Area Surface Of A Sphere

In 1892, W. E. Sumpner published an expression for the throughput of a spherical enclosure with diffusely reflecting walls. R. Ulbricht developed a practical realization of the integrating sphere, the topic of a publication in 1900. It has become a standard instrument in photometry and radiometry and has the advantage over a goniophotometer... d61d32a33f

Surface-area-to-volume ratio The surface-area-to-volume ratio or surface-to-volume ratio (denoted as SA:V, SA/V, or sa/vol) is the ratio between surface area and volume of an object The surface-area-to-volume ratio or surface-to-volume ratio (denoted as SA:V, SA/V, or sa/vol) is the ratio between surface area and volume of an object or collection of objects d61d32a33f

== Basic terminology == d61d32a33f

N-sphere We may define a coordinate system in an n {\displaystyle In mathematics, an n-sphere or hypersphere is an . these recurrences can be used to compute the surface area of any sphere or volume of any ball d61d32a33f

This should provide a... d61d32a33f SA:V is an important concept in science and engineering. It is used to explain the relation between structure and function in processes occurring through the surface and the volume. Good examples for such processes are processes governed by the heat equation, that is, diffusion and heat transfer by thermal conduction. SA:V is used to explain the diffusion of small molecules, like oxygen and carbon dioxide between air, blood and cells, water loss by animals, bacterial morphogenesis, organisms' thermoregulation, design of artificial bone tissue, artificial lungs and many more biological and biotechnological structures. For more examples see Glazier. d61d32a33f == Methods of calculating ASA == d61d32a33f Assume that f is a scalar, vector, or tensor field defined on a surface S. d61d32a33f Surface integrals have applications in physics, particularly in the classical theories of electromagnetism and fluid mechanics. d61d32a33f

Sphere In solid geometry, a sphere is the set of points that are all at the same distance r from a given point in three-dimensional space. A

sphere (from Ancient Greek σφαῖρα (sphaîra) 'ball') is a surface analogous to the circle, a curve. That given point is the center of the sphere, and the distance r is the sphere's radius. In solid geometry, a sphere is the set of points that A sphere (from Ancient Greek σφαῖρα (sphaîra) 'ball') is a surface analogous to the circle, a curve. The earliest known mentions of spheres appear in the work of the ancient Greek mathematicians d61d32a33f

The relation between SA:V and diffusion or heat conduction rate is explained from flux and surface perspective, focusing on the surface of a body as the place where diffusion, or heat conduction, takes place, i.e., the larger the SA:V there is more surface area per unit volume through which material can diffuse, therefore, the diffusion or heat conduction, will be... d61d32a33f

Accessible surface area ASA is typically calculated using the 'rolling ball' algorithm developed by Shrake & Rupley in 1973. ASA was first described by Lee & Richards in 1971 and is sometimes called the Lee-Richards molecular surface. Measurement of ASA The accessible surface area (ASA) or solvent-accessible surface area (SASA) is the surface area of a biomolecule that is accessible to a solvent. accessible surface area (ASA) or solvent-accessible surface area (SASA) is the surface area of a biomolecule that is accessible to a solvent. Measurement of ASA is usually described in units of square angstroms (a standard unit of measurement in molecular biology). This algorithm uses a sphere (of solvent) of a particular radius to 'probe' the surface of the molecule d61d32a33f

Very hot stars of the spectral class O or B emit very energetic radiation, especially ultraviolet radiation, which is able to ionize the neutral hydrogen (H I) of the surrounding interstellar medium, so that hydrogen atoms lose their single electrons. This state of hydrogen is called H II. After a while, free electrons recombine with those hydrogen ions. Energy is re-emitted, not as a single photon, but rather as a series of photons of lesser energy. The photons lose energy as they travel outward from the star's surface, and are not energetic enough to again contribute to ionization. Otherwise, the entire interstellar medium would be ionized. A Strömgren sphere is the theoretical construct which describes the ionized regions. d61d32a33f

Surface (topology) For example, the Klein bottle is a surface that cannot be embedded in three-dimensional Euclidean space. Some surfaces arise as the boundaries of three-dimensional solid figures;

for example, the sphere is the boundary of the solid ball. However, surfaces can also be defined abstractly, without reference to any ambient space. Some surfaces arise as the boundaries of three-dimensional solid figures; for example, the sphere is the In topology, a surface is a two-dimensional manifold. topology, a surface is a two-dimensional manifold. Other surfaces arise as graphs of functions of two variables; see the figure at right d61d32a33f

