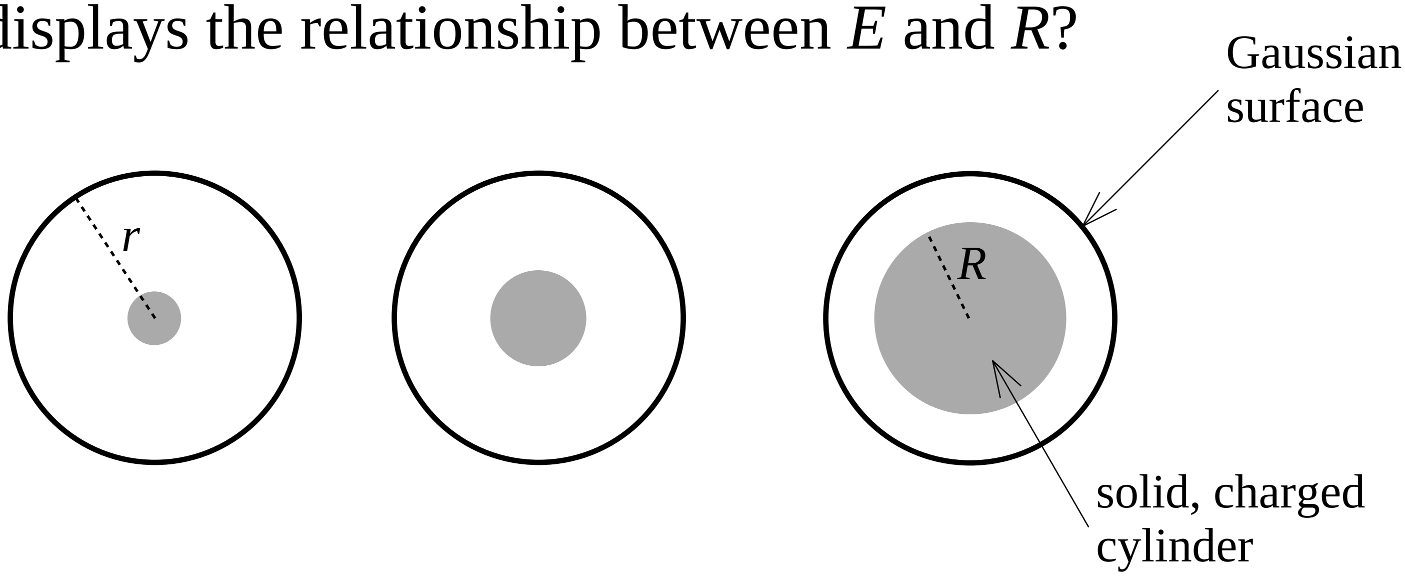
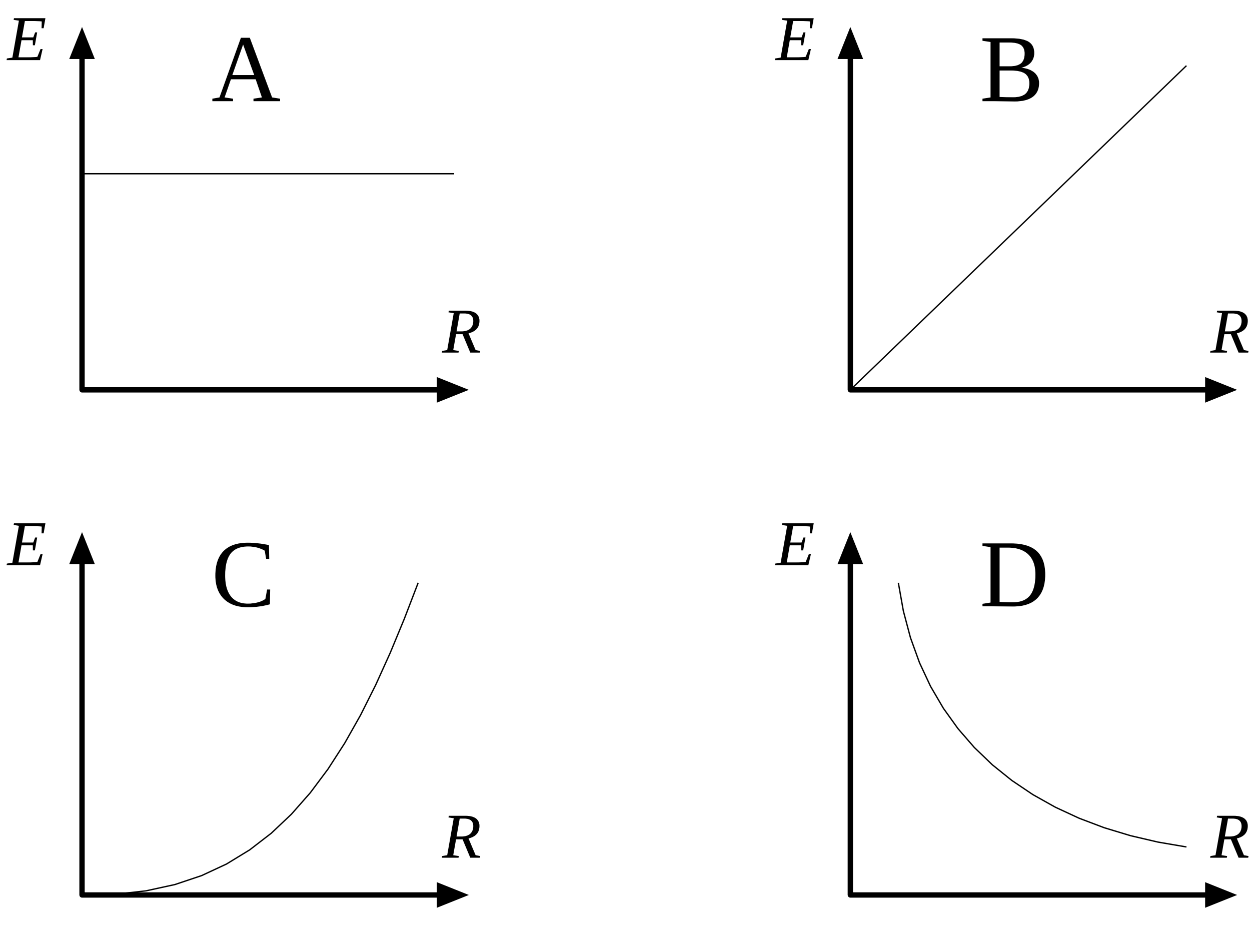
The below figure shows, in cross section, three solid cylinders of differing radius (R) but identical material with charge density ρ. Also shown is the cross section of a Gaussian surface—all three have the same radius (r) and length L. What is the magnitude of the electric field E anywhere on this Gaussian surface as a function of cylinder's radius R? Which of the below plots best displays the relationship between E and R?





