1 A 2.40 μC is subject to a 3.00 mN force due to an Electric Field. What is the magnitude of the Electric Field at the location of the charge?

2 A 6.3 μC electric charge is placed in an Electric Field with a magnitude of 5.0×10^5 N/C. What is the electric force on the charge due to the Electric Field?

3 A 5.6 nC electric charge is placed in an Electric Field and experiences a force of 7.4 μN. What is the magnitude of the Electric Field at that location?

4 A conducting sphere with a radius of 5.0 cm carries a positive charge of 4.0 nC. Find the Electric Field at points 3.0 cm, 5.0 cm, and 15 cm from the center of the sphere.

5 What is the direction and magnitude of the Electric Field due to a -6.8 μC point charge at a distance of 7.4m?

6 An oil drop is charged negatively. How much charge is on the drop if the Electric Field is 6,400 N/C at a distance of 1.2 m?

7 What is the direction and magnitude of the Electric Field 4.0 m away from an 8.6 μC charge?

8 The Electric Field due to a charged particle is 3,600 N/C at a location 2.4 m away from the particle. How much electric charge is on the particle?

9 A conducting sphere with a radius of 15 cm carries a negative charge of 8.0 nC. Find the Electric Field at points 4.0 cm, 15 cm, and 20 cm from the center of the sphere.

10 Calculate and compare the gravitational force and the electrical force between two protons that are separated by 1.2×10^{-15} m ($G = 6.67 \times 10^{-11}$ Nm^2/kg^2, $e = 1.60 \times 10^{-19}$ C, $m_p = 1.67 \times 10^{-27}$ kg).

11 Calculate and compare the gravitational force and the electrical force between two electrons that are separated by 4.15×10^{-12} m ($G = 6.67 \times 10^{-11}$ Nm^2/kg^2, $e = 1.60 \times 10^{-19}$ C, $m_e = 9.11 \times 10^{-31}$ kg).

12 What is the magnitude of the Electric Field required to "levitate" an electron in the Earth's gravitational field?

13 Calculate and compare the gravitational force and the electrical force between two protons that are separated by 4.25×10^{-15} m ($G = 6.67 \times 10^{-11}$ Nm^2/kg^2, $e = 1.60 \times 10^{-19}$ C, $m_p = 1.67 \times 10^{-27}$ kg).

14 Calculate and compare the gravitational force and the electrical force between two electrons that are separated by 9.45×10^{-12} m ($G = 6.67 \times 10^{-11}$ Nm^2/kg^2, $e = 1.60 \times 10^{-19}$ C, $m_e = 9.11 \times 10^{-31}$ kg).

15 What is the magnitude of the Electric Field required to suspend an oil drop of mass 1.0×10^{-4} kg with a charge of 6.2×10^{-6} C in the Earth's gravitational field?

16 Draw the Electric Field surrounding one single positive charge.

17 Draw the Electric Field lines surrounding two positive electric charges that are in a horizontal line, separated by a distance, r.

18 Draw the Electric Field lines surrounding a positive charge on the top and a negative charge below.

19 Draw the Electric Field line surrounding one single negative charge.

20 Draw the Electric Field lines surrounding two negative electric charges that are in a horizontal line, separated by a distance, r.

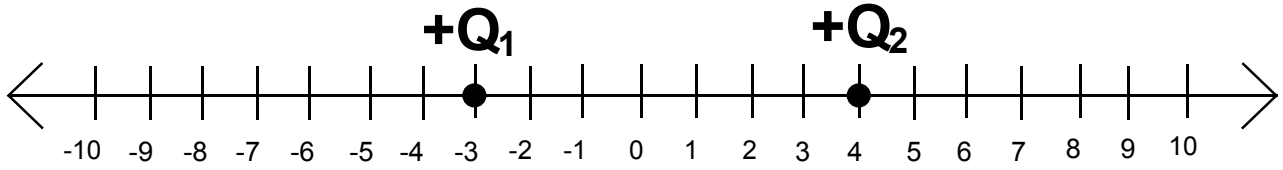
21 Draw the Electric Field lines surrounding a negative charge on the left and a positive charge on the right.

22 As shown in the below diagram, a positive charge, Q_1 = 2.6 μC, is located at a point, x_1 = -3.0 m, and a positive charge, Q_2 = 1.4 μC, is located at a point, x_2 = +4.0 m.

a. Find the magnitude and direction of the Electric Field at the origin due to charge Q1.

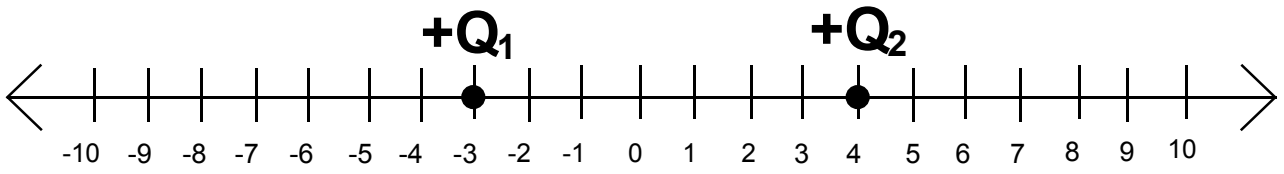
b. Find the magnitude and direction of the Electric Field at the origin due to charge Q2.

c. Find the magnitude and direction of the net Electric Field at the origin.



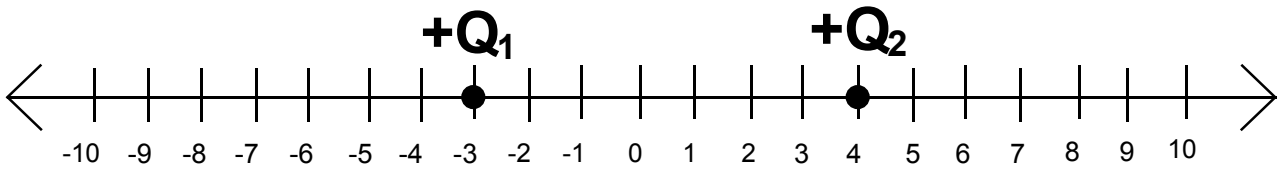
As shown in the below diagram, a positive charge, Q_1 = 2.6 μC, is located at a point, x_1 = -3.0 m, and a positive charge, Q_2 = 1.4 μC, is located at a point, x_2 = +4.0 m.

a. Find the magnitude and direction of the Electric Field at the origin due to charge Q_1.



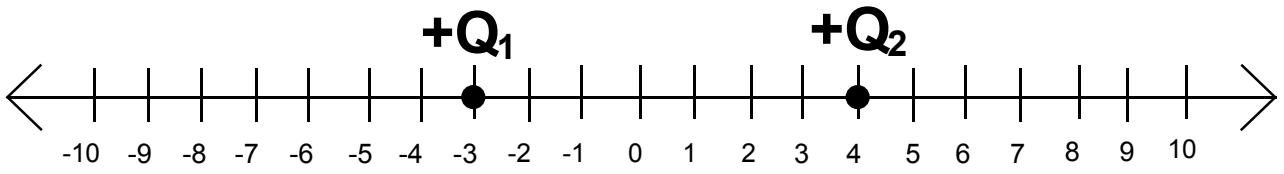
As shown in the below diagram, a positive charge, Q_1 = 2.6 μC, is located at a point, x_1 = -3.0 m, and a positive charge, Q_2 = 1.4 μC, is located at a point, x_2 = +4.0 m.

b. Find the magnitude and direction of the Electric Field at the origin due to charge Q_2.



