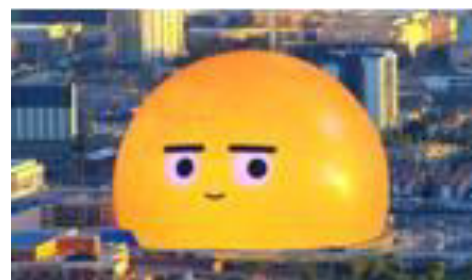
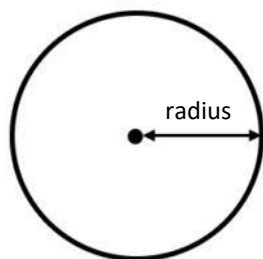


# Sphere



'Sphere' is a music and entertainment arena near Las Vegas, USA. It is a venue for live entertainment powered by cutting-edge technologies that ignite the senses. It is well known for its outer surface which features 54,000m<sup>2</sup> of LED screens. These are used for advertising and to display certain themes. It has been a huge Christmas snow globe and a gigantic Halloween pumpkin. It most often shows a face whose eyes seem to follow nearby road traffic and aircraft.



To create 'Sphere', its designers combined centuries old mathematics with cutting edge engineering. It cost \$2.3 billion dollars to construct.

The surface area of a sphere can be calculated using this formula:

$$\text{surface area} = 4 \times \pi \times \text{radius}^2$$

Pi or  $\pi$  is the ratio of the circumference of any circle to the diameter of that circle. Regardless of the circle's size, this ratio will always equal pi.

Almost 4000 years ago the ancient Babylonians calculated the value of  $\pi$  to be 3. In other words, any circle's circumference was 3 times the size of its diameter.

We now know that  $\pi$  is an irrational number. This means it continues forever without repeating. It is called irrational because it cannot be written as a fraction. Rounded to fifteen decimal places it is 3.14159265358579.

1. What is the difference between a sphere and a circle?
2. Sphere cost \$2,300,000,000 to construct. If one US dollar = 80 pence how much money in pounds did Sphere cost to build? Use a calculator, remember there are 100 pence in 1 pound.
3. Sphere has a radius of 78 m. What is the surface area? Use the formula above, and a calculator.
4. What do we mean when we say that pi is an irrational number?