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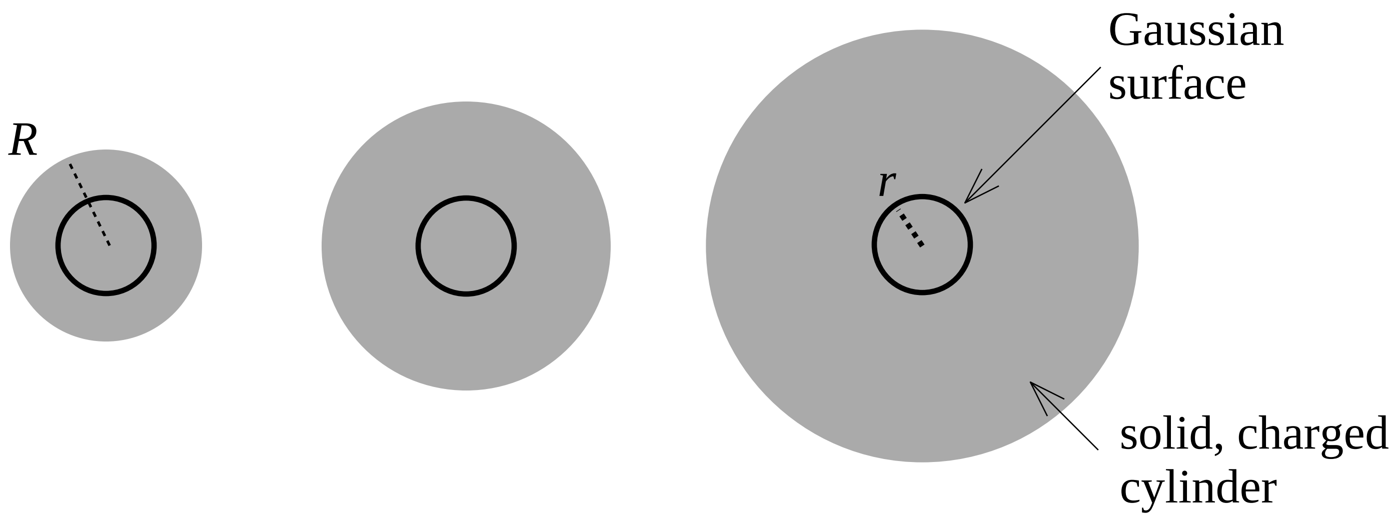
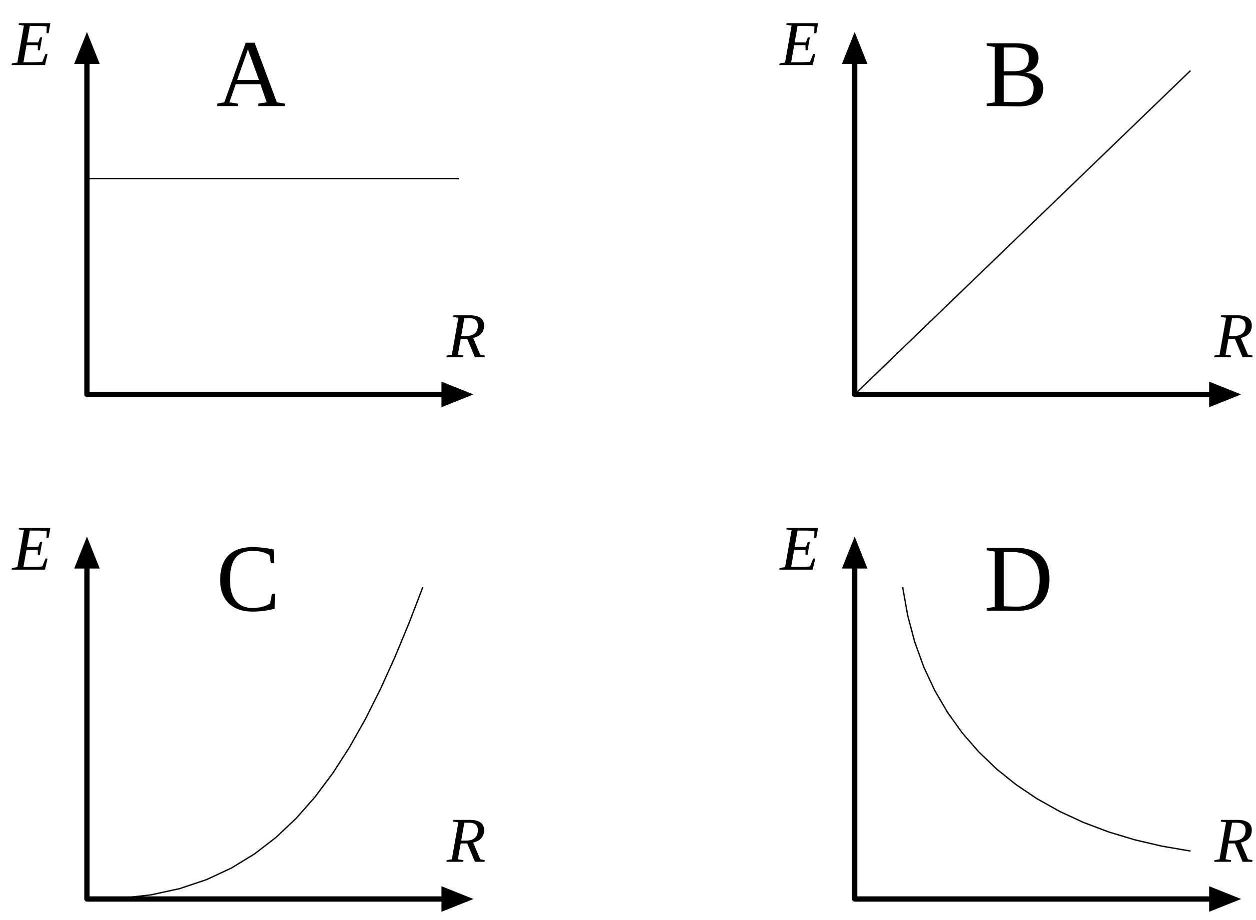