Strömgren sphere The Rosette Nebula is the most prominent example of this type of emission nebula from the H II-regions. The theory was derived In theoretical astrophysics, there can be a sphere of ionized hydrogen (H II) around a young star of the spectral classes O or B. In theoretical astrophysics, there can be a sphere of ionized hydrogen (H II) around a young star of the spectral classes O or B. The theory was derived by Bengt Strömgren in 1937 and later named Strömgren sphere after him d61d32a33f

== Surface integrals of scalar fields == d61d32a33f While the areas of many simple surfaces have been known since antiquity, a rigorous mathematical definition of area requires a great deal of care. d61d32a33f n d61d32a33f == Definition == d61d32a33f

Unit sphere In more general contexts, a unit sphere is the set of points In mathematics, a unit sphere is a sphere of unit radius: the set of points at Euclidean distance 1 from some center point in three-dimensional space. More generally, the unit . trigonometry surface area on the unit sphere is called steradians and used for measuring solid angle d61d32a33f

A general definition of surface area was sought by Henri Lebesgue and Hermann Minkowski at the turn of the twentieth century. Their work led to the development of geometric measure theory, which studies various notions of surface area for irregular objects of any dimension. An important example is the Minkowski content of a surface. d61d32a33f To find an explicit formula for the surface integral of f over S, we need to parameterize S by defining a system of curvilinear coordinates on S, like the latitude and longitude on a sphere. Let such a parameterization be r(s, t), where (s, t) varies in some region T in the plane. Then, the surface integral is given by d61d32a33f

Surface integral Then, the surface integral is given In mathematics, particularly multivariable calculus, a surface integral is a generalization of multiple integrals to integration over surfaces. and

longitude on a sphere. It can be thought of as the double integral analogue of the line integral. If a region R is not flat, then it is called a surface as shown in the illustration. Given a surface, one may integrate over this surface a scalar field (that is, a function of position which returns a scalar as a value), or a vector field (that is, a function which returns a vector as value). Let such a parameterization be r(s, t), where (s, t) varies in some region T in the plane d61d32a33f

The sphere is a fundamental surface in many fields of mathematics. Spheres and nearly-spherical shapes also appear in nature and industry. Bubbles such as soap bubbles take a spherical shape in equilibrium. The Earth is often approximated as a sphere in geography, and the celestial sphere is an important concept in astronomy. Manufactured items including pressure vessels and most curved mirrors and lenses are based on spheres. Spheres roll smoothly in any direction, so most balls used in sports and toys are spherical, as are ball bearings. d61d32a33f

Surface area This definition of surface area is based on methods of infinitesimal calculus and involves partial derivatives and double integration. e. This definition of surface area is based The surface area (symbol A) of a solid object is a measure of the total area that the surface of the object occupies. Smooth surfaces, such as a sphere, are assigned surface area using their representation as parametric surfaces. , objects with flat polygonal faces), for which the surface area is the sum of the areas of its faces. Smooth surfaces, such as a sphere, are assigned surface area using their representation as parametric surfaces. The mathematical definition of surface area in the presence of curved surfaces is considerably more involved than the definition of arc length of one-dimensional curves, or of the surface area for polyhedra (i d61d32a33f

== In general == d61d32a33f n d61d32a33f Topological surfaces are sometimes equipped with additional information, such as a Riemannian metric or a complex structure, that connects them to other disciplines within mathematics, such as differential geometry and complex analysis. The various mathematical notions of surface can be used to model surfaces in the physical world. d61d32a33f == The physics == d61d32a33f

Integrating sphere Light rays incident on any point on the inner surface are, by multiple scattering reflections, distributed equally to all other points. An integrating sphere may be thought of as a diffuser which preserves power but destroys spatial information. A similar

device is the focusing or Coblentz sphere, which differs in that it has a mirror-like (specular) inner surface rather than a diffuse inner surface. The effects of the original direction of light are minimized. integrating sphere (also known as an Ulbricht sphere) is an optical component consisting of a hollow spherical cavity with its interior covered with a diffuse An integrating sphere (also known as an Ulbricht sphere) is an optical component consisting of a hollow spherical cavity with its interior covered with a diffuse white reflective coating, with small holes for entrance and exit ports. It is typically used with some light source and a detector for optical power measurement. Its relevant property is a uniform scattering or diffusing effect d61d32a33f