As shown in the below diagram, a positive charge, Q_1 = 2.6 μC, is located at a point, x_1 = -3.0 m, and a positive charge, Q_2 = 1.4 μC, is located at a point, x_2 = +4.0 m.

c. Find the magnitude and direction of the net Electric Field at the origin.



23 A positive charge, Q_1 = 7.4 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 3.0 m and a positive charge Q_3 = 2.1 μC is located at a point x_3 = 9.0 m.

a. Find the magnitude and direction of the Electric Field at the origin due to Q_1.

b. Find the magnitude and direction of the Electric Field at the origin due to Q_2.

c. Find the magnitude and direction of the Electric Field at the origin due to Q_3.

d. Find the magnitude and direction of the net Electric Field at the origin.

A positive charge, Q_1 = 7.4 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 3.0 m and a positive charge Q_3 = 2.1 μC is located at a point x_3 = 9.0 m.

a. Find the magnitude and direction of the Electric Field at the origin due to Q_1.

A positive charge, Q_1 = 7.4 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 3.0 m and a positive charge Q_3 = 2.1 μC is located at a point x_3 = 9.0 m.

b. Find the magnitude and direction of the Electric Field at the origin due to Q_2.

A positive charge, Q_1 = 7.4 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 3.0 m and a positive charge Q_3 = 2.1 μC is located at a point x_3 = 9.0 m.

c. Find the magnitude and direction of the Electric Field at the origin due to Q_3.

A positive charge, Q_1 = 7.4 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 3.0 m and a positive charge Q_3 = 2.1 μC is located at a point x_3 = 9.0 m.

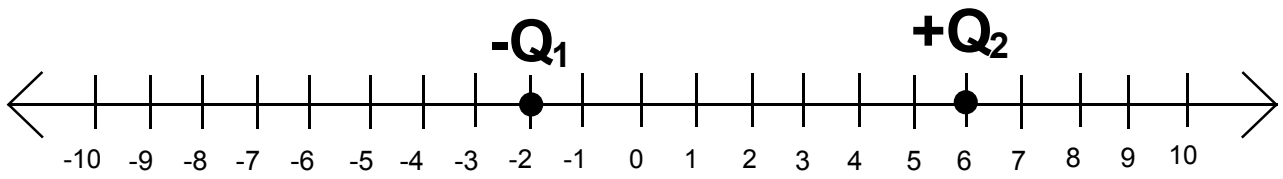
d. Find the magnitude and direction of the net Electric Field at the origin.

24 As shown in the below diagram, a charge, Q_1 = -3.6 μC, is located at a point, x_1 = -2.0 m, and a positive charge, Q_2 = 2.8 μC, is located at a point, x_2 = +6.0 m.

a. Find the magnitude and direction of the Electric Field at the origin due to charge Q_1.

b. Find the magnitude and direction of the Electric Field at the origin due to charge Q_2.

c. Find the magnitude and direction of the net Electric Field at the origin.



As shown in the below diagram, a charge, Q_1 = -3.6 μC, is located at a point, x_1 = -2.0 m, and a positive charge, Q_2 = 2.8 μC, is located at a point, x_2 = +6.0 m.

a. Find the magnitude and direction of the Electric Field at the origin due to charge Q_1.

As shown in the below diagram, a charge, Q_1 = -3.6 μC, is located at a point, x_1 = -2.0 m, and a positive charge, Q_2 = 2.8 μC, is located at a point, x_2 = +6.0 m.

b. Find the magnitude and direction of the Electric Field at the origin due to charge Q_2.

As shown in the below diagram, a charge, Q_1 = -3.6 μC, is located at a point, x_1 = -2.0 m, and a positive charge, Q_2 = 2.8 μC, is located at a point, x_2 = +6.0 m.

c. Find the magnitude and direction of the Electric Field at the origin.

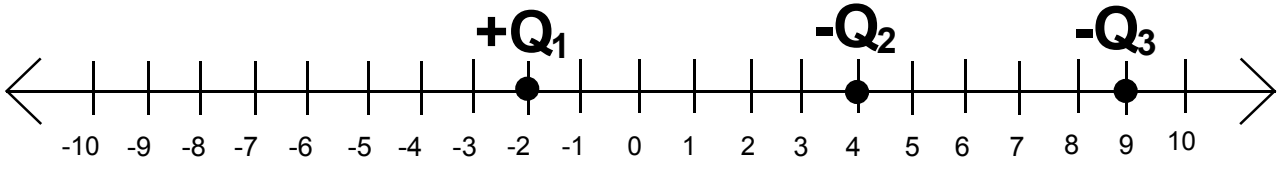
25 A positive charge, Q_1 = 5.2 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 4.0 m and a negative charge Q_3 = -4.1 μC is located at a point x_3 = 9.0 m.

a. Find the magnitude and direction of the Electric Field at the origin due to Q_1.

b. Find the magnitude and direction of the Electric Field at the origin due to Q_2.

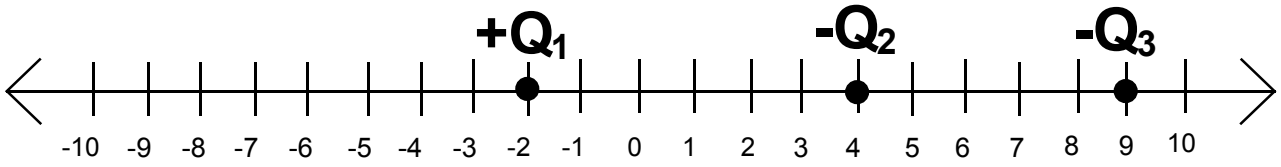
c. Find the magnitude and direction of the Electric Field at the origin due to Q_3.

d. Find the magnitude and direction of the net Electric Field at the origin.



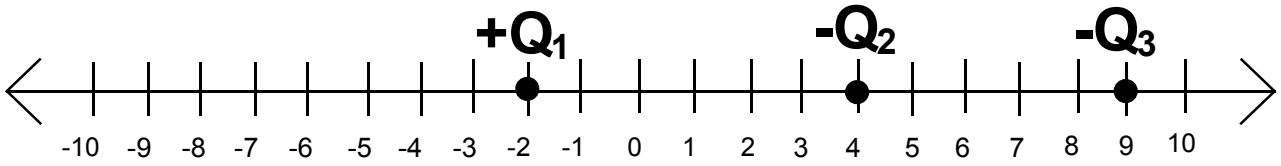
A positive charge, Q_1 = 5.2 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 4.0 m and a negative charge Q_3 = -4.1 μC is located at a point x_3 = 9.0 m.

a. Find the magnitude and direction of the Electric Field at the origin due to Q_1.