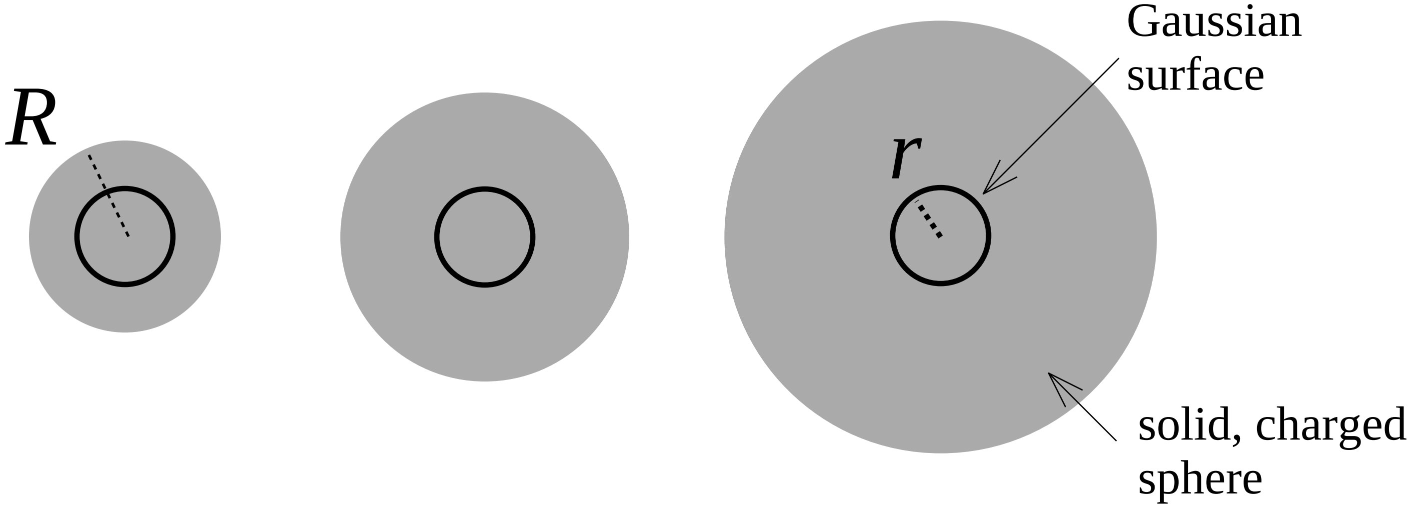
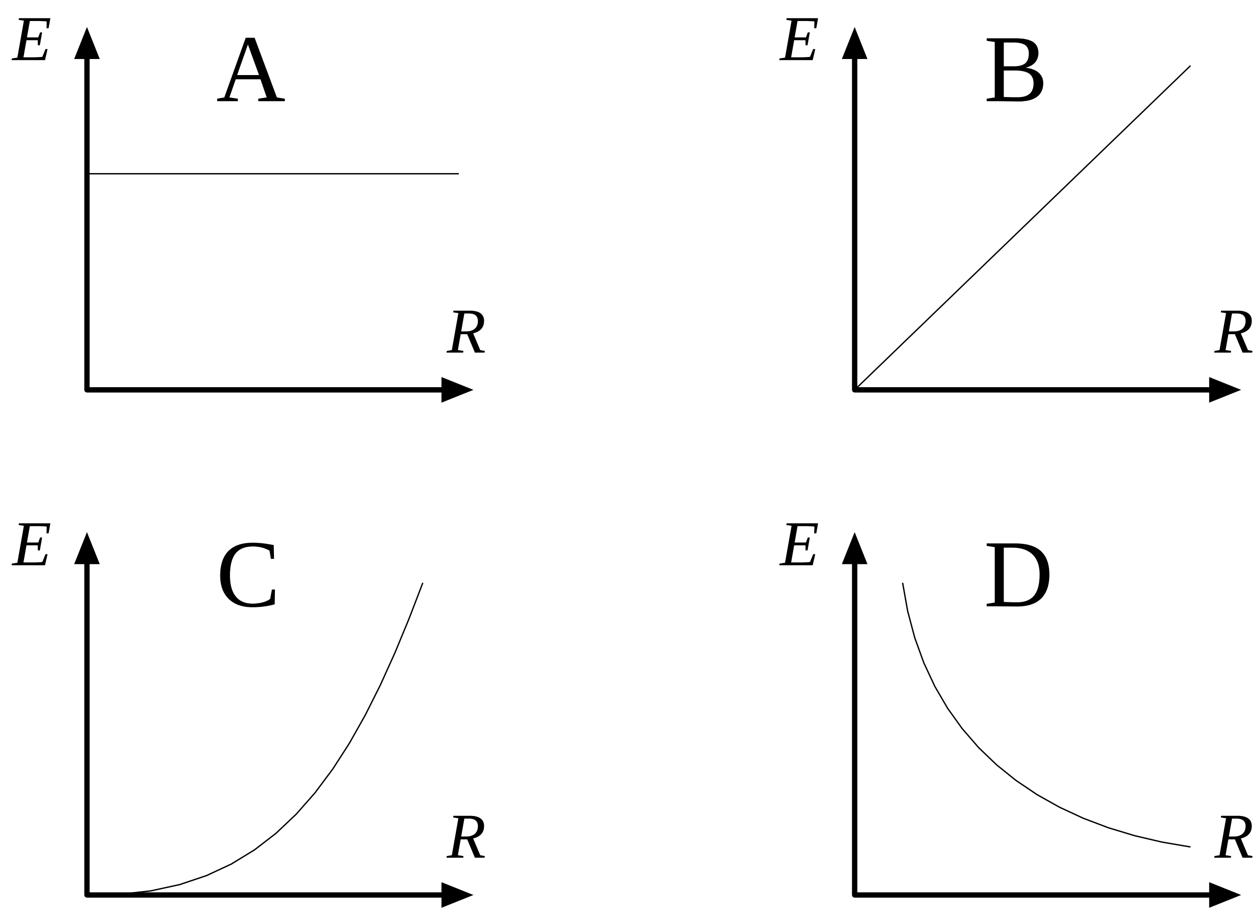
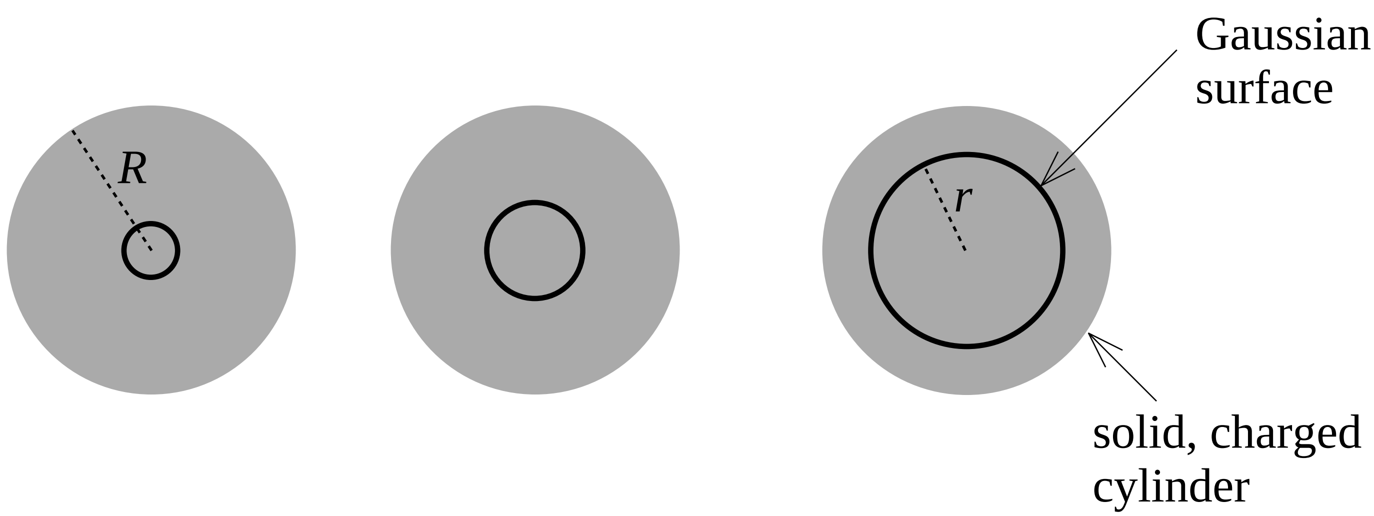


