Name: Period: Date:

**Electrostatics: Electric charges and Coulomb’s Law problems I**

Where:

K: constant=9X109Nm2/C2

Εo: Permittivity constant= 8.85X10-12 C2/N⋅m2

q: Charge [Coulombs]

r: Separation distance [m]



I. Answer the following problems.

1. Calculate the electric force between two point charges of 4.00 µC and 3.00 µC when they are 2.00 cm apart.

2. Two points of equal charge produce an electric force on each other of 3.40x10 -2 N when placed 0.100 m apart. What is the charge on each point?

3. How far apart are two point charges of 2.0x10-6 C and 4.0x10-6 C if they produce an electric force of 0.56 N?

4. Two point charged objects produce an electric force on each other of 6.20x10-2 N. What will the force between them be if the distance between increases three-fold?

5. Two point charges produce a force between on each other of 4.5x10-3 N. What is the force between them if the charge on each triples and the distance between them doubles?

6. Three charged objects are placed in a line as shown. Calculate the force on the middle object due to the other charges.

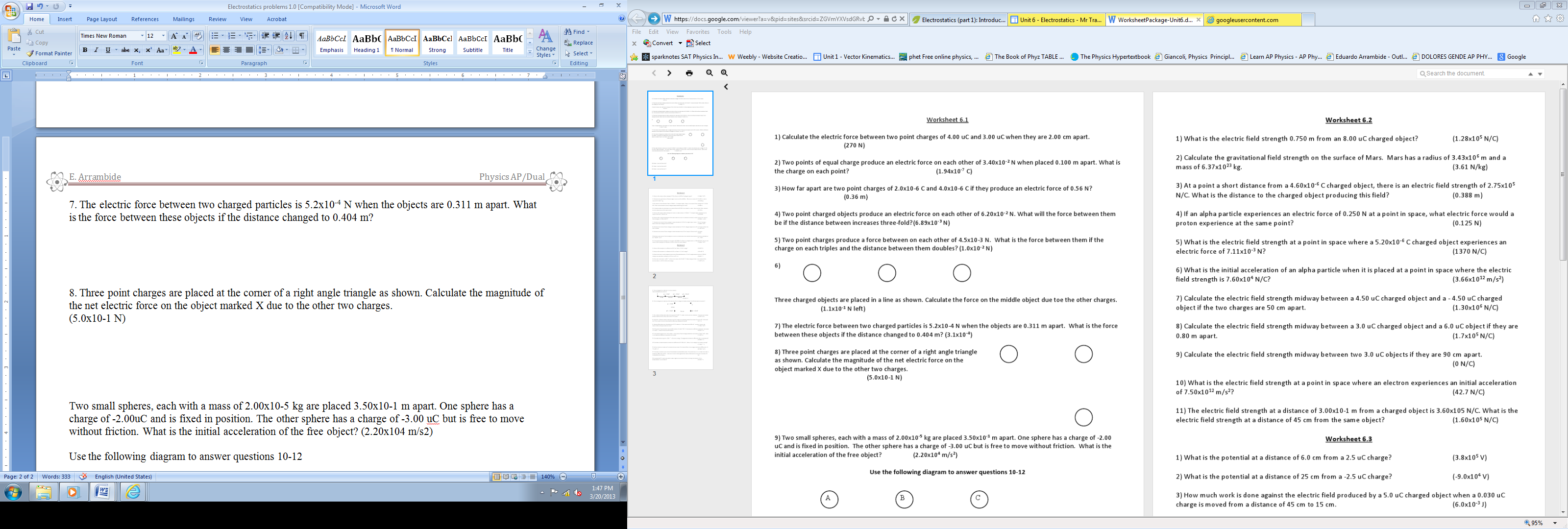
3cm

2cm

1.3x10-6 C 2.2x10-6 C -3.0x10-6 C

7. The electric force between two charged particles is 5.2x10-4 N when the objects are 0.311 m apart. What is the force between these objects if the distance changed to 0.404 m?