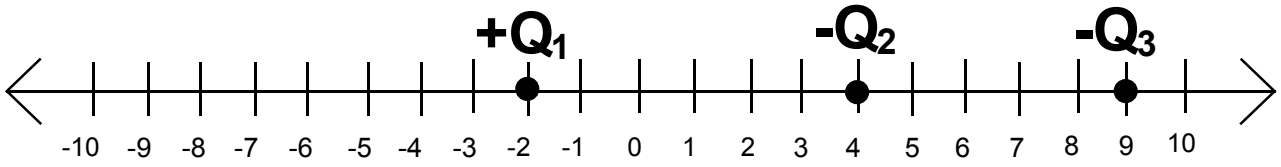
A positive charge, Q_1 = 5.2 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 4.0 m and a negative charge Q_3 = -4.1 μC is located at a point x_3 = 9.0 m.

b. Find the magnitude and direction of the Electric Field at the origin due to Q_2.



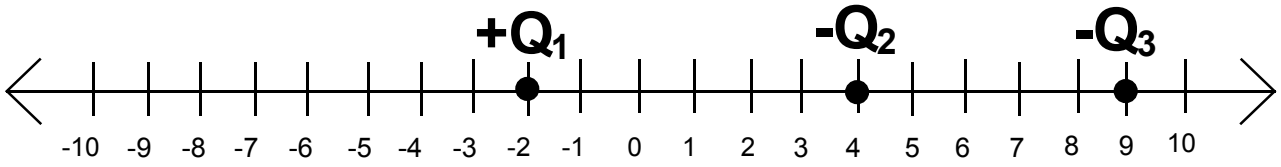
A positive charge, Q_1 = 5.2 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 4.0 m and a negative charge Q_3 = -4.1 μC is located at a point x_3 = 9.0 m.

c. Find the magnitude and direction of the Electric Field at the origin due to Q_3.



A positive charge, Q_1 = 5.2 μC, is located at x_1 = -2.0 m, a negative charge Q_2 = -9.7 μC is located at a point x_2 = 4.0 m and a negative charge Q_3 = -4.1 μC is located at a point x_3 = 9.0 m.

d. Find the magnitude and direction of the Electric Field at the origin.



26 What is the potential energy of an electron and a proton in a hydrogen atom if the distance between them is 5.3×10^{-11} m?

27 What is the potential energy of two charges of +4.2 μC and +6.1 μC which are separated by a distance of 50.0 cm?

28 What is the potential energy of two charges of -3.6 μC and +5.2 μC which are separated by a distance of 75.0 cm?

29 There are three charges, 4.0 μC, 3.5 μC and -6.4 μC, each at the vertex of an equilateral triangle of side length 0.020 m. What is the potential energy of the system?

30 What is the potential energy of two charges of -5.2 μC and -8.2 μC which are separated by a distance of 50.0 cm?

31 What is the potential energy of two charges of 4.2 μC and -6.1 μC which are separated by a distance of 75.0 cm?

32 What is the potential energy of two electrons that are separated by a distance of 3.5×10^{-11} m?

33 What is the potential energy of three charges of 2.0 μC, -4.5 μC and -3.4 μC that are in a straight line, with the -4.5 μC charge in the middle, and each charge is 5.0 cm away from its adjacent charge?

34 Draw Equipotential lines due to a positive point charge.

35 What is the electric potential 50.0 cm from a -7.4 μC point charge?

36 What is the electric potential 25 cm from a +5.0 μC point cł

37 Two point charges of +3.5 μC and +8.3 μC are separated by a distance of 4.0 m. What is the electric potential midway between the charges?

38 A conducting sphere with a radius of 5.0 cm carries a positive charge of 3.6 mC. What is the electric potential at the following distances from the center of the sphere: 2.5 cm; 5.0 cm; and 10.0 cm?

39 A proton passes through a potential difference of 350 V. Find its kinetic energy and velocity ($e = 1.60 \times 10^{-19}$ C, $m_p = 1.67 \times 10^{-27}$ kg).

40 How much work is done in moving a +2.6 μC charged particle from a point with a potential of 100.0 V to a point with a potential of 20.0 V?

41 An Electric Field does 40.0 mJ of work to move a +6.8 μC charge from one point to another. What is the potential difference between these two points?

42 Draw Equipotential lines due to a negative point charge.

43 What is the electric potential 65.0 cm from a -8.2 μC point charge?

44 What is the electric potential 30.0 cm from a +6.8 μC point charge?

45 Two point charges of +2.5 μC and -6.8 μC are separated by a distance of 4.0 m. What is the electric potential midway between the charges?

46 A conducting sphere with a radius of 8.0 cm carries a positive charge of 4.2 mC. What is the electric potential at the following distances from the center of the sphere: 2.5 cm; 8.0 cm; and 9.5 cm?

47 An electron falls through a potential difference of 200.0 V. Find its kinetic energy and velocity ($e = 1.60 \times 10^{-19}$ C, $m_e = 9.11 \times 10^{-31}$ kg).

48 An Electric Field does 25 mJ of work to move a +7.4 μC ch

49 How much work is required by an Electric Field to move a -4.3 μC from a point with a potential 50.0 V to a point with a potential -30.0 V?

50 An Electric Field does 150 μJ of work to move a -8.4 μC charge from one point to another. What is the potential difference between these two points?

51 Draw Equipotential lines in a uniform Electric Field, with the positive line of charge on the top, and the negative line of charge on the bottom.

52 An Electric Field of 440 N/C is desired between two plates which are 4.6 mm apart; what voltage should be applied?

53 What is the magnitude of the electric force on an electron in a uniform Electric Field of 2,500 N/C?

54 A 240 V power supply creates an Electric Field of 4.5×10^6 N/C between two parallel plates. What is the separation between the plates?

55 A proton is accelerated by a uniform 360 N/C Electric Field. Find the kinetic energy and the velocity of the proton after it has traveled 50.0 cm.

56 A uniform 450 N/C Electric Field moves a +3.4 μC charge 10.0 cm; how much work is done by the Electric Field?

57 How much work is done by a uniform 760 N/C Electric Field on a proton in accelerating it through a distance of 60.0 cm?

58 What is the magnitude and direction of the electric force on an electron in a uniform Electric Field of 4200 N/C that points due west? What is the acceleration of the electron?

59 Draw Equipotential lines in a uniform Electric Field, with the negative line of charge on the top, and the positive line of charge on the bottom.

60 How strong is the Electric Field between two metal plates 5.0 mm apart if the potential difference between them is 240 V?

61 How much voltage should be applied to two parallel plates, which are 12 mm apart, in order to produce a 1500 N/C Electric Field between them?

62 Two plates are connected to a 120 V battery which have a small air gap. How small can the gap be if the Electric Field cannot exceed the air's breakdown value of 5.0×10^6 N/C, causing a spark?