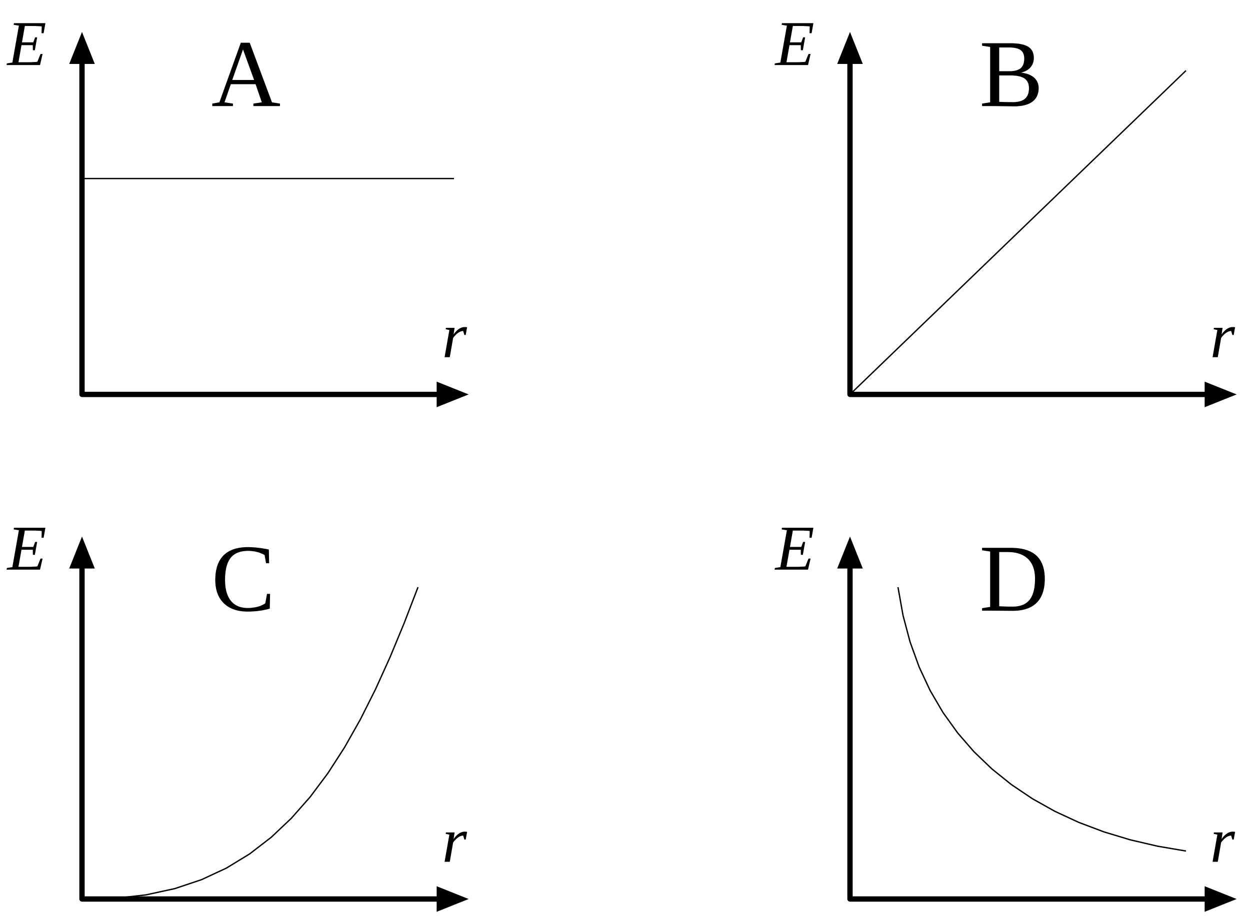



R
r
Gaussian surface
solid, charged sphere


E
A
R
E
B
R
E
C
R
E
D
R

The below figure shows, in cross section, three identical solid cylinders of radius (R) and with charge density ρ. Also shown is the cross section of three Gaussian surfaces; The three have the <u>differing</u> radius (r) but the same length L. What is the magnitude of the electric field E anywhere on these Gaussian surfaces as a function of r? Which of the below plots best displays the relationship between E and r?





