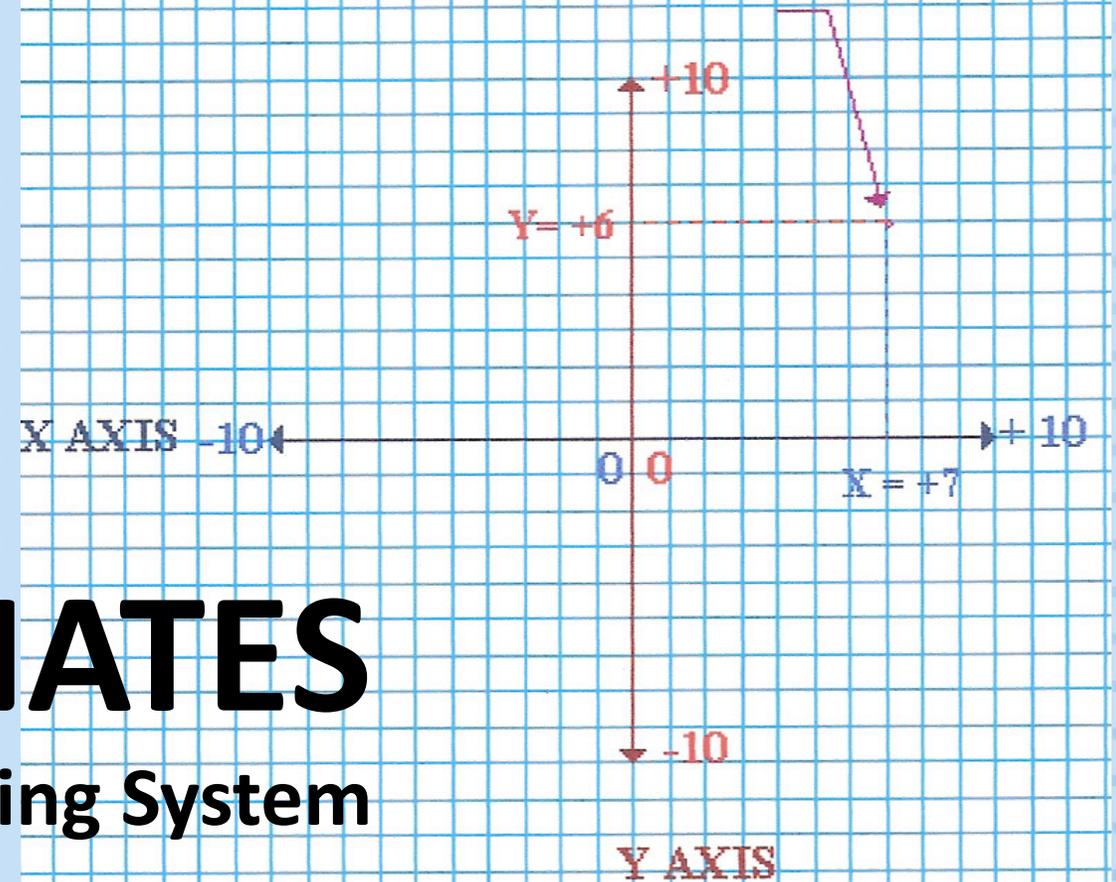
= 3,244

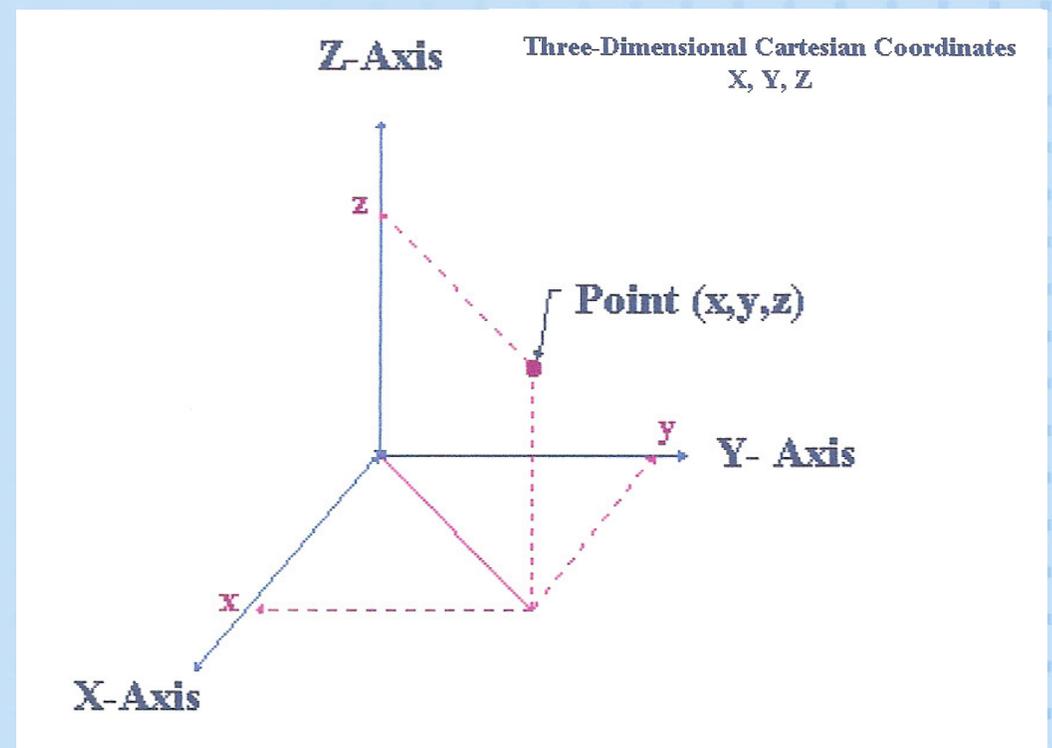