63 An electron is released from rest in a uniform Electric Field and accelerates to the west at a rate of 2.4×10^8 m/s^2. What is the magnitude and direction of the Electric Field?

64 An electron falls a distance of 25 cm in a uniform 500.0 N/C Electric Field; how much work is done on the electron?

65 A potential difference of 120 V is applied between two parallel plates. What is the Electric Field strength between the plates if they are 2.5 mm apart?

66 An initially stationary electron is accelerated by a uniform 640 N/C Electric Field. Find the kinetic energy and velocity of the electron after it has traveled 15 cm.

67 A 0.20 g oil drop has a negative charge of -3.2 μC and remains stationary between two charged parallel plates.

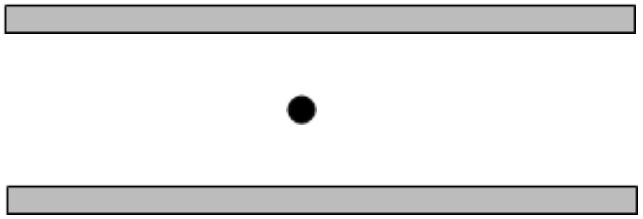
a. Draw the Electric Field line between the plates.

b. Draw a free-body diagram and show all the forces acting on the drop.

c. Find the magnitude of the Electric Field required between the plates to keeps the drop stationary.

d. If the plates are 3.0 cm apart, what is the voltage difference between the plates?

e. The mass of the drop decreases with time due to evaporation. Describe what will happen to the oil drop.



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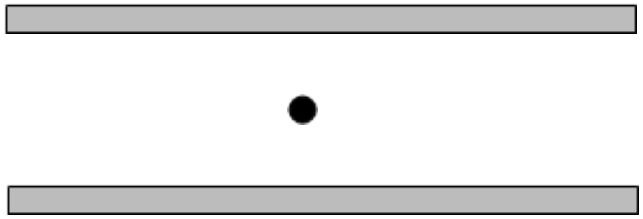

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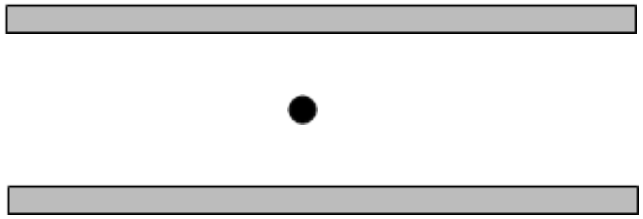

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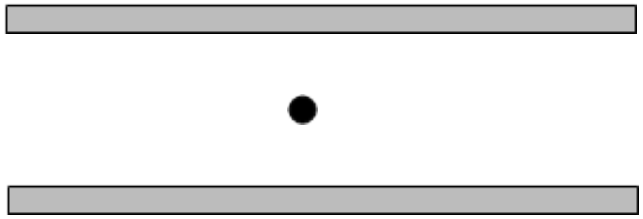

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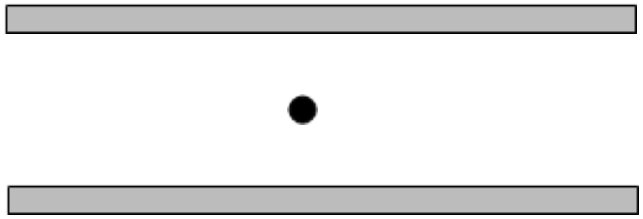

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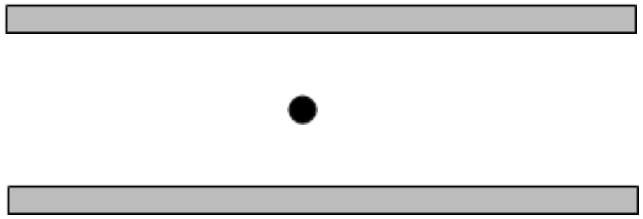


68 A 4.00×10^3 N/C uniform Electric Field is directed towards the east. An electron is released from rest inside the field.

a. Draw a free-body diagram and show the direction of the electric force acting on the electron.

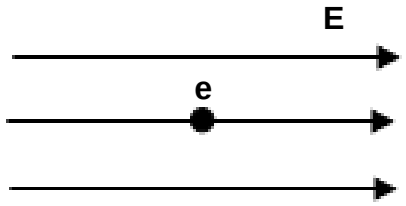
b. Find the magnitude of the electric force on the electron.

c. Determine the acceleration of the electron.

d. What is the velocity of the electron after 5.00 s?

e. How far will the electron travel in the first 3.00 s?

f. What is the velocity of the electron after it has traveled 10.0 m?



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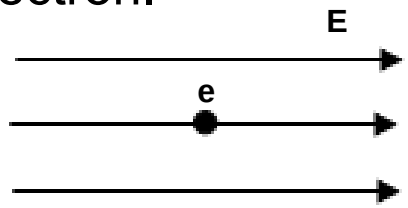
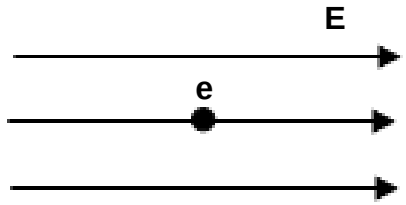


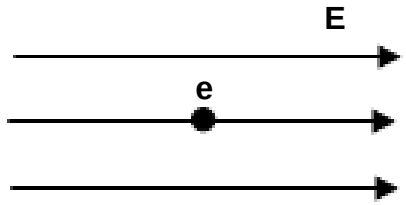
A 4.00×10^3 N/C uniform Electric Field is directed towards the east. An electron is released from rest inside the field.

b. Find the magnitude of the electric force on the electron.



A 4.00×10^3 N/C uniform Electric Field is directed towards the east. An electron is released from rest inside the field.

c. Determine the acceleration of the electron.



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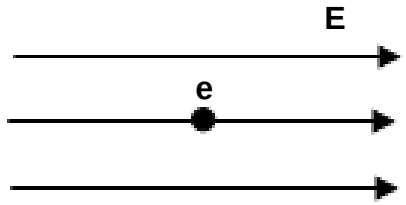
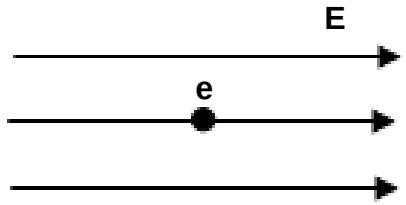
d. What is the velocity of the electron after 5.0 s?



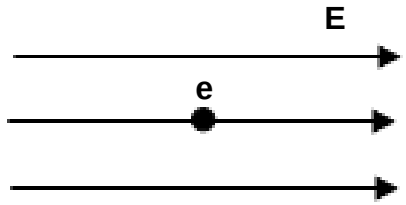
A 4.00×10^3 N/C uniform Electric Field is directed towards the east. An electron is released from rest inside the field.

e. How far will the electron travel in the first 3.00 s?



