A small space probe, with mass 160 kg, is launched from a spacecraft near Mars. It travels toward the surface of Mars, where it will land. At a time 18.3 seconds after launch, the probe is at location \( \langle 4.30 \times 10^3, 8.70 \times 10^2, 0 \rangle \) m, and at this same time its momentum is \( \langle 4.40 \times 10^4, -7.60 \times 10^3, 0 \rangle \) kg·m/s. At this instant, the net force on the probe due to the gravitational pull of Mars plus the air resistance acting on the probe is \( \langle -7.0 \times 10^3, -9.2 \times 10^2, 0 \rangle \) N.

(a) Assuming that the net force on the probe is approximately constant over this time interval, what is the momentum of the probe 18.5 seconds after it is launched?

(b) What is the location of the probe 18.5 seconds after it is launched?