

All volumes → L
 All pressures → kPa
 All temps → K

$PV = nRT$
 ↓ constant (8.314)

Ideal Gas Law Problems – Solution Key

- 1) If I have 4 moles of a gas at a pressure of 5.6 atm and a volume of 12 liters, what is the temperature? **205 K**
 $T = (567.28 \text{ kPa} \times 12 \text{ L}) \div (4 \text{ mol} \times 8.314)$
 209K
- 2) If I have an unknown quantity of gas at a pressure of 1.2 atm, a volume of 31 liters, and a temperature of 87 °C, how many moles of gas do I have? **1.26 moles**
 $(121.52 \text{ kPa} \times 31 \text{ L}) \div (360 \text{ K} \times 8.314)$
 360K
- 3) If I contain 3 moles of gas in a container with a volume of 60 liters and at a temperature of 400 K, what is the pressure inside the container? **1.64 atm** OR **166.28 kPa**
 $(3 \times 8.314 \times 400) / 60 = P$
- 4) If I have 7.7 moles of gas at a pressure of 0.09 atm and at a temperature of 56 °C, what is the volume of the container that the gas is in? **2310 L**
 $(329 \text{ K} \times 8.314 \times 7.7) / 9.15 \text{ kPa} = V$
- 5) If I have 17 moles of gas at a temperature of 67 °C, and a volume of 88.89 liters, what is the pressure of the gas? **5.34 atm** **540 kPa**
- 6) If I have an unknown quantity of gas at a pressure of 0.5 atm, a volume of 25 liters, and a temperature of 300 K, how many moles of gas do I have? **0.51 moles**
- 7) If I have 21 moles of gas held at a pressure of 78 atm and a temperature of 900 K, what is the volume of the gas? **19.9 L**
- 8) If I have 1.9 moles of gas held at a pressure of 5 atm and in a container with a volume of 50 liters, what is the temperature of the gas? **1603 K**
- 9) If I have 2.4 moles of gas held at a temperature of 97 °C and in a container with a volume of 45 liters, what is the pressure of the gas? **1.62 atm** **164.1 kPa**
- 10) If I have an unknown quantity of gas held at a temperature of 1195 K in a container with a volume of 25 liters and a pressure of 560 atm, how many moles of gas do I have? **143 moles**
- 11) If I have 0.275 moles of gas at a temperature of 75 K and a pressure of 1.75 atmospheres, what is the volume of the gas? **0.97 L**
- 12) If I have 72 liters of gas held at a pressure of 3.4 atm and a temperature of 225 K, how many moles of gas do I have? **13.3 moles**
 $(34.42 \text{ kPa} \times 72) / (8.314 \times 225) = n$