A 4.00×10^3 N/C uniform Electric Field is directed towards the east. An electron is released from rest inside the field.

f. What is the velocity of the electron after it has traveled 10.0 m?



69 In a region of space, the electric potential is described by the set of equipotential lines shown below. A -35.0 μC charge will be moved from one location to another in this region.

a. On the diagram, indicate the Electric Field direction at the points: A, B, C, D and E.

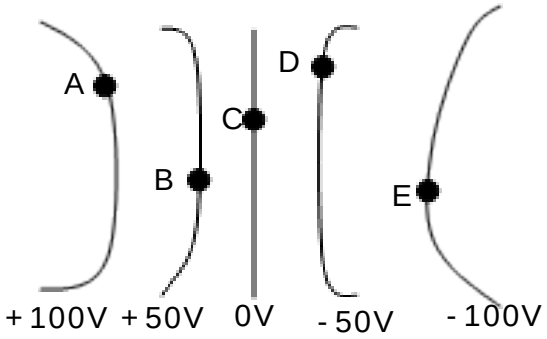
b. Between which two points is there the greatest potential difference?

c. Between which two locations will the work done by the Electric Field on the charge be the greatest?

d. How much work is done by the Electric Field on the charge if it moves from point B to point C?

e. How much work is done by the Electric Field on the charge if it moves from point E to point D?

f. Compare the magnitude of the work done on the charge when it moves from point A to point B; when it moves from point A to point E; and from point E to point B.



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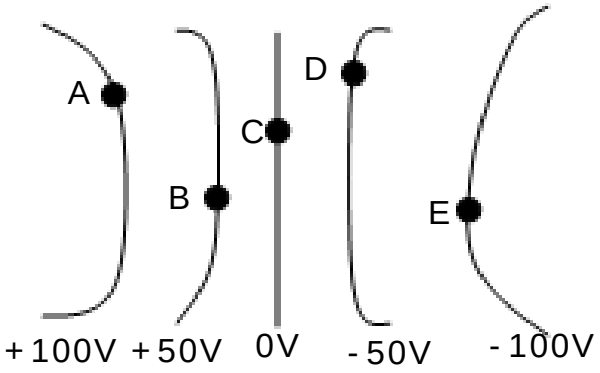

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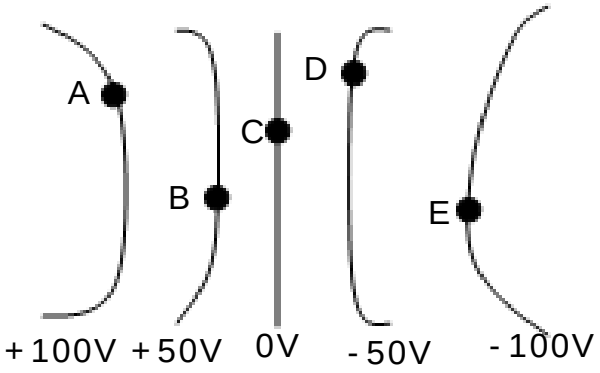
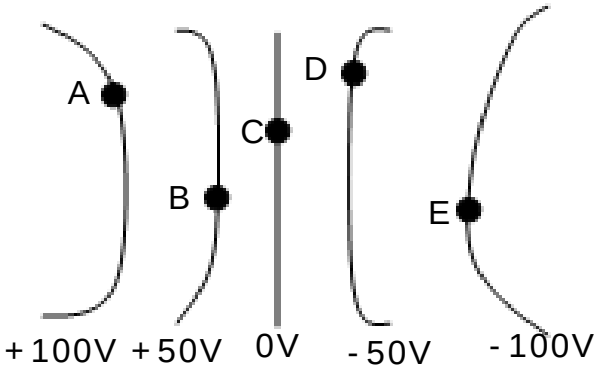
b. Between which two points is there the greatest potential difference?



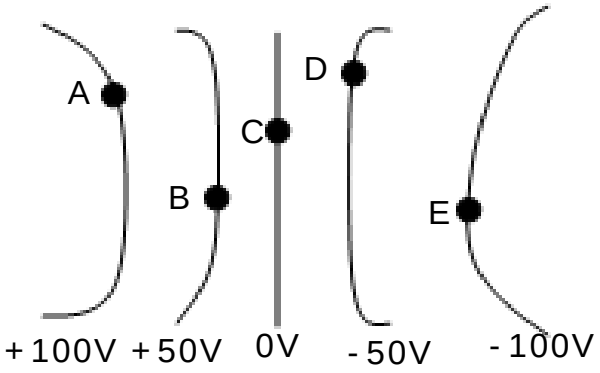
In a region of space, the electric potential is described by the set of equipotential lines shown below. A -35.0 μC charge will be moved from one location to another in this region.

c. Between which two locations will the work done by the Electric Field on the charge be the greatest?



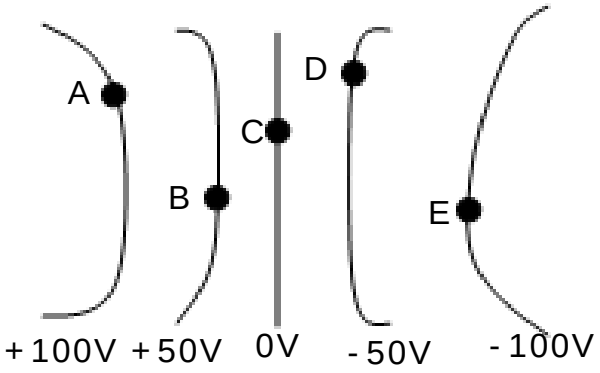
In a region of space, the electric potential is described by the set of equipotential lines shown below. A -35.0 μC charge will be moved from one location to another in this region.

d. How much work is done by the Electric Field on the charge if it moves from point B to point C?



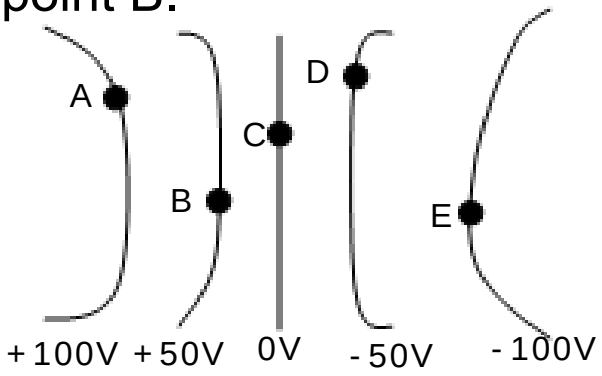
In a region of space, the electric potential is described by the set of equipotential lines shown below. A -35.0 μC charge will be moved from one location to another in this region.

e. How much work is done by the Electric Field on the charge if it moves from point E to point D?



In a region of space, the electric potential is described by the set of equipotential lines shown below. A -35.0 μC charge will be moved from one location to another in this region.

f. Compare the magnitude of the work done on the charge when it moves from point A to point B; when it moves from point A to point E; and from point E to point B.



