Sample Pump Performance Calculation

Work the Following Example by Hand:

A pump is connected to an electric motor. The motor is supplied with 1 A of current from a 12 VDC source. The apparatus is run steadily for 30 seconds, and the following measurements are recorded:

Mass of Fluid Collected:	500 grams
Diameter of Exit Tube:	3/16 inch
Density of Water:	1000 kg/m^3
Height of fluid exit above reservoir:	30 inches

Compute the head in meters, the flow rate in L/min, and the efficiency of the pump. Include ALL units in calculations. It would be very helpful to convert any US Customary units to SI units before beginning the solution to avoid complexity.

Answers:

Head:	h = 0.762 m
Volumetric flow rate:	Q = 1.0 L/min
Velocity in the exit tube:	v = 0.9356 m/s
Efficiency:	η = 1.1%