#

Geometry/Trigonometry
Unit 10: Surface Area and Volume of Solids Notes

Name:
Date:
Period:

---

(1) PAGE 590 – 591 #2 – 26 EVEN

(2) PAGE 596 #1 – 14

(3) PAGE 596 – 597 #15 – 25 ; FF #26 AND 28

(4) PAGE 603 #1 – 18

(5) PAGE 603 – 604 #19 – 26

(6) PAGE 610 #1 – 8

(7) PAGE 610 – 611 #9 – 16, 19 – 21

(8) PAGE 617 #1 – 9

(9) PAGE 617 #10 – 17

(10) PAGE 623 #1 – 12

(11) PAGE 623 #13 - 20

(12) PAGE 629- 630 #9 - 16

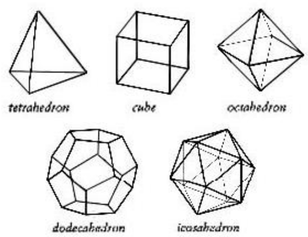
(13) PAGE 637 #1 – 20 ALL

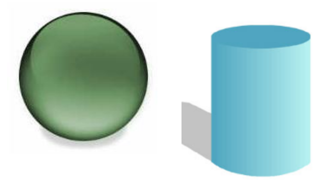
Geometry Notes 12.1 Exploring Solids

A ____________________ is a solid that is bounded by polygons called _________________, that enclose a single region of space.

An _______________ of a polyhedron is a _____________________________formed by the ______________________ of __________________________.

A _______________ of a polyhedron is a point where ____________________________________ meet.





These are Polyhedrons

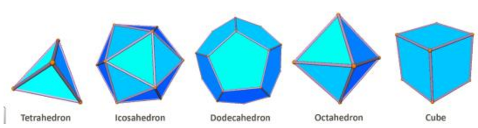
These are NOT Polyhedrons

Theorem 12.1 – Euler's Theorem: The number of faces (F), vertices (V), and edges (E) of a polyhedron is related by

$$F + V = E + 2$$

The ______________ of a polyhedron consists of _______________ on its _______________.

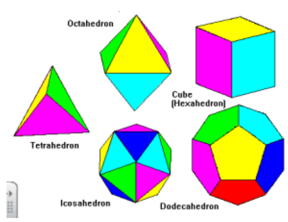
A polyhedron is ________________ if any _______________________ on its surface can be ____________ by a line ________________ that lies entirely _____________________ the polyhedron.



Convex Polyhedrons

NonConvex Polyhedrons

A polyhedron is __________ if all its faces are _____________________________________ and the ______________________________________ at each vertex in ________________________________.

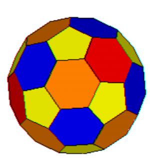


There are only __________ of them.

________________________ is one whose faces are ___________________ of regular polygon and whose ________________ are all exactly the______________.

Geometry Notes 12.2 Surface Area of Prisms and Cylinders

A __________ is a polyhedron that has ___________________________ faces called ____________.



The other faces, called ______________________, are ___________________ and are formed by connecting corresponding vertices of the bases. The ________________ connecting these corresponding vertices are _____________________.

The _______________, or height, of a prism is the __________________ between ___________.

In a __________________, each ______________ is _______ to both ___________.

___________ that have lateral edges that are ________________ to the bases are oblique prisms.

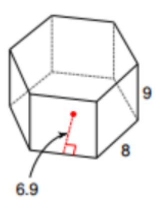
The_____________ of the _______________________ is the ________________ of the prism.

_____________ are classified by __________.

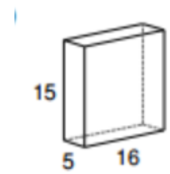
The ________________ of a polyhedron is the _______ of the ________ of its ________.

Theorem 12.2 – The Surface Area of a Right Prism: $S = 2B + Ph$, where B is the area of a base, P is the perimeter of a base and H is the height.

E1.



P1.



A circular cylinder (or simply _______) is a solid with _______________ that lie in _____________.

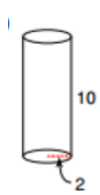
The ___________, or height, of a cylinder is the ______________________ between its ________.

The _____________ of a cylinder is the____________ of its _________________________.

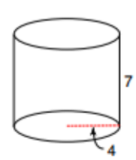
A cylinder is _______ if the __________________ of its __________ is__________ to its bases.

Theorem 12.3 – Surface Area of a Right Cylinder: $S = 2B + Ch$, where B is the area of a base, C is the circumference of a base, r is the radius of a base, and h is the height. Or $S = 2\pi r^2 + 2\pi rh$

E2.



P2.



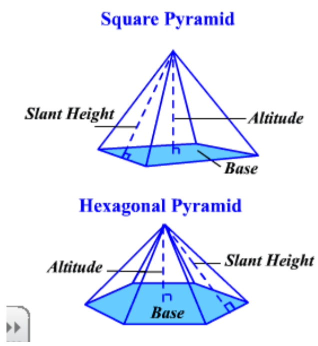
Geometry Notes 12.3 Surface Area of Pyramids and Cones

A ________________ is a polyhedron in which the _________________ and the ________________ are _________________ that have a common vertex.

The__________________ of two lateral faces is a __________________.

The___________________ of the base and a lateral face is a ________________.

The ________________, or height, of the pyramid is the __________________ between the ______ and the___________.

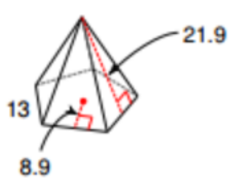


A pyramid is __________________ if its__________________ is a ____________________ and if the segment from the __________________ to the_________________ of the base is_____________________ to the ______________.