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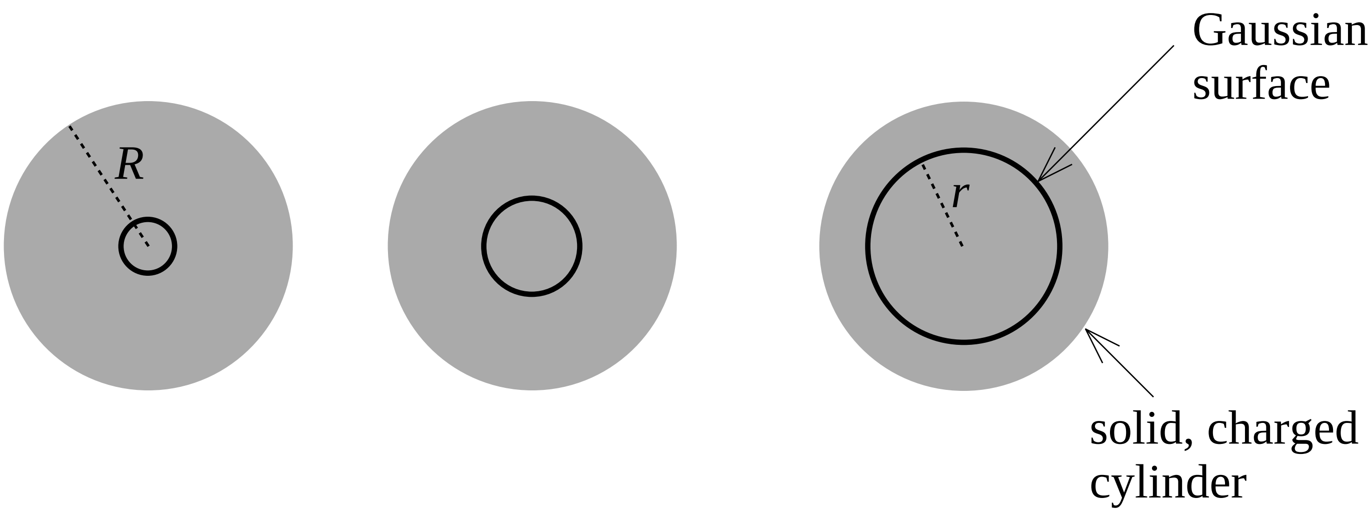