70 A positive charge, Q_1 = +4.60 μC, is located at point x_1 = -4.00 m and a charge, Q_2 = -3.80 μC, is located at a point x_2 = 6.00 m.

a. Find the magnitude and direction of the electric force between the charges.

b. Find the magnitude and direction of the Electric Field at the origin due to charge Q_1.

c. Find the magnitude and direction of the Electric Field at the origin due to charge Q_2.

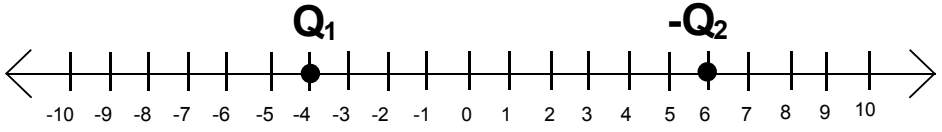
d. Find the magnitude and direction of the net Electric Field at the origin.

e. Find the electric potential at the origin due to charge Q_1.

f. Find the electric potential at the origin due to charge Q_2.

g. Find the net electric potential at the origin.

h. How much work must be done to bring a 1.00 μC test charge from infinity to the origin?



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b. Find the magnitude and direction of the Electric Field at the origin due to charge Q_1.

A positive charge, Q_1 = +4.60 μC, is located at point x_1 = -4.00 m and a charge, Q_2 = -3.80 μC, is located at a point x_2 = 6.00 m.

c. Find the magnitude and direction of the Electric Field at the origin due to charge Q_2.

A positive charge, Q_1 = +4.60 μC, is located at point x_1 = -4.00 m and a charge, Q_2 = -3.80 μC, is located at a point x_2 = 6.00 m.

d. Find the magnitude and direction of the Electric Field at the origin.

A positive charge, Q_1 = +4.60 μC, is located at point x_1 = -4.00 m and a charge, Q_2 = -3.80 μC, is located at a point x_2 = 6.00 m.

e. Find the electric potential at the origin due to charge Q_1.

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f. Find the electric potential at the origin due to charge Q_2.

A positive charge, Q_1 = +4.60 μC, is located at point x_1 = -4.00 m and a charge, Q_2 = -3.80 μC, is located at a point x_2 = 6.00 m.

g. Find the electric potential at the origin.

A positive charge, Q_1 = +4.60 μC, is located at point x_1 = -4.00 m and a charge, Q_2 = -3.80 μC, is located at a point x_2 = 6.00 m.

h. How much work must be done to bring a 1.00 μC test charge from infinity to the origin?

71 A proton is released, from rest, in a 2500 N/C uniform Electric Field which is directed towards the west.

a. Draw a free-body diagram and show the direction of the force acting on the proton due to the field.

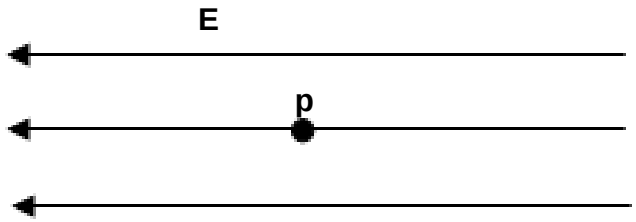
b. Find the magnitude of the electric force on the proton.

c. What is the acceleration of the proton?

d. What is the velocity of the proton after 3.0 s?

e. How far will the proton have traveled in the first 7.0 s?

f. What will the proton's velocity be after it has traveled 8.0 m?



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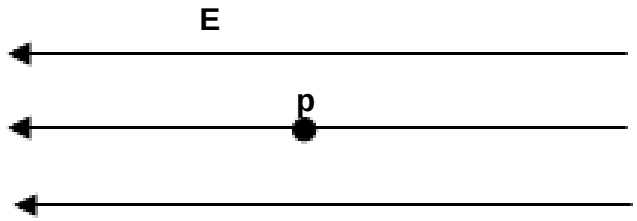
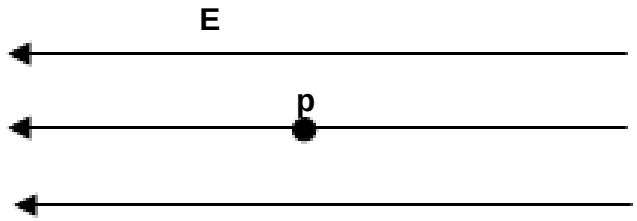


A proton is released, from rest, in a 2500 N/C uniform Electric Field which is directed towards the west.

b. Find the magnitude of the electric force on the proton.



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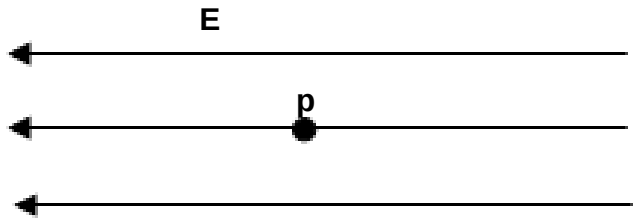

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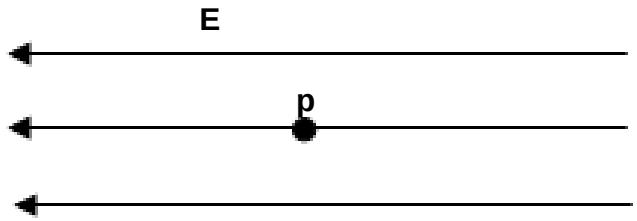

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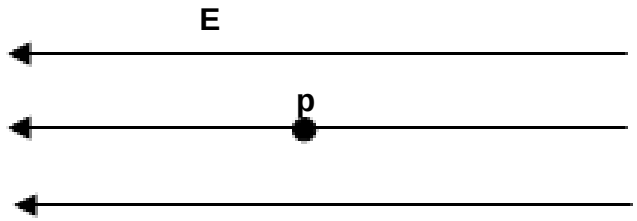
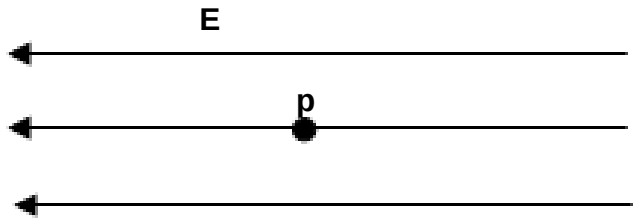


A proton is released, from rest, in a 2500 N/C uniform Electric Field which is directed towards the west.

f. What will the proton's velocity be after it has traveled 8.0 m?



72 In a region of space, the electric potential is described by the set of equipotential lines shown below. A -35 μC charge will be moved from one location to another in this region.

a. On the diagram, indicate the Electric Field direction at the points: A, B, C, D and E.