8. Three point charges (q1=-3µC, q2=5µC and q3=6µC) are placed at the corner of a right angle triangle as shown. Calculate the magnitude of the net electric force on q1 due to the other two charges.



5cm

5cm

q1

q2

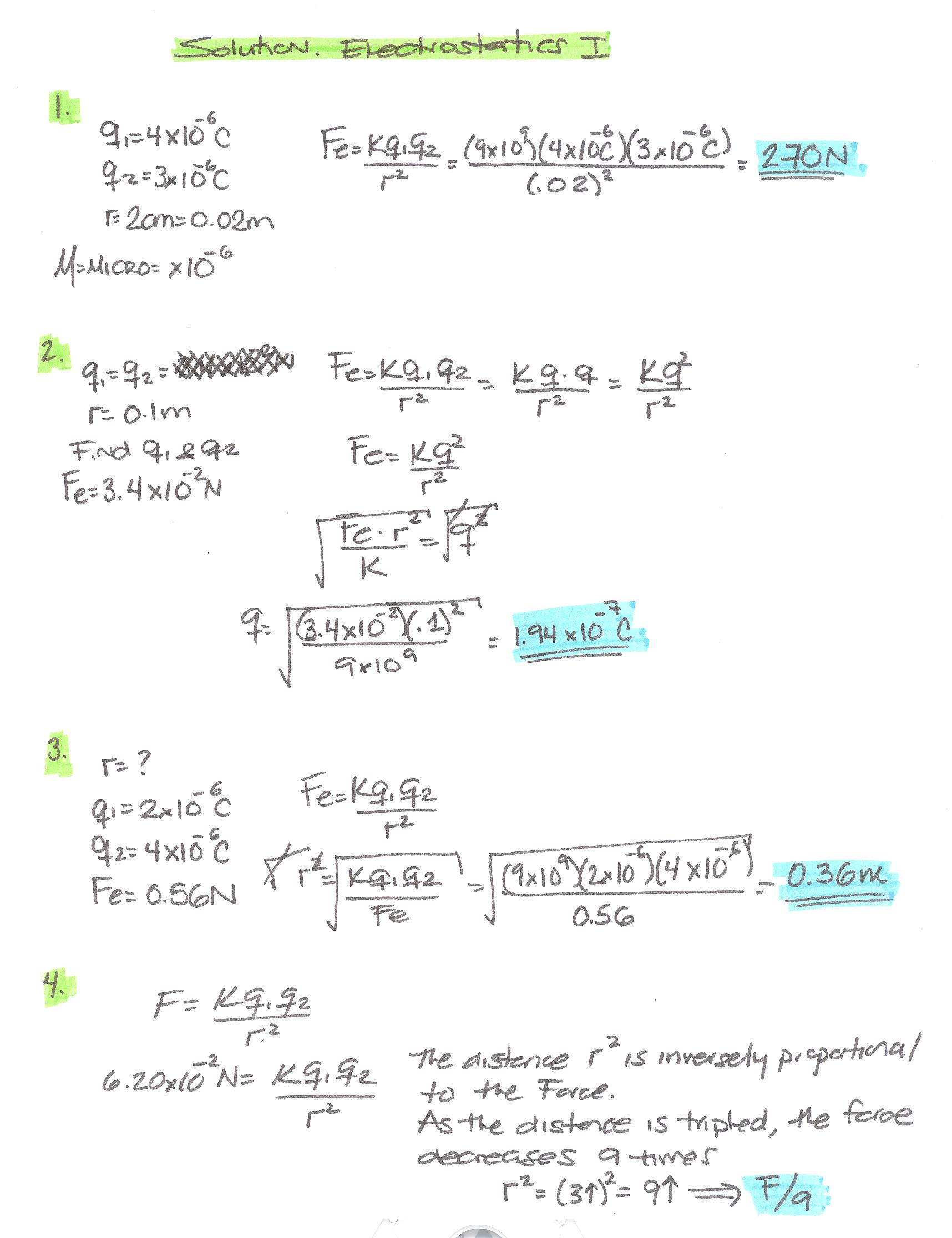
q3