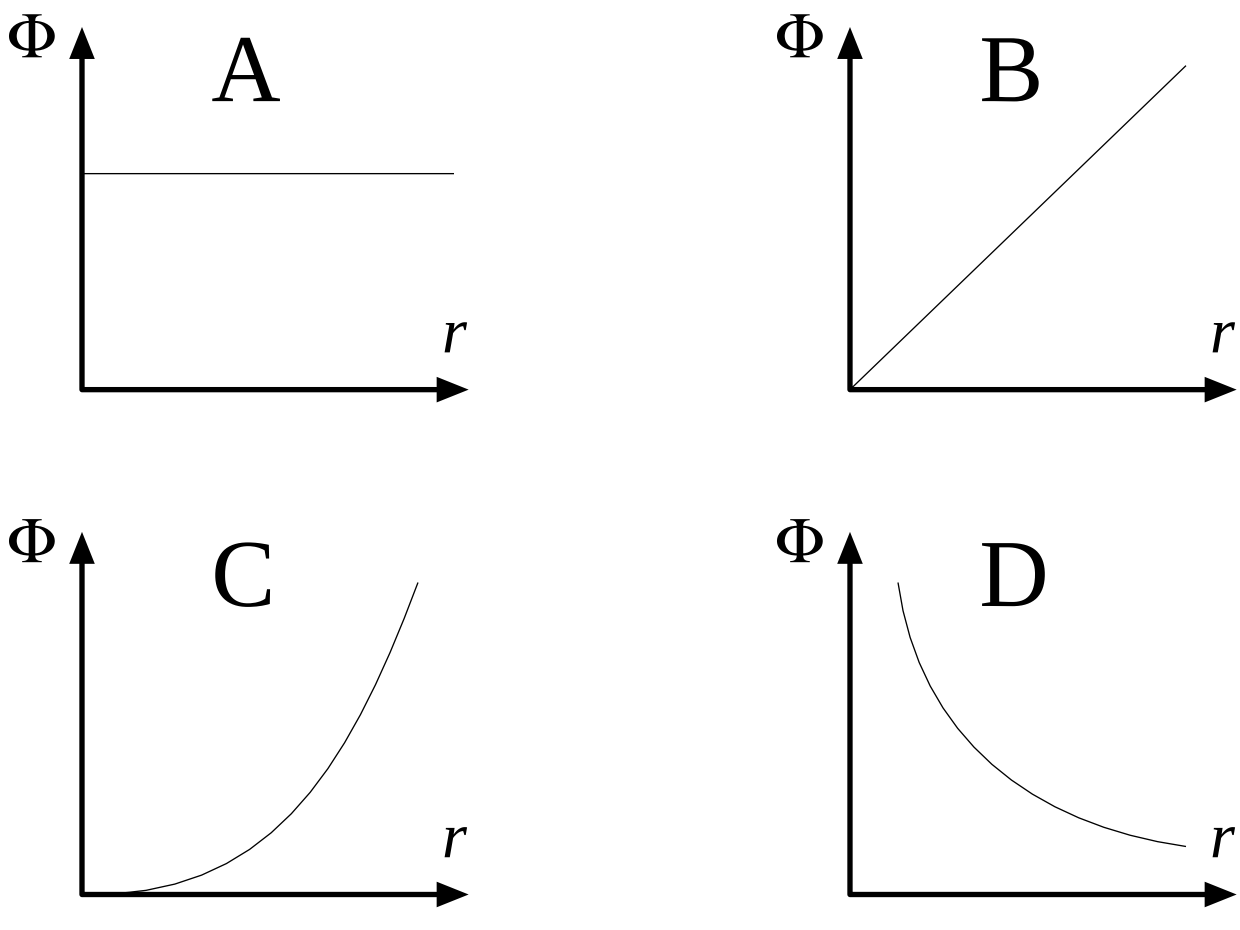

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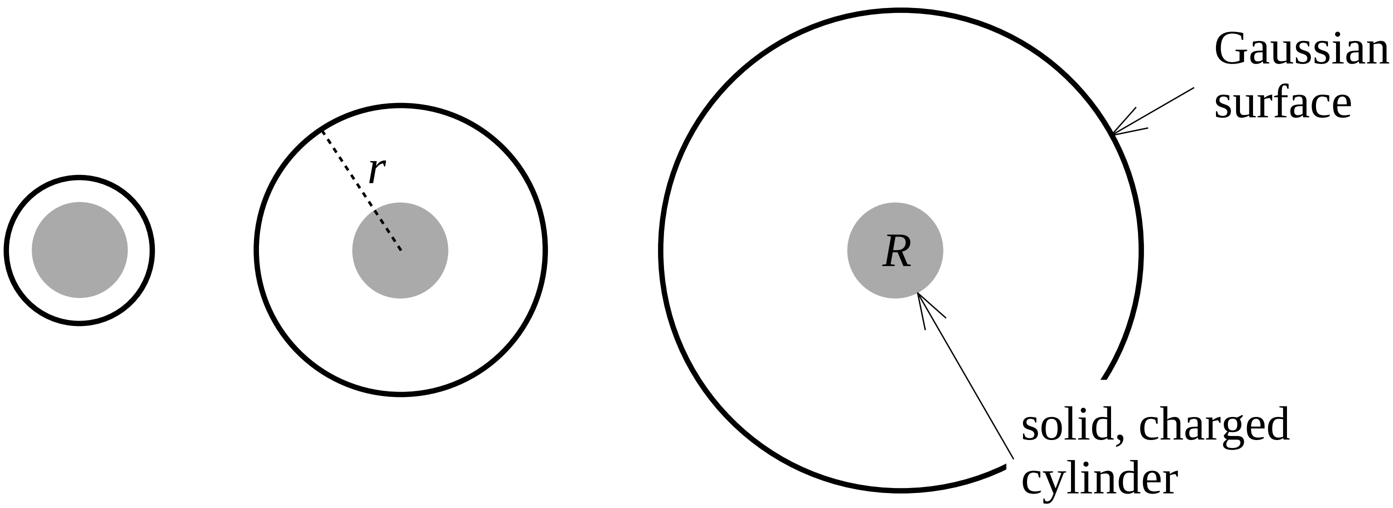
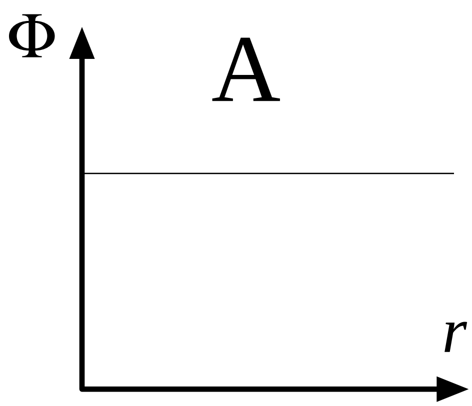
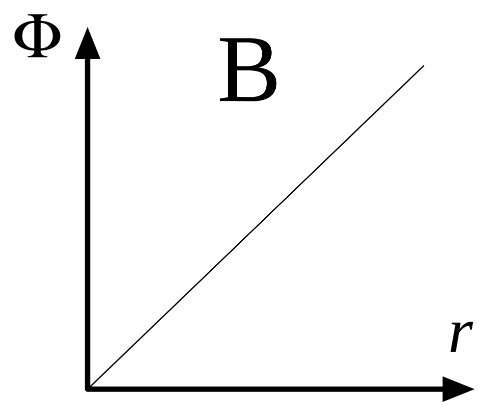
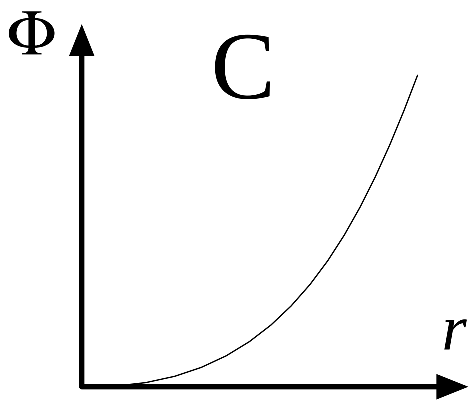
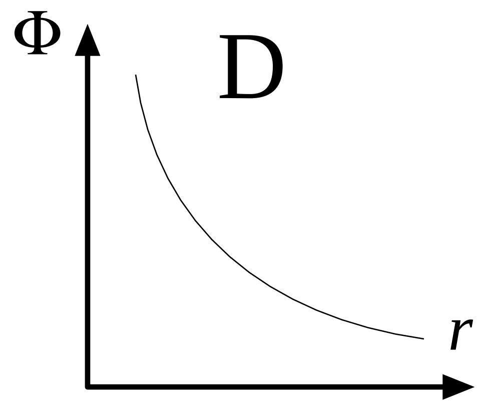
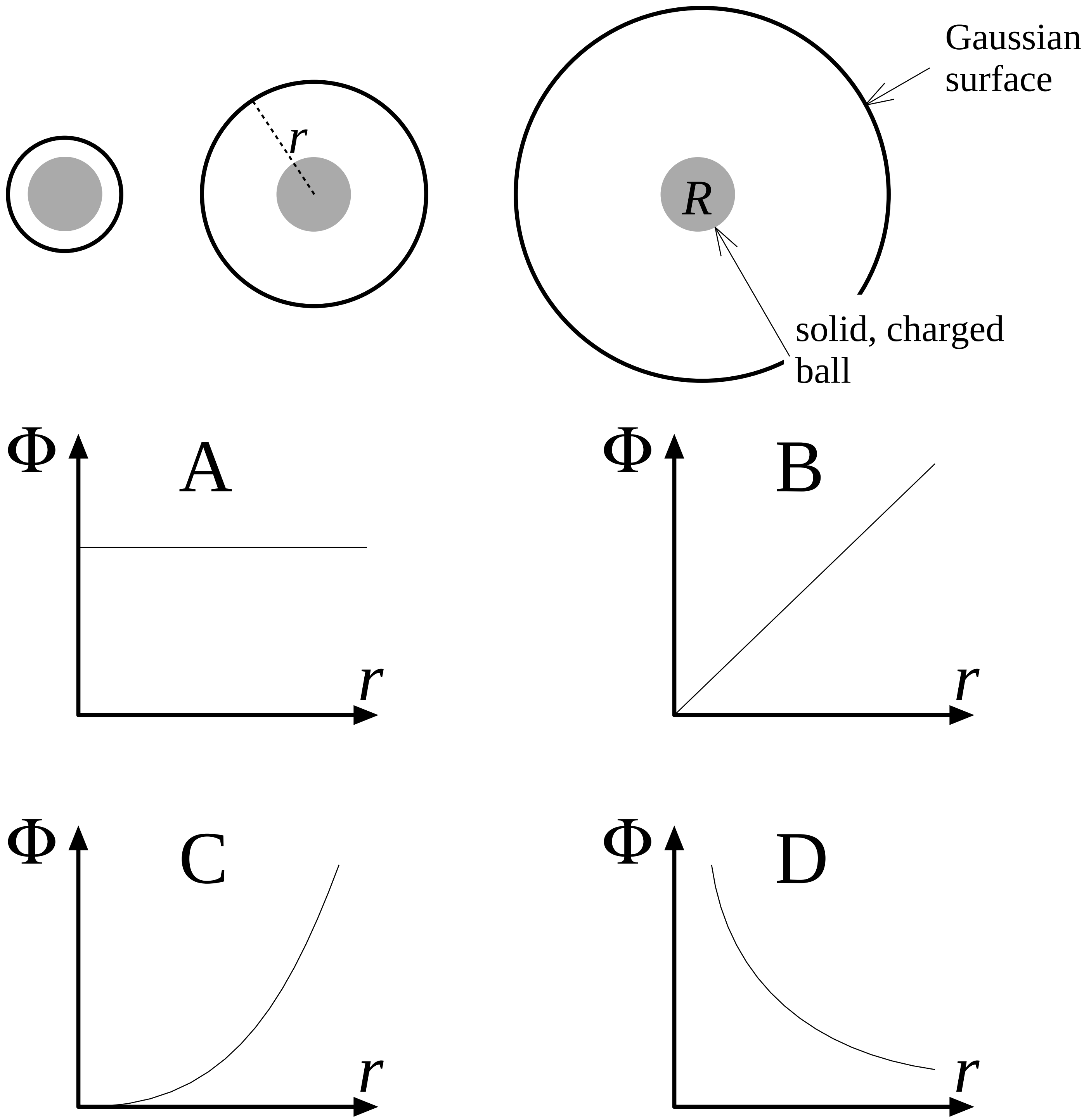