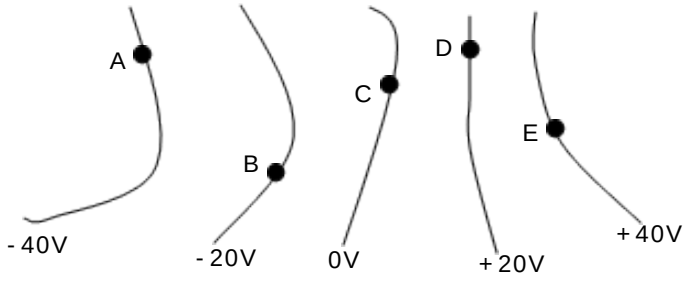
b. Between which two points is there the greatest potential difference?

c. Between which two locations will the work done by the Electric Field on the charge be the greatest?

d. How much work is done by the Electric Field on the charge if it moves from point A to point D?

e. How much work is done by the Electric Field on the charge if it moves from point C to point A?

f. The charge is moved from point A to point B in the first trial. In the second trial, the charge is moved from point A to point E, and then it is moved to point B. Compare the magnitude of the work done on the charge between the two trials.



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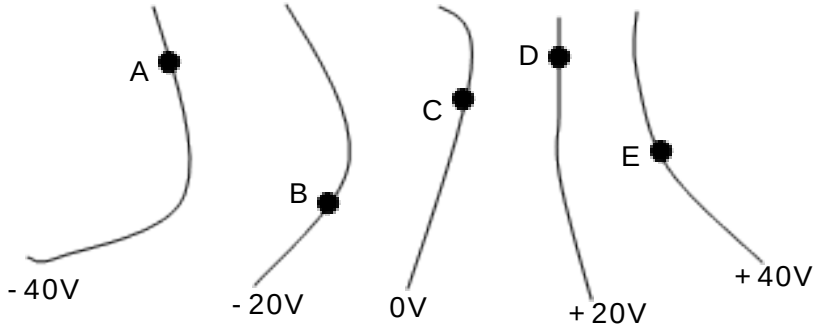

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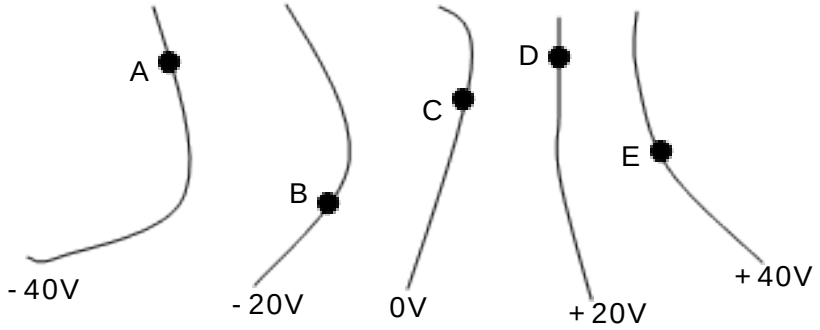
b. Between which two points is there the greatest potential difference?



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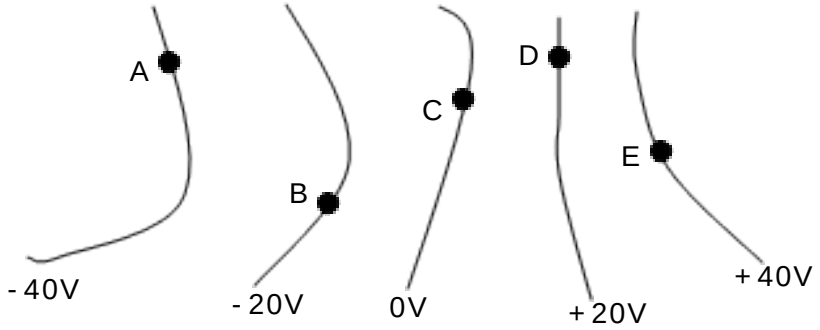
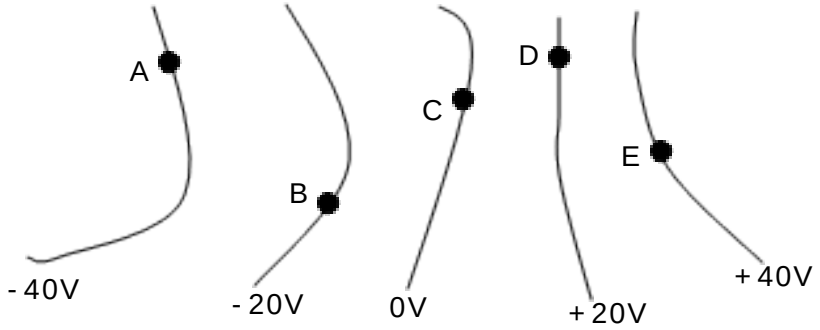
c. Between which two locations will the work done by the Electric Field on the charge be the greatest?



In a region of space, the electric potential is described by the set of equipotential lines shown below. A -35 μC charge will be moved from one location to another in this region.

d. How much work is done by the Electric Field on the charge if it moves from point A to point D?



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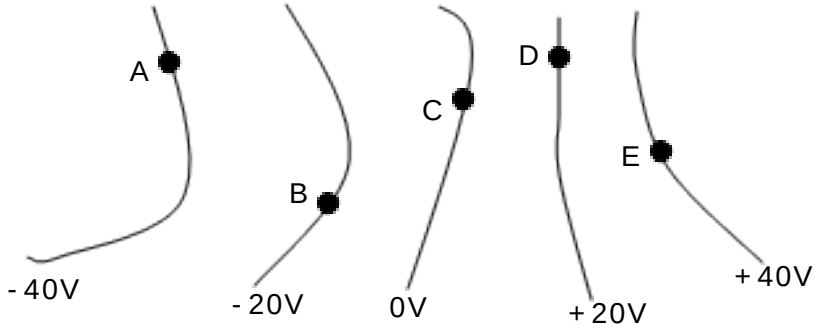
e. How much work is done by the Electric Field on the charge if it moves from point C to point A?



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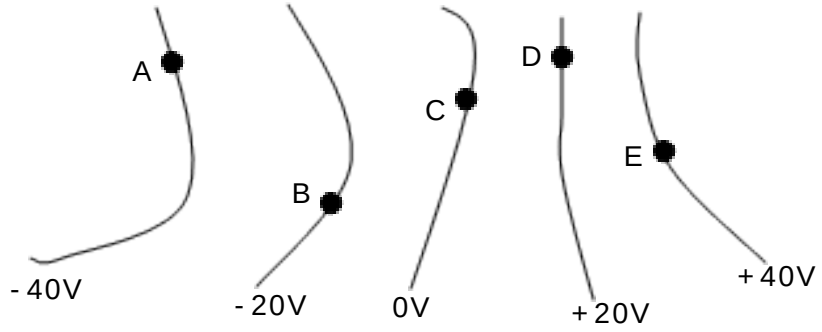


73 A negative charge, Q_1 = -5.40 μC, is located at point x_1 = -2.00 m and a positive charge, Q_2 = 7.60 μC, is located at a point x_2 = 4.00 m.

a. Find the magnitude and direction of the electric force between the charges.

b. Find the magnitude and direction of the Electric Field at the origin due to charge Q_1.

c. Find the magnitude and direction of the Electric Field at the origin due to charge Q_2.