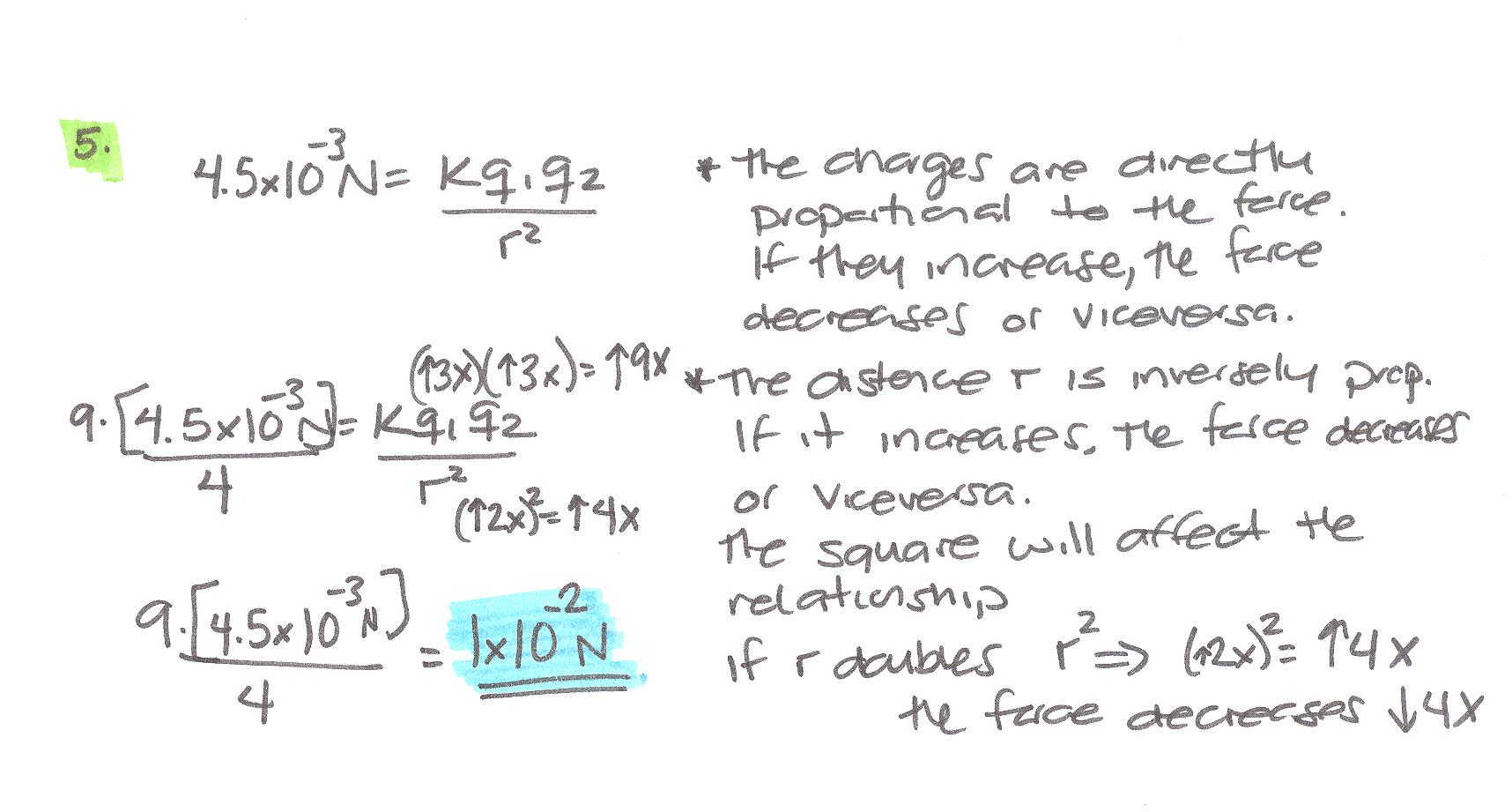
9. Two small spheres, each with a mass of 2.00x10-5 kg are placed 3.50x10-1 m apart. Sphere A has a charge of -2.00µC and is fixed in position. The other sphere, B, has a charge of -3.00 µC but is free to move without friction.