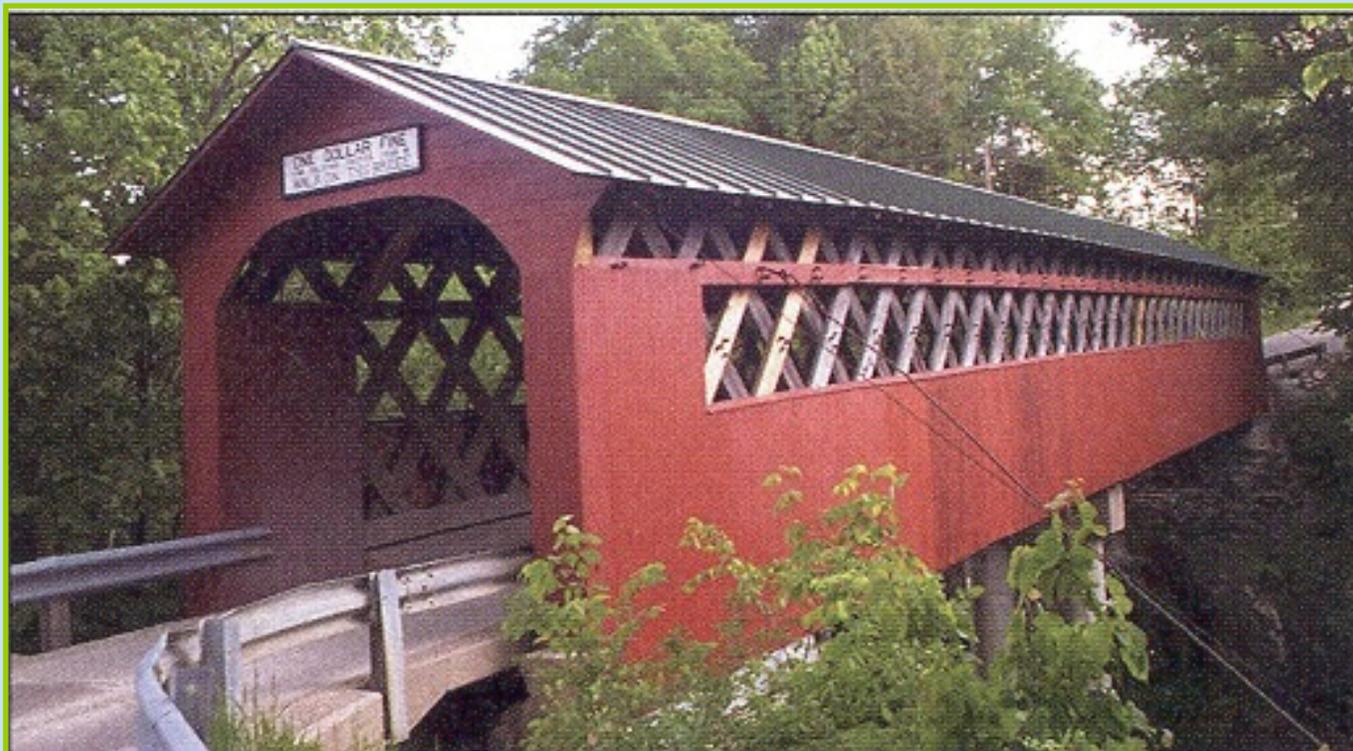# COORDINATES

