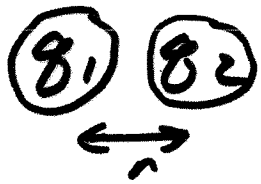
Read 12.5

Group tomorrow

Review

2 charges 

$$F = \frac{K q_1 q_2}{r^2}$$

$K = 9 \times 10^9 \ N \cdot m^2/C^2$

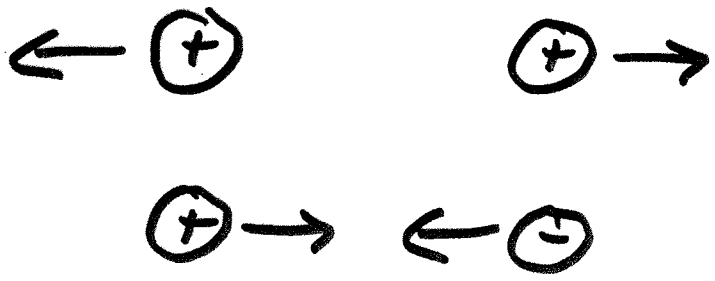
q_1, q_2 make positive

i.e $-q_2 \rightarrow q_2$

Direction

same sign repel

like sign attract



Interactive Question

If the distance between two point charges remains constant while the size of one of the charges is quadrupled, the force between the charges is multiplied by

A) 16

B) 4

C) 1/4

D) 1/16

E) 1

Interactive Question

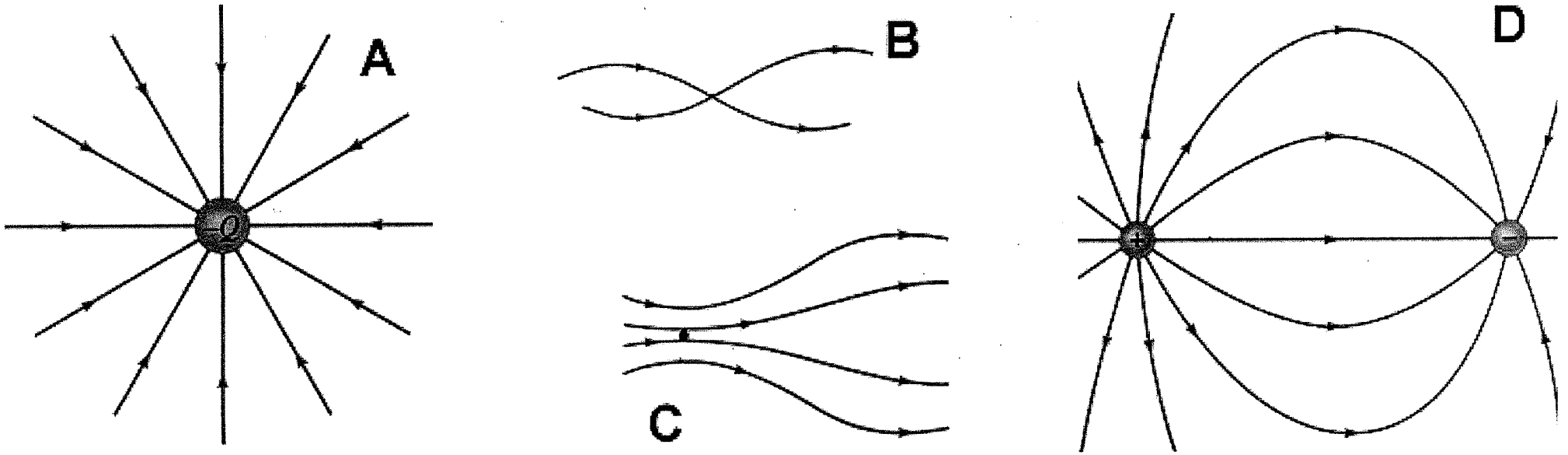
D

If the distance between two point charges is tripled while the size of the charges remains the same, the force between the charges is multiplied by

A) 9
B) 3
C) 1/3
D) 1/9
E) 1

Interactive Question

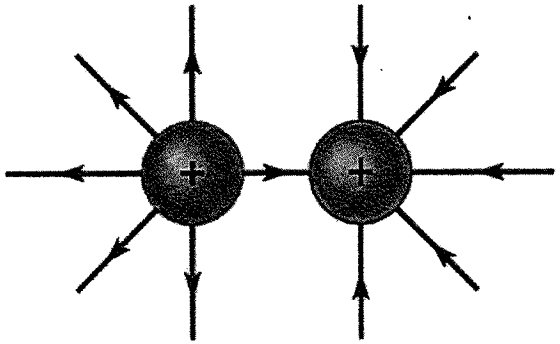
Which of these is not a possible representation of electric field lines?