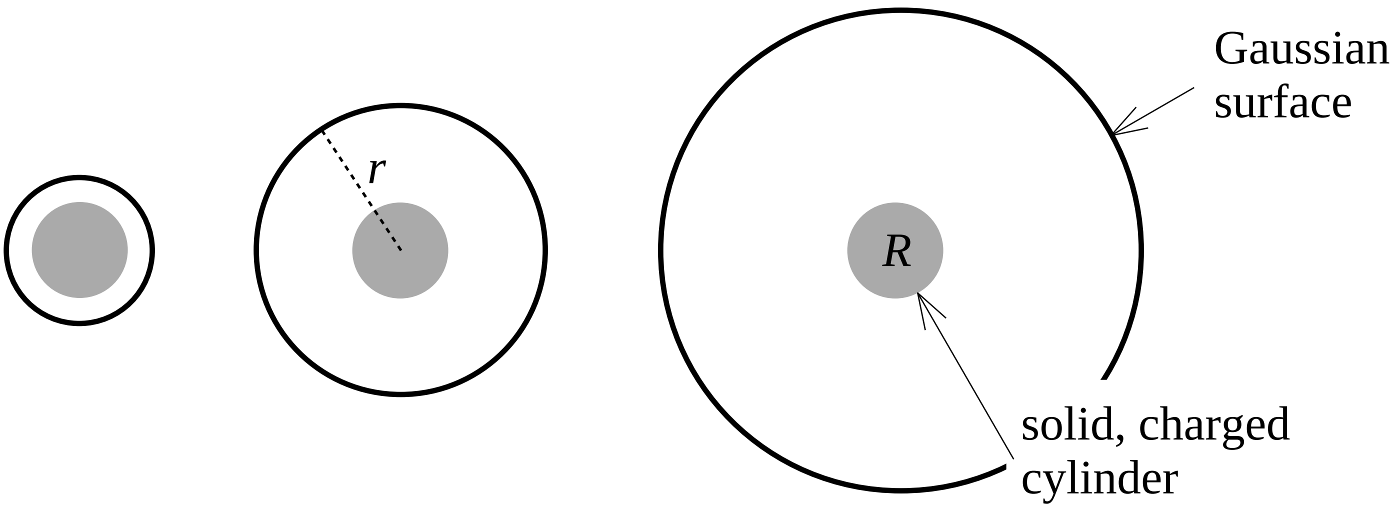


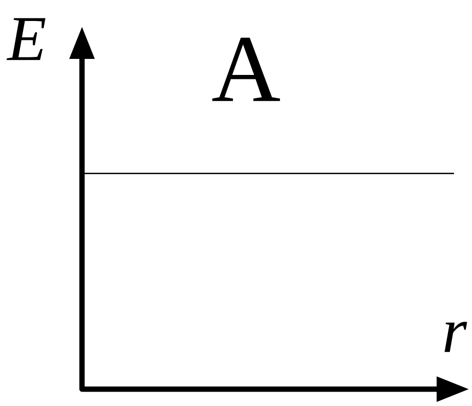


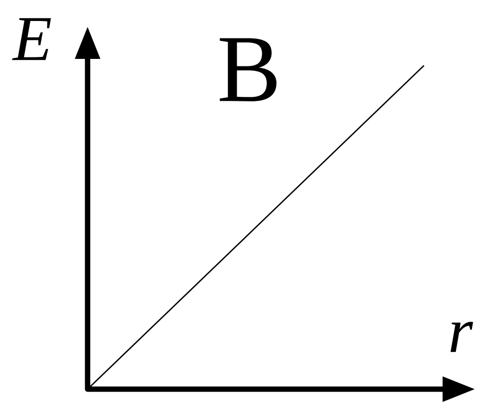


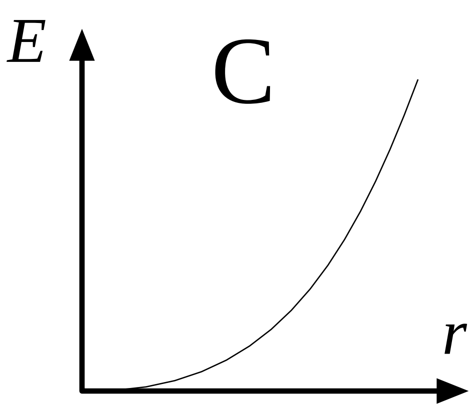

Gaussian
surface
r
R
solid, charged
ball
Φ
A
r
Φ
B
r
Φ
C
r
Φ
D
r

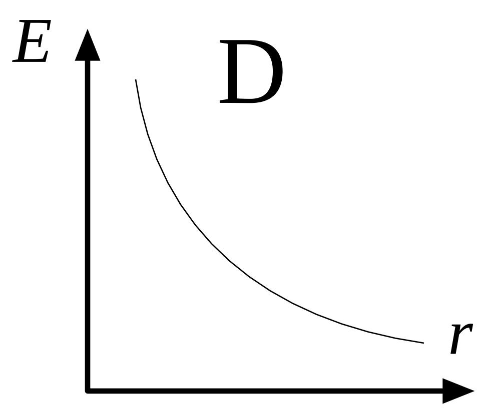
The below figure shows, in cross section, three identical solid cylinders of radius (*R*) and with charge density ρ. Also shown is the cross section of three Gaussian surfaces; The three have <u>differing</u> radius (*r*) but the same length *L*. What is the magnitude of the electric field *E* anywhere on these Gaussian surfaces as a function of *r*? Which of the below plots best displays the relationship between *E* and *r*?



