2. (15 points)

Block $A$ of mass 2.0 kg and block $B$ of mass 8.0 kg are connected as shown above by a spring of spring constant 80 N/m and negligible mass. The system is being pulled to the right across a horizontal frictionless surface by a horizontal force of 4.0 N, as shown, with both blocks experiencing equal constant acceleration.

(a) Calculate the force that the spring exerts on the 2.0 kg block.

(b) Calculate the extension of the spring.

The system is now pulled to the left, as shown below, with both blocks again experiencing equal constant acceleration.

(c) Is the magnitude of the acceleration greater than, less than, or the same as before?

   _____ Greater  _____ Less  _____ The same

   Justify your answer.

(d) Is the amount the spring has stretched greater than, less than, or the same as before?

   _____ Greater  _____ Less  _____ The same

   Justify your answer.

(e) In a new situation, the blocks and spring are moving together at a constant speed of 0.50 m/s to the left. Block $A$ then hits and sticks to a wall. Calculate the maximum compression of the spring.