# ˚° ✧ Geometry Round ✧ °˚

30 minutes

Please put all answers on the provided answer sheet, units are not required

1. Mark Watney is stranded on Mars. His greenhouse has a ceiling consisting of triangular glass panes. One of the equilateral triangles has all sides equal to 4. What is the triangle's area?

2. A new Death Star is being designed. In the blueprint, a square is inscribed in a circle. What is the ratio of the area of the circle to the area of the square?

3. The starship Enterprise is traveling towards a Borg cube. The angle between the cube and the ship makes a 45 degree angle, and the ship is 3 miles from the cube. How tall is the cube?

4. R2–D2 is cutting a pie into 4 unequal sections. In the figure, the arc length of ST = 5/6π. The radius is 2. What is the angle of $\angle$QPR, in degrees?
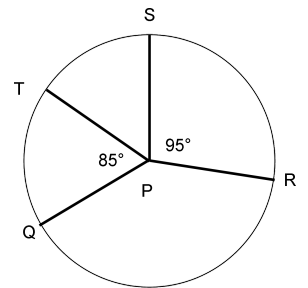
5. The Guardians of the Galaxy received a mysterious right cylindrical container. It has a diameter of 16 cm and a height of 15 cm. Find the container's volume and leave your answer in terms of π.

6. Ender has designed a game to play at his space battle school. In his game, a rectangular box with side lengths x,y,z has a surface area of 3. Another rectangular box has size lengths 3x,3y,3z. What is the surface area of this new box?

7. The Webb Space Telescope's hexagonal mirrors are being designed. The distance between points B and C on a regular hexagon ABCDEF is equal to 12. Triangles ADF and BCE intersect to form kite GHIJ. The area of GHIJ can be written in the simplest form of x√y. What is xy?

8. Spock has traveled to the planet, Vulcan, to receive a meditation box. In the rectangular box, the sum of the side lengths is 24, the surface area is 22, and the volume is 6. What is the longest side length of the box?

9. Captain Picard's new combadge is pictured in the figure shown. Point D is the center of the circle. ∠ABD and ∠ACD are 20°. What is the value of x?
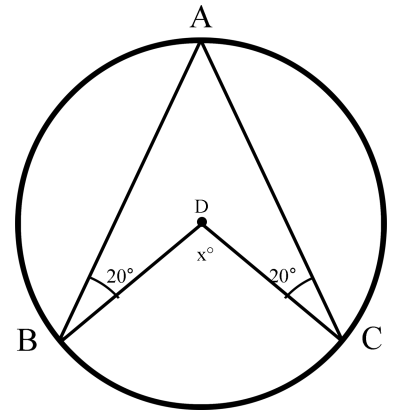
10. Obi-Wan Kenobi is designing a garden. In his garden, a square is inscribed inside a circle, then another circle is inscribed inside the square. If the area of the inner circle is 4π, what is the area of the outer circle? (leave your answer in tems of π)