A Mathematical Mapping System

3-D
COORDINATE SYSTEM
Three-Dimensional Cartesian Coordinate Systems

Three-Dimensional Cartesian Coordinates
X, Y, Z

Z-Axis

z

Point (x,y,z)

y

Y- Axis

x

X-Axis

PARALLEL LINES in Engineering

- Roadways and Sidewalks
- Bridges
- Prestressed Concrete "I" Beams
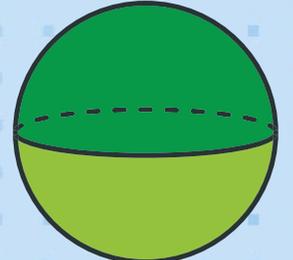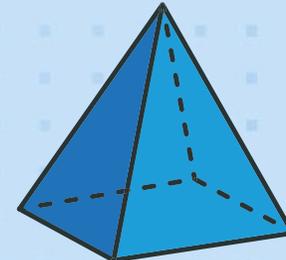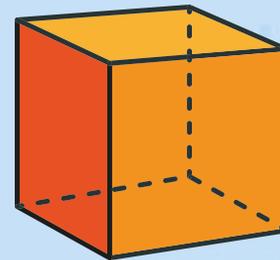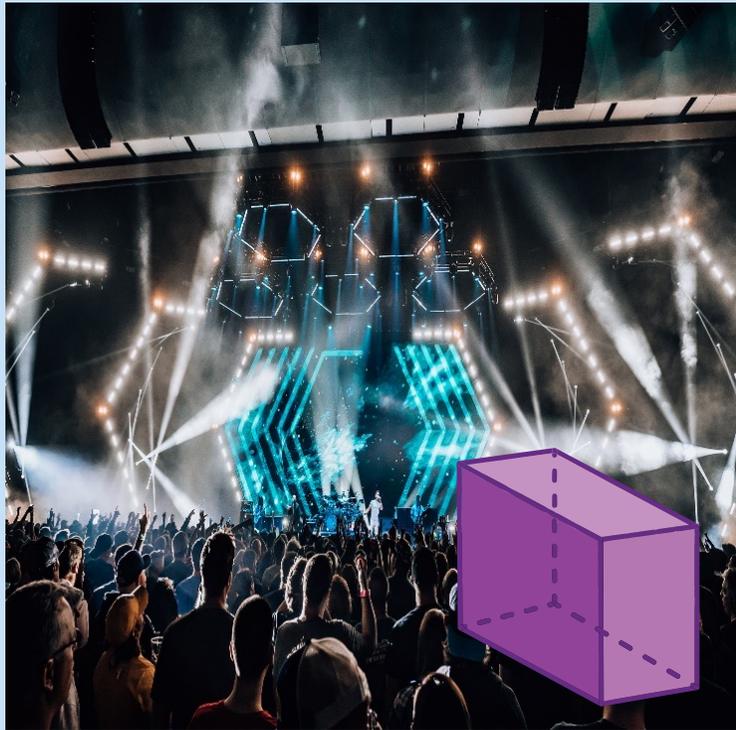- Steel Girder Beams
- Railroads
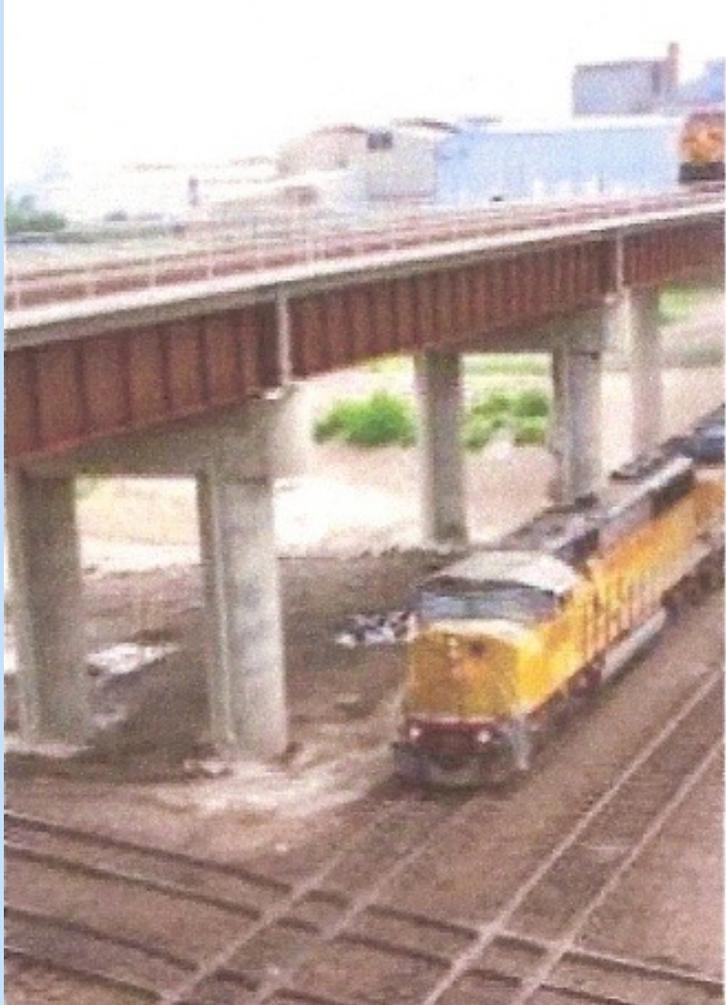
CAREERS

