Check Your Understanding
Geometry – Area and Volume

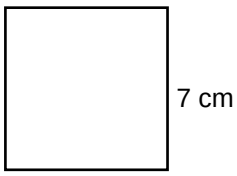
Key Concepts	Basic Questions	Intermediate Questions	Advanced Questions
Area	1	4, 5	
Surface Area		2, 7	
Volume		3, 6, 7	
Equivalency and Missing Measures		4, 5, 6, 7	

Remember:

- **Shapes (2D) are equivalent if they have the same areas**
- **Solids (3D) are equivalent if they have the same volumes**

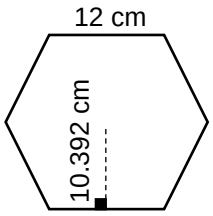
1) Determine the area of the following regular shapes.

a)



b) An equilateral triangle with a perimeter of 18 m.

c)



d) An octagon with a perimeter of 32 mm and an apothem of 4.828 mm

2) Determine the surface area of the following solids:

a) A tetrahedron with side length 3 cm.

b) A cube with side length 7 mm.

c) An octahedron with side length 1.3 m.

d) A dodecahedron with side length 2.7 in.

e) An icosahedron with side length 1.5 ft.

3) Determine the volume of the following solids:

a) A tetrahedron with side length 1.3 m.

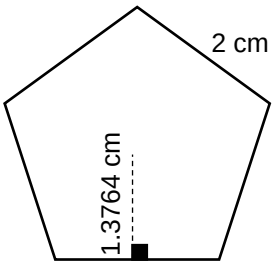
b) A cube with side length 12 cm.

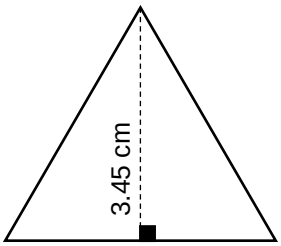
c) An octahedron with side length 1.3 mm.

d) A dodecahedron with side length 3.1 in.

e) An icosahedron with side length 0.8 ft.

4) The regular pentagon and the equilateral triangle (shown below) are equivalent. Determine the side length of the triangle.





5) A square with side lengths of 21 mm is equivalent to heptagon with an apothem of 11.438 mm. Determine the side length of the heptagon.

6) An octahedron and a cube are equivalent. The octahedron has side lengths of 0.9 m. Determine the side lengths of the cube.

7) A tetrahedron and a dodecahedron are equivalent. The tetrahedron has side lengths of 5.4 in. Determine the surface area of the dodecahedron.

Answer Key

1a) $A = 49\ cm^2$ b) $A = 15.59m^2$ c) $A = 374.11\ cm^2$ d) $A = 77.25\ mm^2$

2a) $SA = 15.59\ cm^2$ b) $SA = 294\ mm^2$ c) $SA = 5.85\ m^2$ d) $SA = 150.51\ in^2$
e) $SA = 19.49\ ft^2$

3a) $V = 0.26\ m^3$ b) $V = 1728\ cm^3$ c) $V = 1.04\ mm^3$ d) $V = 228.29\ in^3$
e) $V = 1.12\ ft^3$

4) The side lengths of the triangle are 3.99 cm

5) The side lengths of the heptagon are 11.02 mm

6) The side lengths of the cube are 0.7 m

7) The surface area of the dodecahedron is 37.07 in^2