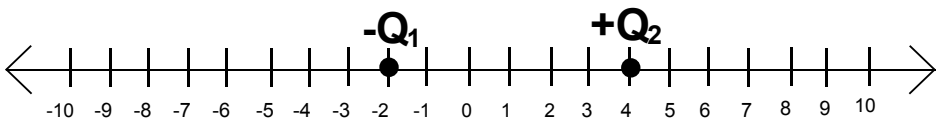
d. Find the magnitude and direction of the net Electric Field at the origin.

e. Find the electric potential at the origin due to charge Q_1.

f. Find the electric potential at the origin due to charge Q_2.

g. Find the net electric potential at the origin.

h. How much work must be done to bring a 10.0 nC test charge from infinity to the origin?



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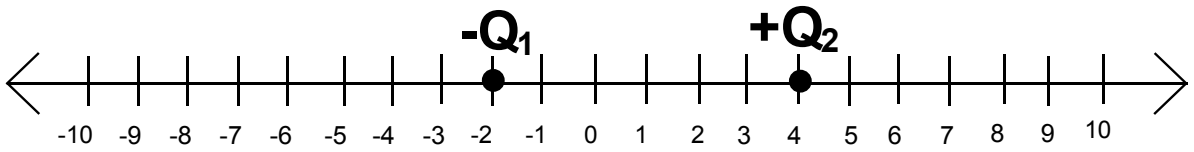

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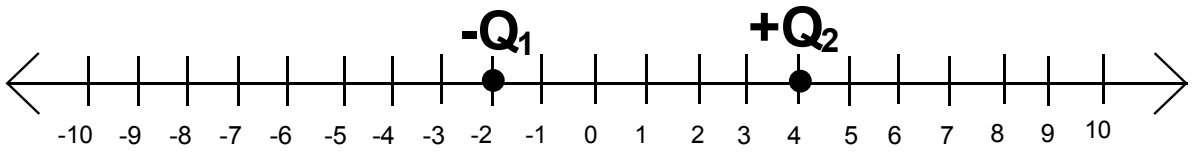
b. Find the magnitude and direction of the Electric Field at the origin due to charge Q_1.



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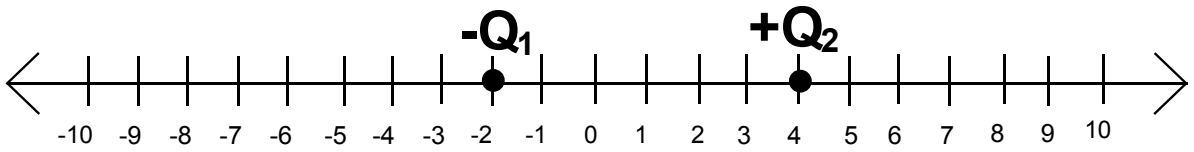
c. Find the magnitude and direction of the Electric Field at the origin due to charge Q_2.



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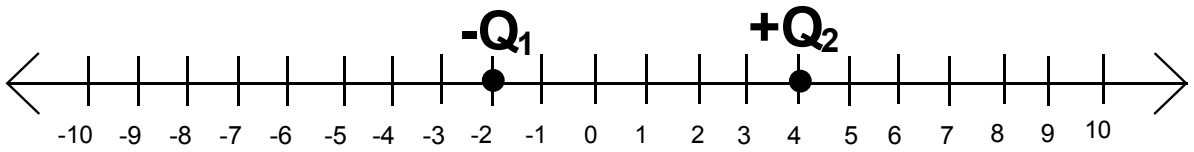
d. Find the magnitude and direction of the Electric Field at the origin.



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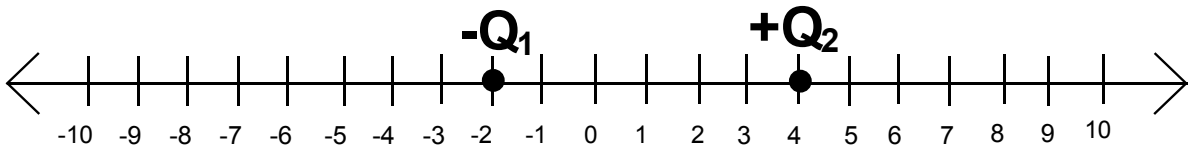
e. Find the electric potential at the origin due to charge Q_1.



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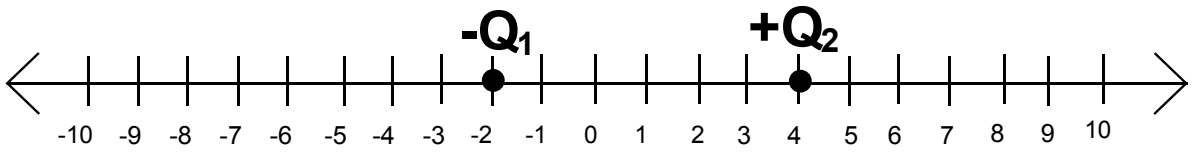
f. Find the electric potential at the origin due to charge Q_2.



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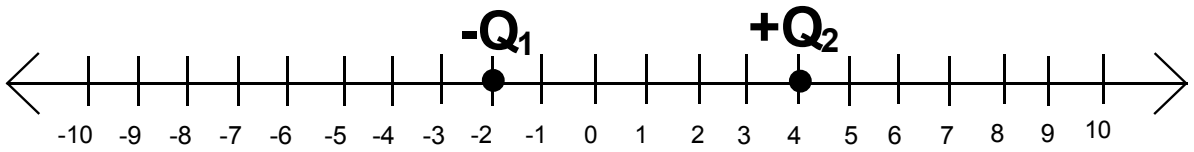

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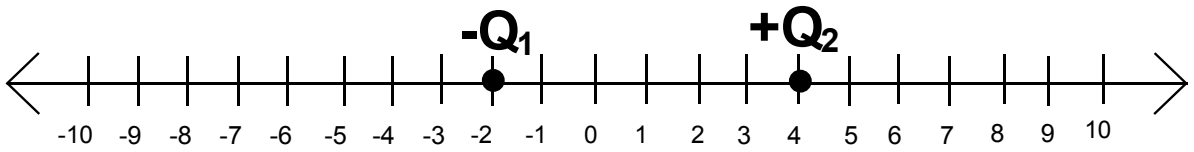
h. How much work must be done to bring a 10.0 nC test charge from infinity to the origin?



74 An alpha particle ($q = +3.20 \times 10^{-19}$ C and $m = 6.64 \times 10^{-27}$ kg) is accelerated from rest by a potential difference of 5000.0 V in a uniform Electric Field. The potential difference is applied over a distance of 10.0 cm.

a. What is the maximum kinetic energy of the alpha particle?

b. What is the maximum speed of the alpha particle?

c. What is the Electric Field strength?

d. What is the acceleration of the alpha particle?

e. How long will it take for the alpha particle to travel the 10.0 cm?

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e. How long will it take for the alpha particle to travel the 10.0 cm?