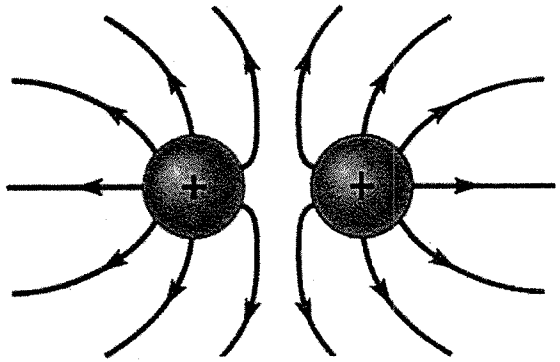
E) None of the above

Interactive Question

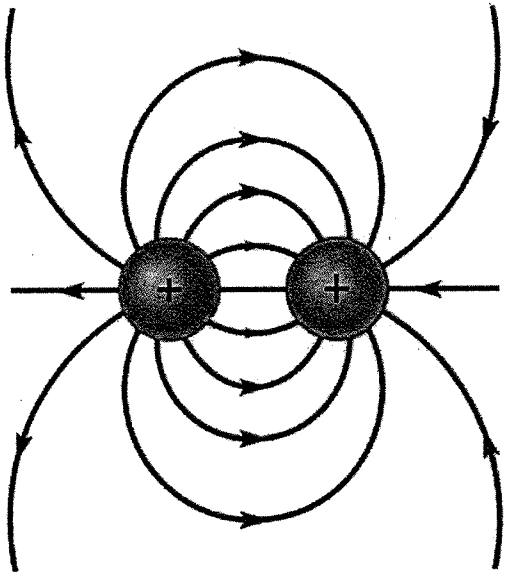
The field lines due to two spheres with like charges are shown by



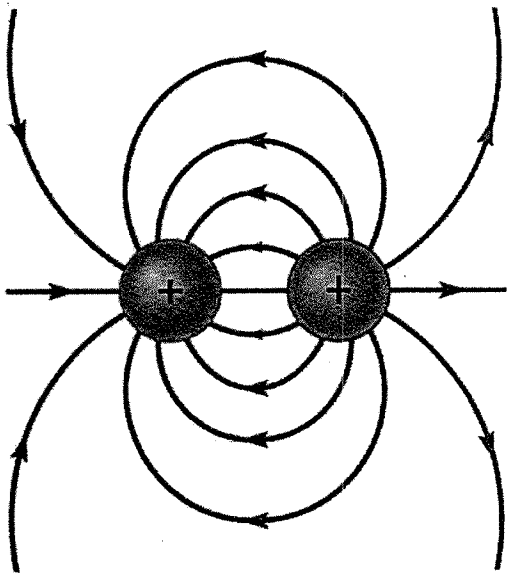
(A)



(B)

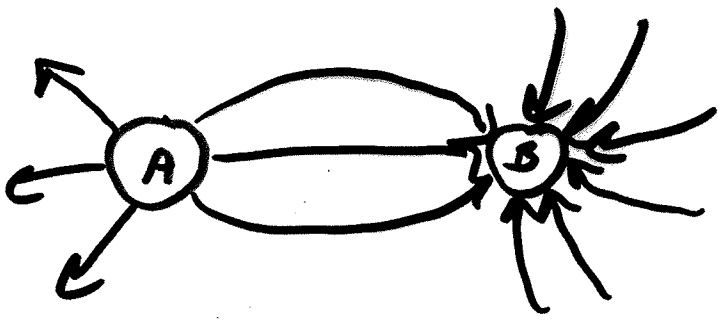


(C)



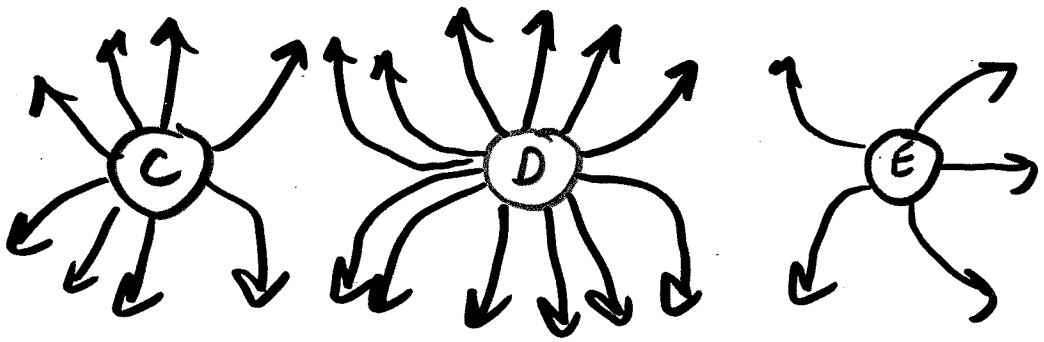
(D)

charges?
which one larger?



A +
B −

magnitude of B greater than A



C, D, E positive

magnitude

largest D

smallest E

Interactive Question

D

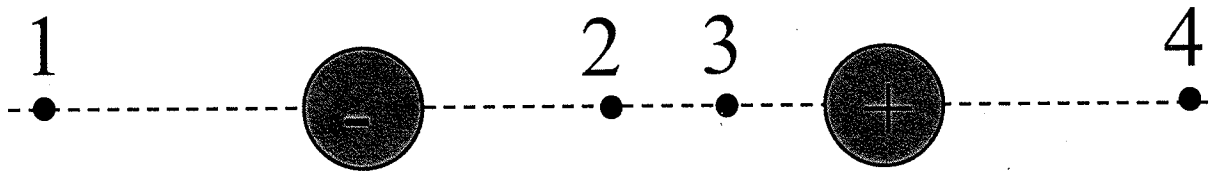
An object with a charge of a –2.6 mC feels an electric force toward the east. Which direction does the electric field point at the place where the object is located?

