) Calculate the root mean square velocity of the gas.

$$v_{rms} = \sqrt{\frac{3RT}{M}}$$

R → Gas constant
T → Temperature
M → Molar Mass

```
#include <stdio.h>
#include <math.h>
#define Gas_constant 8.314462618153324
int main() {
    float temperature, molar mass, rms speed;
    printf("Enter the temperature (in K): ");
    scanf("%f", &temperature);
    printf("Enter the molar mass of the gas (in g); ");
    scanf("%f", &molar_mass);
    rms_speed = sqrt(3* Gas constant * temperature/ molar mass)
    printf("The RMS speed of the molecule is %.2f m/s\n", rms_speed)
    return 0;
}
```

output:

Enter the temperature and molecular weight of oxygen = 483 m/s

eg: calculate the rms value of oxygen at 500 K.

$$C_{rms} = \sqrt{3RT/M}$$

$$= \sqrt{\frac{3 \times 8.314 \times 300}{0.032}}$$

$$= 3 \times 8.314 \times 300 = 7482.6 \text{ J/mol}$$

$$= \sqrt{\frac{7482.6 \text{ J/mol}}{0.032 \text{ kg/mol}}}$$

$$C_{rms} = 483.5 \text{ m/s}$$