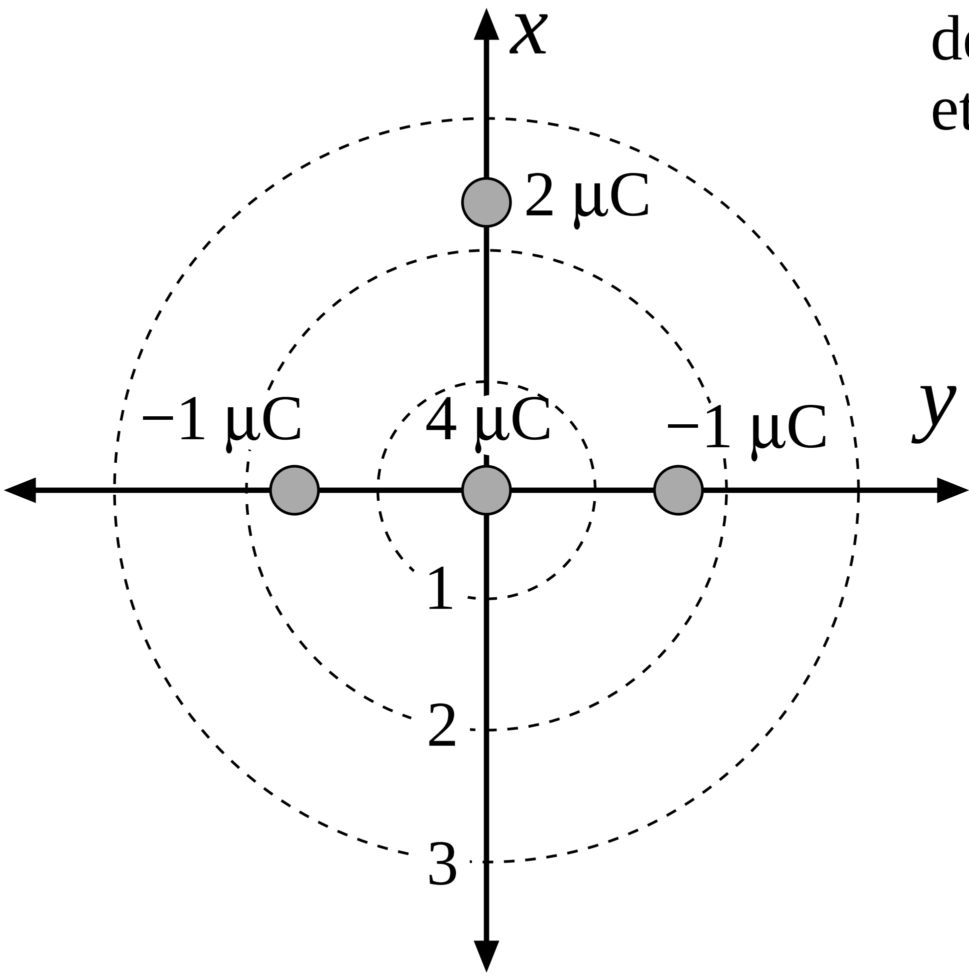








The figure shows the location and charge on four tiny conductors sitting in the *xy* plane. Consider the electric flux (Φ) through three gaussian spheres centered on the origin with radii as shown in the figure. Which of the below options best describes the relationship between the flux through these three spheres. (Φ_1 denotes the electric flux through sphere 1, etc.)

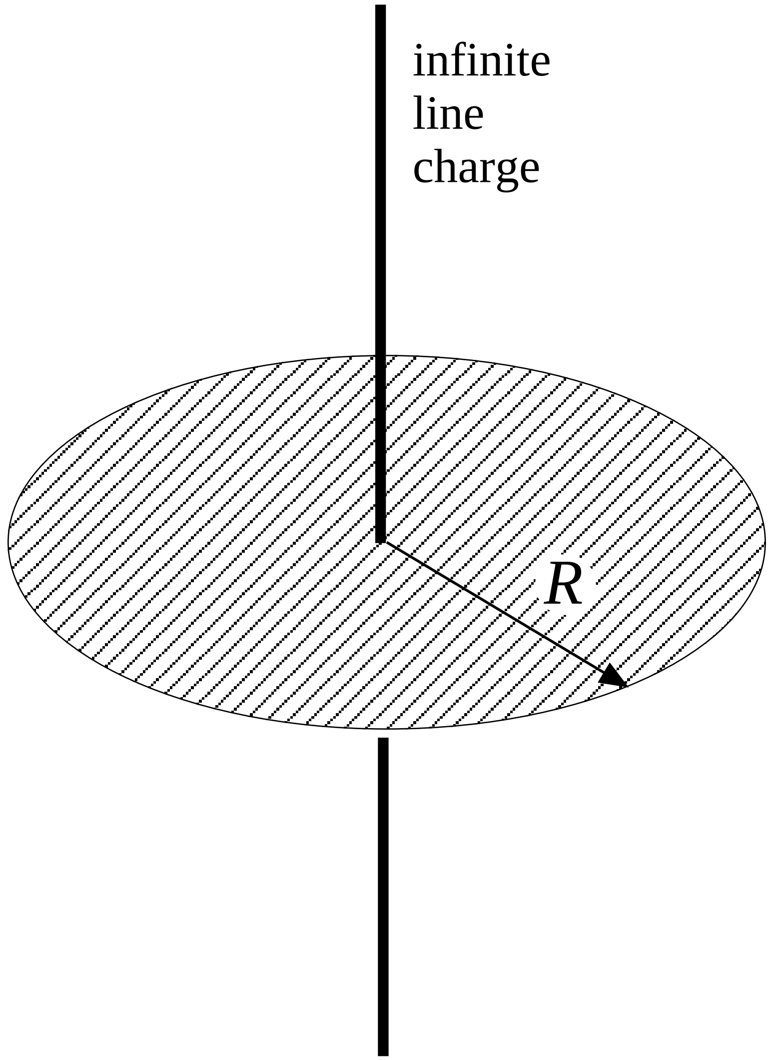


A. $\Phi_1 > \Phi_2 > \Phi_3$

B. $\Phi_1 < \Phi_2 < \Phi_3$

C. $\Phi_1 = \Phi_2 = \Phi_3$

D. $\Phi_2 < \Phi_1 = \Phi_3$



Consider the case of an infinite, uniformly-charged wire sitting on the *z* axis. The electric flux through a disk of radius *R*, sitting in the *xy* plane and centered on the origin is:

A. $2\pi R E$

B. $+\pi R^2 E$

C. $-\pi R^2 E$

D. 0