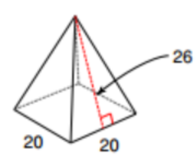
The _____________________ of a regular pyramid is ___________________ of any ___________________.
A ____________________________ has no slant height.

Theorem 12.4 – Surface Area of a Regular Pyramid: $S = B + \frac{Pl}{2}$, where B is the area of the base, P is the perimeter of the base and *l* is the slant height.

E1.



P1.



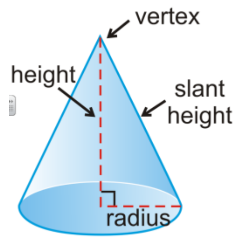
A circular cone, or simply ______________, is a solid that has ____________________ and a ______________ that is________ in the same ________________________.

The __________________________ consists of all__________________ that connect the________________ with points on the _____________________.

The ___________________, or height, of a cone is the _________________________________ between the______________________ and the plane that _______________________________________.

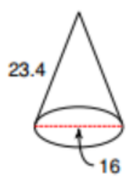
A right cone is one in which the ________________ lies ___________________________ of the base.

The ______________________ of a right cone is the distance between the________________ and a ____.

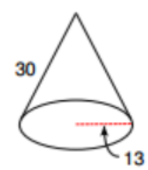


Theorem 12.5 – Surface Area of a Right Cone: $S = \pi r^2 + \pi r l$, where r is the radius of the base and *l* is the slant height of the cone.

E2.



P2.



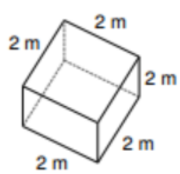
Geometry Notes 12.4 Volume of Prisms and Cylinders

One can think of the__________________ of a polyhedron as the number of ___________________ contained in its ______________________________.

Volumes are measured in _______________________.

Postulate 25 – Volume of Cube Postulate: The volume of a cube is the cube of the length of its side, or $V = s^3$

E1.



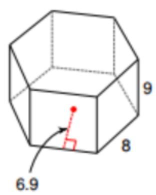
Postulate 26 – Volume Congruence Postulate: If two polyhedrons are congruent then they have the same volume.

Postulate 27 – Volume Addition Postulate: The volume of a solid is the sum of the volumes of all its nonoverlapping parts.

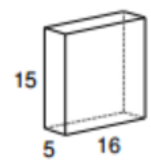
Theorem 12.5 - Cavalieri's Principle: If two solids have the same height and the same cross-sectional area at every level, then they have the same volume.

Theorem 12.7 – Volume of a Prism: $V = Bh$, where B is the area of the base and h is the height.

E2.

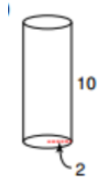


P2.

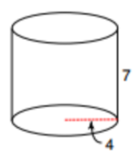


Theorem 12.8 – Volume of a Cylinder: $V = Bh$, where B is the area of a base, h is the height and r is the radius of the base. Or $V = \pi r^2 h$.

E2.



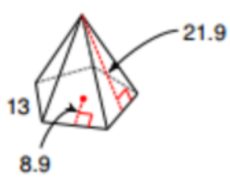
P2.



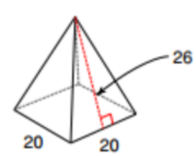
Geometry Notes 12.5 Volume of Pyramids and Cones

Theorem 12.9 – Volume of a Pyramid: $V = \frac{1}{3}Bh$, where B is the area of the base and h is the height.

E1.

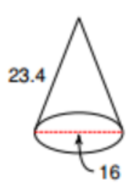


P1.

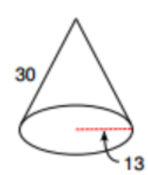


Theorem 12.10 – Volume of a Cone: $V = \frac{1}{3}Bh$, where B is the area of the base, h is the height, and r is the radius of the base. Or $V = \frac{1}{3}\pi r^2 h$

E2.



P2.



These theorems _______________ to all pyramids and cones, both regular and ________________.

Geometry Notes 12.6 Surface Area and Volume of Spheres

A ______________________ is the set of all points in _________________ that are a given distance, r, from a point called the_________________.

The distance,____________, is the______________ of the sphere.

The term __________________ also refers to any___________________ whose ___________________ are the_________________ of the sphere and a _____________________________________.

A ______________ of a sphere is a _________________ whose _______________ are __________________.

A______________ of a sphere is a _______________ that contains its _______________.

All __________________ of a sphere have the ________________, and this length is called the sphere's diameter. The diameter is twice the radius_______________.

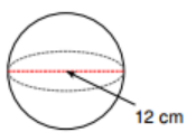
If a __________________ a sphere, the________________ will either be a single __________ or a ________.

If the __________ contains the __________ of a sphere, then the _______________ is a _______________ of the sphere.

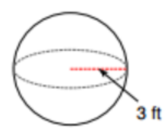
Each _____________ of a sphere ______________ a sphere into two congruent halves called ___________.

Theorem 12.11 – Surface Area of a Sphere: $S = 4\pi r^2$, where r is the radius

E1.

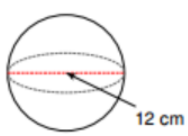


P1.



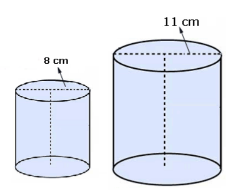
Theorem 12.12 – Volume of a Sphere: $V = \frac{4}{3}\pi r^3$, where r is the radius

E1.



P1.

Geometry Notes 12.7 Similar Solids



Two solids are ________________ if the________________ of their _________________________ (such as height or radii) are _____________.

This common_______________ is called the ______________ of one solid to the other solid.

Any two cubes are similar and so are any two spheres.

Theorem 12.13 - If two solids are similar with a scale factor of $a: b$, then the corresponding areas have a ratio of $a^2: b^2$ and corresponding volumes have a ratio of ____: ____