Check Your Understanding
Geometry – Area and Volume

Key Concepts	Basic Questions	Intermediate Questions	Advanced Questions
Rules of Equivalency 2D	1, 2, 3, 4	5, 6	7, 8
Rules of Equivalency 3D	9, 10, 11, 12	13, 14	15, 16

1) An equilateral, isosceles and a scalene triangle all have the same perimeter. Which one has the greatest area?

2) A square and a rectangle (that is not a square) are equivalent. Which one has the smallest perimeter?

3) A regular pentagon, regular hexagon, regular heptagon, and regular octagon are equivalent. Which one has the smallest perimeter?

4) A regular pentagon, regular hexagon, regular heptagon, and regular octagon have the same perimeter. Which one has the greatest area?

5) What is the maximum area of a rectangle with a perimeter of 16 cm?

6) What is the maximum area, to the nearest hundredth, of a triangle with perimeter of 12cm?

7) We know that a circle is not a regular polygon. However, create the following equivalent shapes: equilateral triangle, square, regular octagon, and circle. Which one has the smallest perimeter?

8) Create an equilateral triangle, square, regular octagon and circle with the same perimeters. Which one has the largest area?

9) Four rectangular prisms have the same surface area. What is special about the one with the largest volume?

10) Four tetrahedrons are equivalent. What is special about the regular tetrahedron?

11) You have the platonic solids. They are all equivalent. Which one has the smallest surface area?

12) You have the five platonic solids. They all have the same surface area. Which one has the largest volume?

13) What is the minimum surface area of a rectangular prism with a total volume of 512 cm^3?

14) What is the maximum volume of a rectangular prism with a total surface area of 150 cm²?

15) We know that spheres are not regular polygons. However, create the following equivalent solids: tetrahedron, cube, icosahedron, and sphere. Which one has the smallest surface area?

16) Create a tetrahedron, cube, icosahedron, and sphere with the same surface areas. Which one has the largest volume?

Answer Key

1) Equilateral triangle
2) Square
3) Octagon
4) Octagon
5) $A = 16\ cm^2$
6) $A = 6.928\ cm^2$
7) Circle
8) Circle
9) It's regular (a cube)
10) It has the smallest surface area
11) Icosahedron
12) Icosahedron
13) $Surface\ Area = 384\ cm^2$
14) $Volume = 125\ cm^3$
15) Sphere
16) Sphere