The ideal gas law is the equation of state of a hypothetical ideal gas. It is a good approximation to the behavior of many gases under various conditions, although it has several limitations. The ideal gas law is often introduced in its common form:

$$PV = nRT$$

where P is the pressure of the gas, V is the volume of the gas, n is the amount of substance of gas (also known as number of moles), T is the temperature of the gas and R is the ideal, or universal, gas constant.

From given:

T is 76.0 C or 273. 15 + 76=349.15 K

P is 744 torr or 99,19 kPa

V is 4.52 L

R is 8.31, so amount of $CH_4$ is next:

n =PV/RT

n =99,19*4.52 / 8.31*349.15 = **0,155 mol**

also n=m/Mr, where Mr is molecular mass of gas

For $CH_4$ it is 16 g/mol

If n = m/Mr, m=n*Mr=0,155*16=**2,48 g**