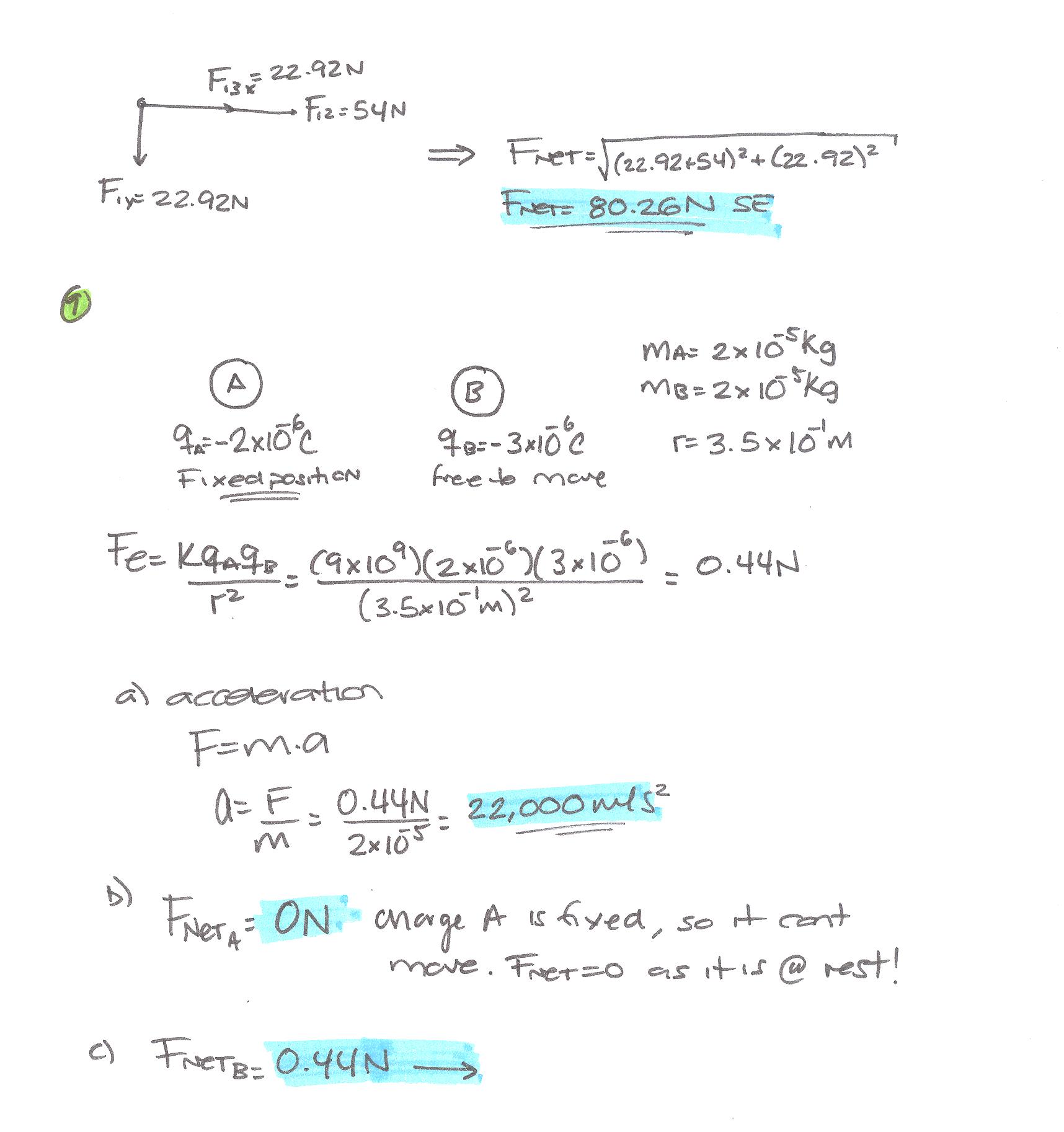
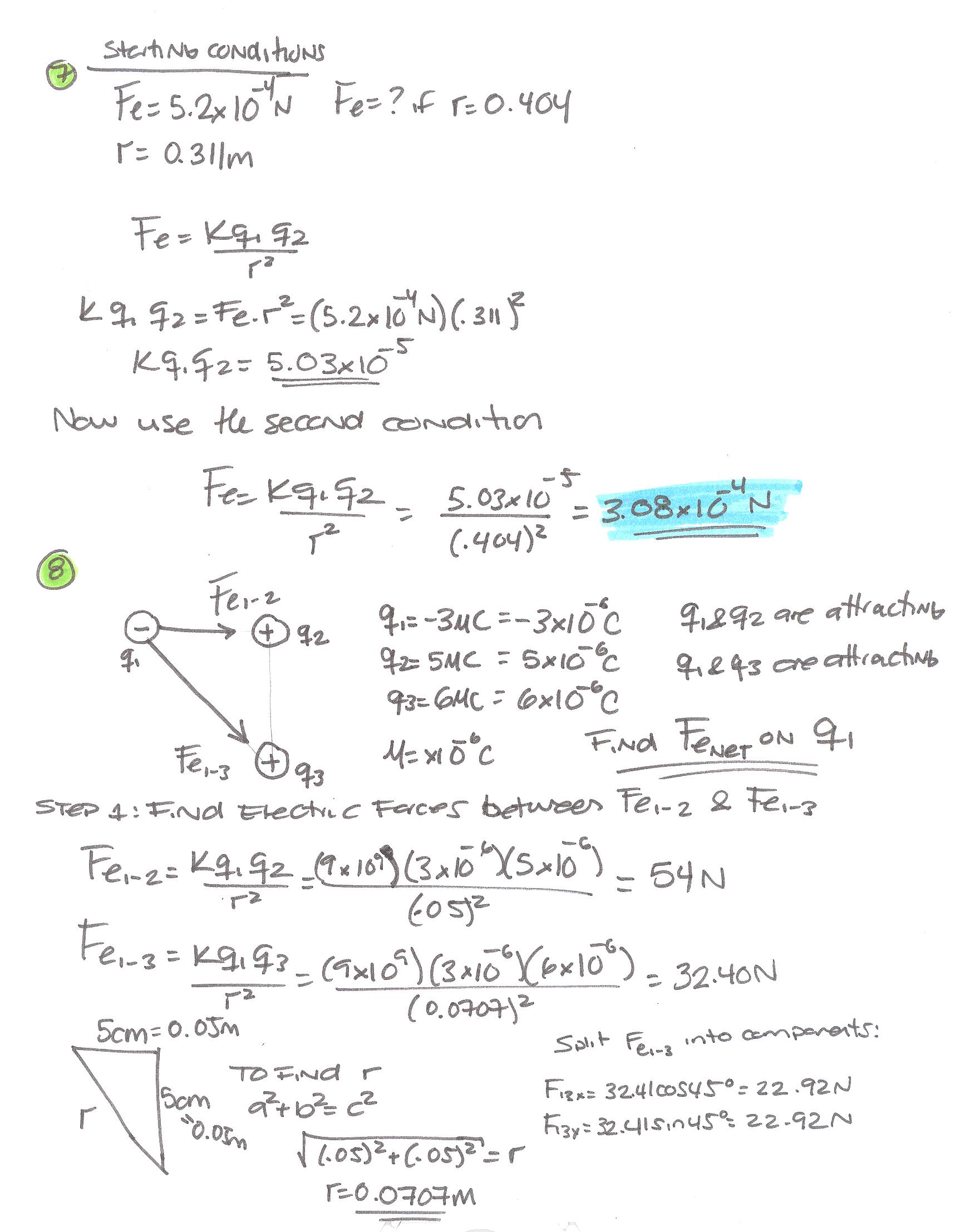
