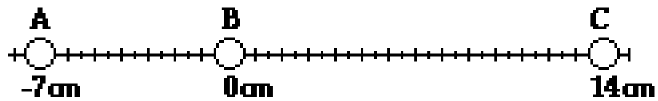
Electric Fields and Electric Forces

1. Three charges are located along the same axis as shown. Their charges are:

    $Q_A = +5.0 \times 10^{-8}$ C

    $Q_B = -8.0 \times 10^{-8}$ C

    $Q_C = +10. \times 10^{-8}$ C



a. Determine the magnitude and direction of the individual forces exerted between the various charges.

Charge A: F_{BA} = ________________, __________ F_{CA} = ________________, __________

Charge B: F_{AB} = ________________, __________ F_{CB} = ________________, __________

Charge C: F_{AC} = ________________, __________ F_{BC} = ________________, __________

b. Determine the net force on each charge.

ΣF_A = ____________________, ____________ ΣF_B = ____________________, ____________

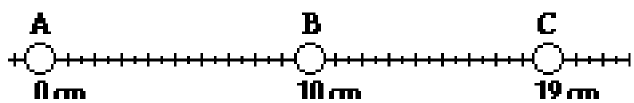
ΣF_C = ____________________, ____________

2. Three charges are located along the same axis as shown. Their charges are:

    $Q_A = -1.35\ \mu C$

    $Q_B = +2.35\ \mu C$

    $Q_C = -4.92\ \mu C$



a. Determine the magnitude and direction of the individual forces exerted between the various charges.

Charge A: F_{BA} = ________________, __________ F_{CA} = ________________, __________

Charge B: F_{AB} = ________________, __________ F_{CB} = ________________, __________

Charge C: F_{AC} = ________________, __________ F_{BC} = ________________, __________

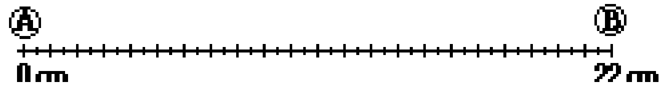
b. Determine the net force on each charge.

ΣF_A = ____________________, ____________ ΣF_B = ____________________, ____________

ΣF_C = ____________________, ____________

3. Charge A and charge B are fixed along the x-axis. Their locations and charges are shown below.

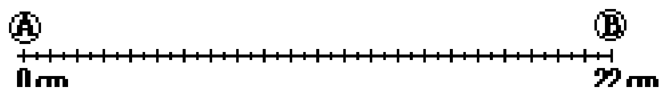
Q_A = -22 μC
Q_B = -16 μC



Determine the location at which a third charge (+15 μC) must be placed in order for the net force on the third charge to be 0 N.

4. Charge A and charge B are fixed along the x-axis. Their locations and charges are shown below.

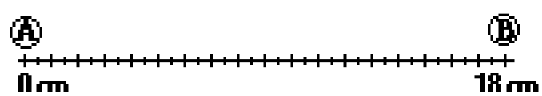
Q_A = -12 μC
Q_B = +37 μC



Determine the location along the x-axis at which a third charge (+23 μC) must be placed in order for the net force on the third charge to be 0 N. **PSAYW**

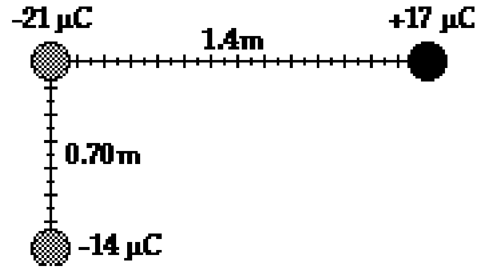
5. Charge A and charge B are fixed along the x-axis. Their locations and charges are shown below.

Q_A = +14 μC
Q_B = -21 μC

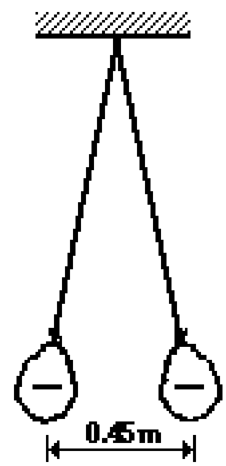


Determine the location along the x-axis at which the electric field is 0 N/C. **PSAYW**

6. Consider the configuration of three charges shown at the right. Determine the magnitude and direction of the resultant electric force upon the charge at the origin (upper left corner of triangle).



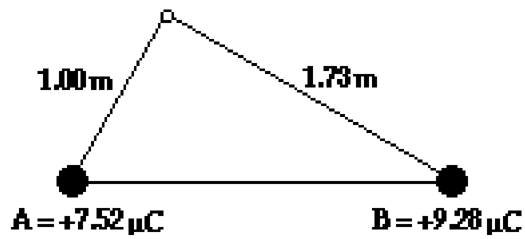
7. Two 1.4-gram balloons are charged in exactly the same manner with exactly the same type and amount of charge. They are suspended from the same point on the ceiling and hang from 1.7-m long strings in the manner shown at the right. Use this information to determine the charge on each balloon.



8. Determine the magnitude and direction of the net electric field at the top of the 30-60-90 triangle.

E_A = ________________________, ______________

E_B = ________________________, ______________



9. Three charges - A, B, and C - are placed at the corners of an equilateral triangle. The length of each side is 1.0 m. Determine the magnitude and direction of the net electric field at the midpoint location along the bottom side of the triangle. (First determine the **E** field created by each of the three sources; then add the **E** field vectors together.)

E_A = ____________________, ______________

E_B = ____________________, ______________

E_C = ____________________, ______________