Careers with heavy emphasis on geometry.

1. **Engineer**
2. **Construction Worker**
3. **Pilot**
4. **Math Teacher**
5. **Interior Designer**
6. **Plumber**
7. **Fashion Designer**
8. **Game Developer**
9. **Surveyor**
10. **Architect**

Geometry is everywhere around you

- Sports
- Food
- Cars
- Wrapping Presents
- Concerts
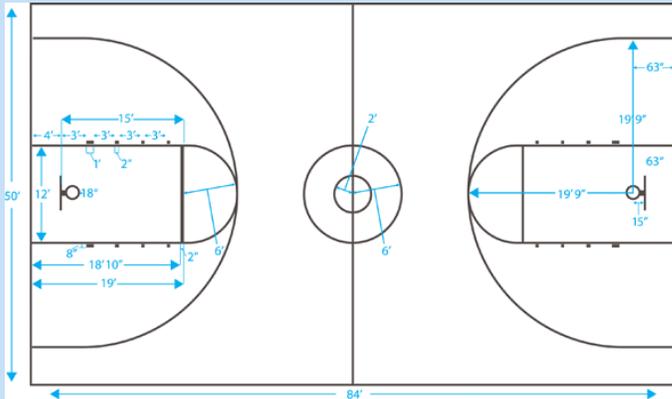
THANK YOU!

KENTUCKY ENGINEERING EXPOSURE NETWORK

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WEBSITE:
transportation.ky.gov/Education
/Pages/KEEN.aspx