## Problems of the Week 5

Always show your work to receive credit (NO WORK=NO CREDIT)

1. A 550 V power source provides energy to a load resistance $\mathrm{R}_{\mathrm{L}}$ through a pair of copper ( $\rho=1.72 \times 10^{-8} \Omega \mathrm{~m}$ ) wires that are 20 km long. The diameter of the wires is 3.0 mm .

During a storm the current, I, supplied by the source increases and the voltage across $\mathrm{R}_{\mathrm{L}}$ decreases. An engineer concludes that a fault has developed somewhere along the line and that there is a shunt resistance $R_{S}$ at some distance $x$ from the source. If the load resistance is disconnected, I is measured to be 3.8A. When the line terminals at the load are shorted, I is 7.2 A . What is x (2pts)?
A. 7.8 km
B. 17.9 km
C. 14.6 km
D. 2.1 km