A) North
B) South
C) East
D) West
E) None of the above

Interactive Question

E

Two objects with charge of equal magnitude but opposite sign, lie along a line as shown. What are the directions of the electric field at points 1, 2, 3, and 4?



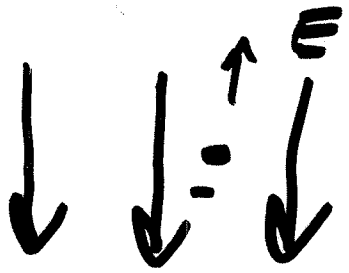
	1	2	3	4
A)	Left	Zero	Right	Right
B)	Right	Zero	Left	Right
C)	Right	Left	Right	Left
D)	Zero	Left	Left	Zero
E)	Right	Left	Left	Right

Problem: In a certain region of space, an electric field is pointing straight down with a strength of 250 N/C. If an object with a charge of –6.6 mC is placed there, what is the electrostatic force felt by that object?

choose "down" as negative direction

$E = -250\ N/C$

$q = -6.6 \times 10^{-3}\ C$ want F



$F = Eq$

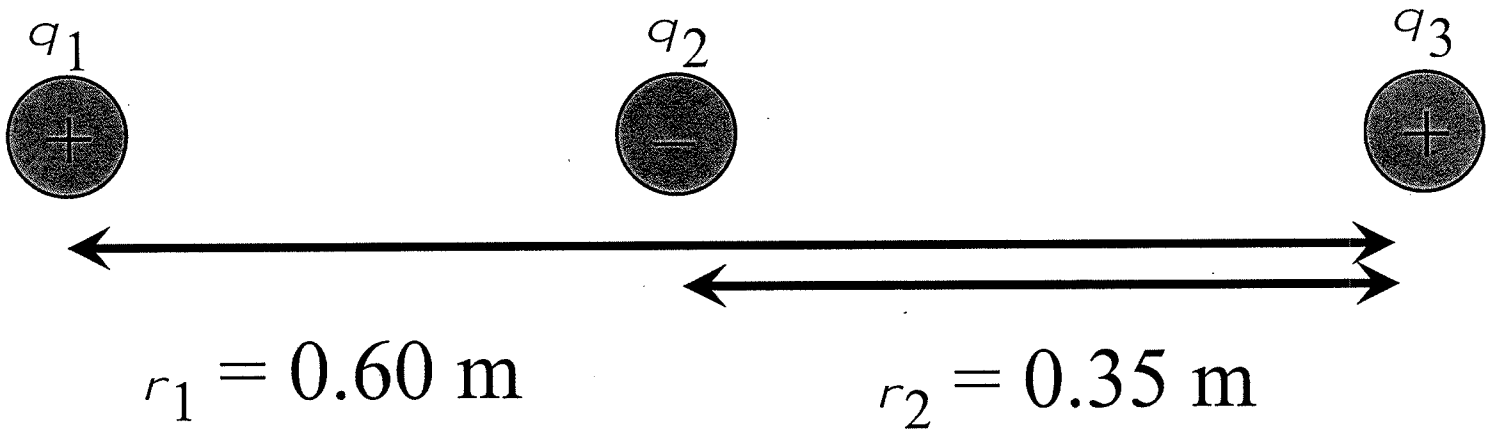
$(-250\ N/C)(-6.6 \times 10^{-3}\ C) = 1.65\ N$

+ sign upward force

Problem: Three spheres are oriented as shown in the figure with charges equal to $q_1 = 8.6\ \mu C$, $q_2 = -5.3\ \mu C$, and $q_3 = 3.2\ \mu C$.

(a) What is the net electrostatic force on q_3 from the other two spheres?

(b) If q_3 is considered a "test charge" what is the electrostatic field from the other two spheres at the point where q_3 is located?



$$F_1 = \frac{k q_1 q_3}{r^2} = \frac{(9\times10^9\ N m^2/C^2)(8.6\times10^{-6}\ C)(3.2\times10^{-6}\ C)}{(.6\ m)^2}$$

$$.69\ N$$

$$F_2 = \frac{k q_2 q_3}{r^2} = \frac{(9\times10^9\ N m^2/C^2)(5.3\times10^{-6}\ C)(3.2\times10^{-6}\ C)}{(.35\ m)^2}$$

$$1.25\ N$$

$\leftarrow$ $-$ $\quad$ $+$ $\rightarrow$

$F_1 = +.69\ N$

$F_2 = -1.25\ N$

$.69\ N - 1.25\ N = -.56\ N$

b) $F = Eq$ $\qquad E = \frac{F}{q} = \frac{-.56\ N}{3.2\times10^{-6}\ C}$

$$\Rightarrow E = -1.75\times10^5\ N/C$$