Electric Field of Point Charges

[1] Three equal charges are placed at the corners of an equilateral triangle. Show that the electric field at the center is zero.

[2] Find the direction and magnitude of $\vec{E}$ at the center of a square with charges at the corners as shown in figure below. Assume that $q = 1 \times 10^{-8}$coul, $a = 5$cm

Fig. **1**
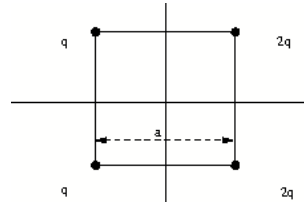
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[3] Sixteen equal charges q are placed at the corners of a regular polygon of 17 sides. Find the force exerted by these charges on a seventeenth charge q placed at the center of the polygon.

[4] Show that the electric field at the center of a regular N-sided polygon is zero when equal charges are placed at the corners of the polygon.

[5] Three equal charges are placed at the corners of an equilateral triangle. Show that the electric field at the center is zero.

[6] Three charges are located on the circumference of a circle of radius R as shown in the figure below. The two charges Q subtend an angle 90° at the centre of the circle. The charge q is symmetrically placed on the circumference with respect to the charges Q. What is the magnitude of Q if the electric field at the centre is zero?
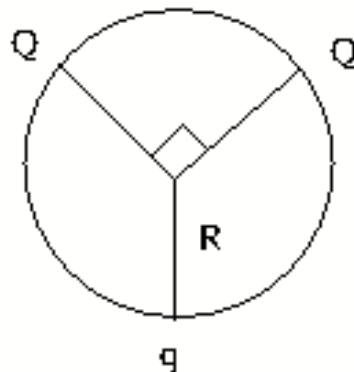
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Fig. **2** Find Q

[7] A spherical surface of radius R is cut into two parts by a plane passing through the two points A, B as shown in Fig 1. A point charge Q is placed at a point C outside

the sphere, and is at a distance $d > R$ from the centre, It is given that lines AC and BC are tangents to the sphere. Find the total flux of the electric field passing through the surface ADB.
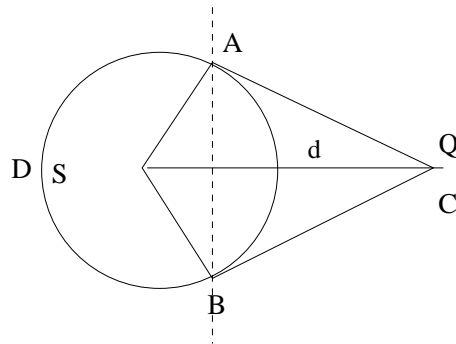

Fig. **3**