Task:

$CH_4 + 2O_2 = CO_2 + 2H_2O$ how many grams of CH_4 were burned if 4.4 grams of CO_2 was formed?

Solution:

According to the chemical equation the amount of CO_2 produced is equal to the amount of CH_4 burned. ($n(CO_2) = n(CH_4)$)

To calculate the mass of CH_4 we should find the number of moles of CH_4 first
$n(mol) = m(g) / MW(g/mol)$

The molar weight is calculated using atomic weights from the periodic table of elements.

$MW(CO_2) = 12 + 2 \cdot 16 = 44$ g/mol

$MW(CH_4) = 12 + 4 \cdot 1 = 16$ g/mol

As the number of moles is equal we can write
$m(CO_2) / MW(CO_2) = m(CH_4) / MW(CH_4)$

The equation for the mass of CH_4 is

$m(CH_4) = m(CO_2) \cdot MW(CH_4) / MW(CO_2) = 4.4 \cdot 16 / 44 = 1.6$ g

Answer: $m(CH_4) = 1.6$ g