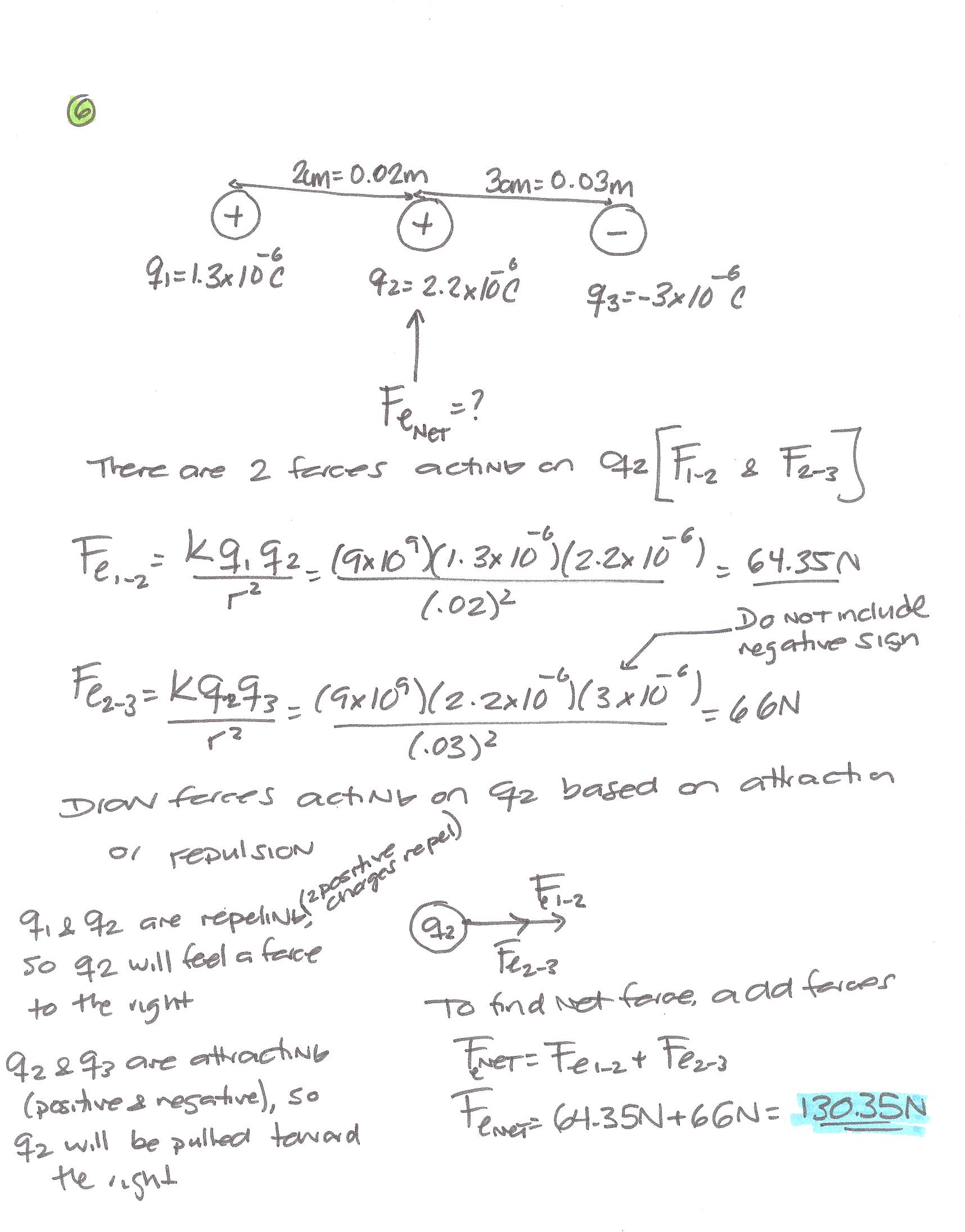
a. What is the initial acceleration of the free object?

b. What is the net force on A?

c. What is the net force on B?

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