Geometry 1.7

*8th grade standard

Identify and name three-dimensional figures
Find surface area and volume*

polyhedron Solid → polygons

face polygon

edge faces meet (segment)

vertex edges meet (points)

prism

pyramid

cylinder

cone

sphere

regular polyhedron

platonic solid

surface area outside

volume fill p.51 25,26

height

slant height

Quiz 1.5-1.6

activity: rice solids

Sep 11-4:03 PM

p.51

25) E: 63° F: 117°

$(x)+(x+54)=180$

$2x+54=180$

$-54 \quad -54$

$\frac{2x}{2}=\frac{126}{2}$

$x=63$

26) $(x)+(x-76)=180$

$2x-76=180$

$x=128$ $\frac{2x}{2}=\frac{256}{2}$

Sep 10-10:14 AM

http://www.learner.org/interactives/geometry/3d_prisms.html

Sep 17-9:56 PM

Polyhedrons

A prism is a polyhedron with two parallel congruent faces called bases connected by parallelogram faces.

base

A pyramid is a polyhedron that has a polygonal base and three or more triangular faces that meet at a common vertex.

apex

vertex

base

Sep 11-4:10 PM

Not Polyhedrons

A cylinder is a solid with congruent parallel circular bases connected by a curved surface.

base

A cone is a solid with a circular base connected by a curved surface to a single vertex.

vertex

base

A sphere is a set of points in space that are the same distance from a given point. A sphere has no faces, edges, or vertices.

p.67

Sep 11-4:10 PM

Polyhedrons or *polyhedra* are named for the shape of their bases.

base...category

triangular prism

rectangular prism

pentagonal prism

triangular pyramid

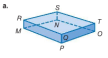
rectangular pyramid

pentagonal pyramid

Sep 11-4:10 PM

Example 1 Identify Solids

Determine whether each solid is a polyhedron. Then identify the solid. If it is a polyhedron, name the bases, faces, edges, and vertices.

a. 

b. 

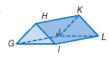
c. 

yes, rect. prism
B NMPO, SRQT
F RQPM, OPQT, TSNU, NMRS
edge RQ, QP, PM, MR, QT, TO, OP
vert. TS, SN, NO, RS, MN
R, M, Q, P, T, O, S, N

Sep 11-4:10 PM

Guided Practice

1A. 

1B. 

Sep 11-4:11 PM

A polyhedron is a **regular polyhedron** if all of its faces are regular congruent polygons and all of the edges are congruent. There are exactly five types of regular polyhedrons, called **Platonic Solids** because Plato used them extensively.

Key Concept Platonic Solids

Tetrahedron	Hexahedron or Cube	Octahedron	Dodecahedron	Icosahedron
				
4 equilateral triangle faces	6 square faces	8 equilateral triangular faces	12 regular pentagonal faces	20 equilateral triangular faces

7-27a
43-59

Sep 11-4:11 PM

8th grade standard (I'm not going to baby you...)

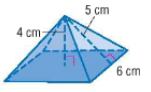
Key Concept Surface Area and Volume

Prism	Regular Pyramid	Cylinder	Cone	Sphere
				
$T = Ph + 2B$	$T = \frac{1}{2}P\ell + B$	$T = 2\pi rh + 2\pi r^2$	$T = \pi r\ell + \pi r^2$	$T = 4\pi r^2$
$V = Bh$	$V = \frac{1}{3}Bh$	$V = \pi r^2 h$	$V = \frac{1}{3}\pi r^2 h$	$V = \frac{4}{3}\pi r^3$
T = total surface area		V = volume		h = height of a solid
P = perimeter of the base		B = area of base		ℓ = slant height, r = radius

Sep 11-4:12 PM

Example 2 Find Surface Area and Volume

Find the surface area and volume of the square pyramid.



Watch Out!

Height vs. Slant Height The height of a pyramid or cone is not the same as its slant height.

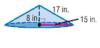
Sep 11-4:12 PM

Guided Practice

Find the surface area and volume of each solid to the nearest tenth.

2A. 

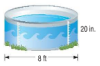
2B. 

2C. 

Sep 11-4:13 PM

Real-World Example 3 Surface Area and Volume

POOLS The diameter of the pool Mr. Sato purchased is 8 feet. The height of the pool is 20 inches. Find each measure to the nearest tenth.



a. surface area of the pool

b. the volume of water needed to fill the pool to a depth of 16 inches

Sep 11-4:14 PM

Guided Practice

3. **CRAFTS** Jessica is making spherical candles using a mold that is 10 centimeters in diameter. Find each measure to the nearest tenth.

A. the volume of wax needed to fill the mold

B. the surface area of the finished candle

Sep 11-4:14 PM

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