1. In Fig. **??**, a quadrilateral $ABCD$ is drawn to circumscribe a circle with center O, such that the sides AB, BC, CD, and DA touch the circle at points P, Q, R and S respectively. Prove that $AB + CD = BC + DA$.

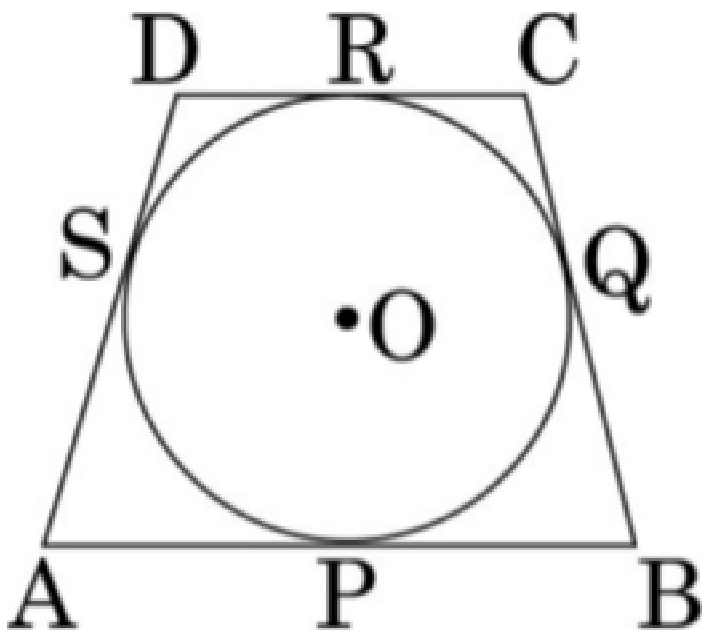

Figure 1: Quadrilateral ABCD

2. In Fig. **??**, a tent is in the shape of a cylinder surmounted by a conical top of the same diameter. If the height and diameter of the cylindrical part are $2.1m$ and $3m$ respectively, and the slant height of the conical part is $2.8m$, find the cost of the canvas needed to make the tent if the canvas is available at the rate of $|500/m^2$. (Use $\pi = \frac{22}{7}$)

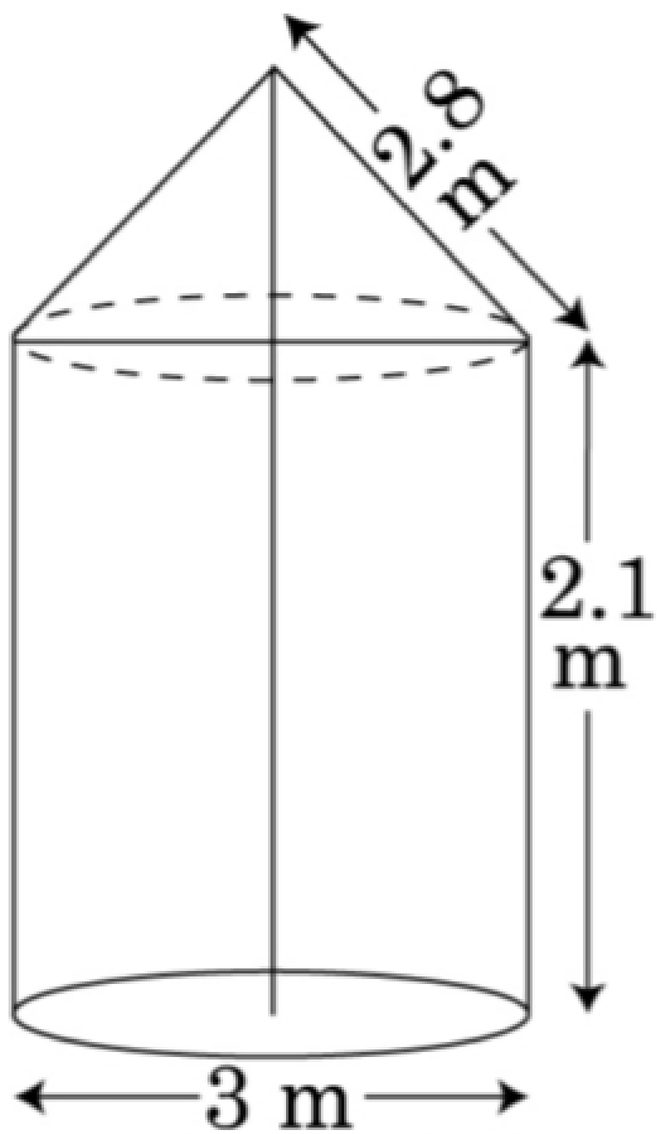

Figure 2: Cone on top of a cylinder

3. A sphere of diameter $12cm$ is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by $3\frac{5}{9}cm$. Find the diameter

of the cylindrical vessel.

4. Due to heavy floods in a state, thousands were rendere d homeless. Fifty schools collectively offered to provide place and canvas for 1500 tents to be fixed by the government and decided to share the whole expenditure equally. The lower part of each tent is cylindrical with a base radius of $2.8m$ and height $3.5m$, with a conical upper part of the same base radius but of height $2.1m$. If the canvas used to make the tents costs $|120/m^2$, find the amount shared by each school to set up the tents. What value is generated by the above problem? (Use $\pi = \frac{22}{7}$)

5. In Fig. **??**, the vertices of $\triangle ABC$ are $A(4,6), B(1,5)$ and $C(7,2)$. A line segment DE is drawn to intersect the sides AB and AC at D and E re spectively such that $\frac{AD}{AB} = \frac{AE}{AC} = \frac{1}{3}$. Calculate the area of $\triangle ADE$ and compare it with the area of $\triangle ABC$.

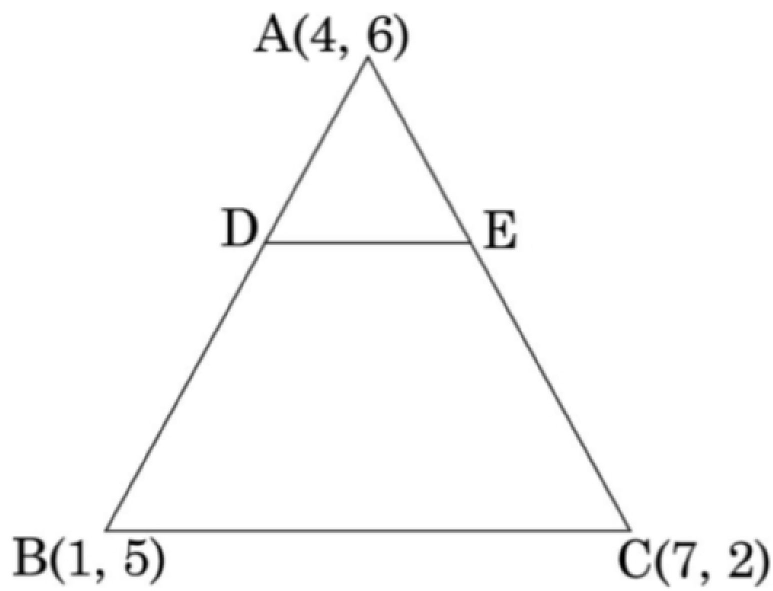

Figure 3: Triangle ABC

6. Draw a triangle with sides $5cm, 6cm$ and $7cm$. T hen draw another triangle whose sides are $\frac{4}{5}$ of the corresponding sides of the first triangle.