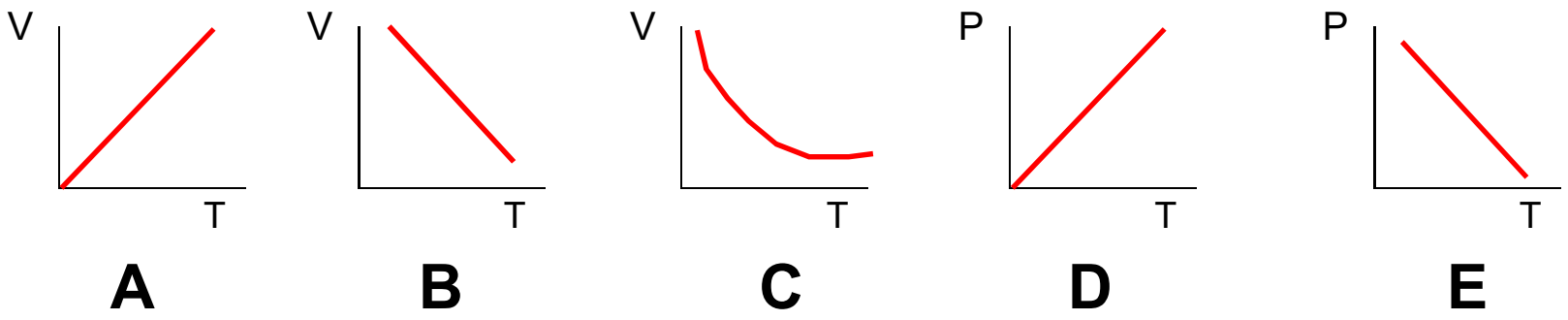
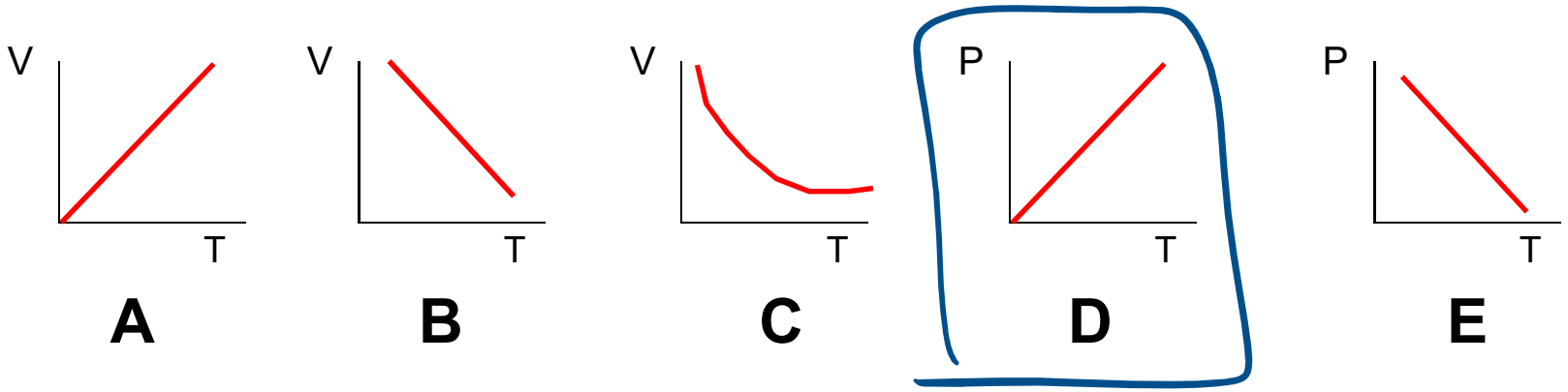
Use the ideal gas law to select from the graphs below the one that best represents the relation between ***between thermodynamic state variables*** for an isochoric process in which heat is added.



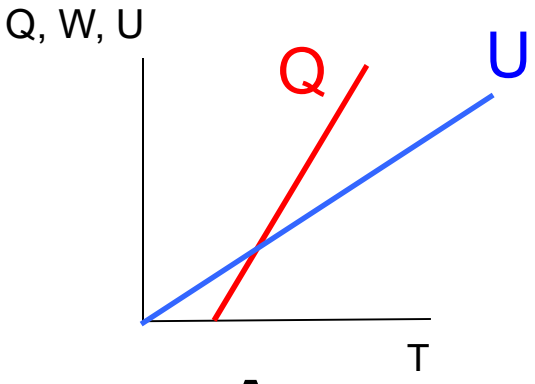
$\frac{PV}{T}$ const

Use the ideal gas law to select from the graphs below the one that best represents the relation between ***between thermodynamic state variables*** for an isochoric process in which heat is added.

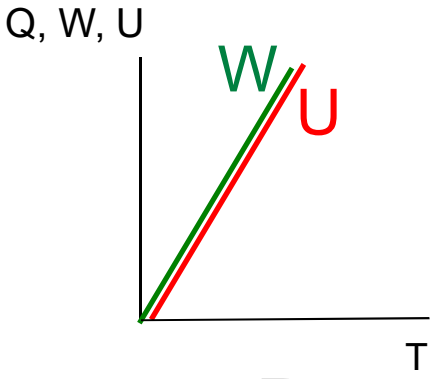
const volume $\Rightarrow \frac{P}{T}$ const $\Rightarrow$ P is prop. to T



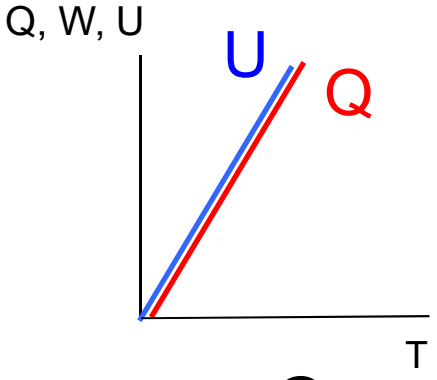
Given an isochoric process for an ideal gas with heat transfer Q, work W, and internal energy U, which is the best plot as the gas is heated?



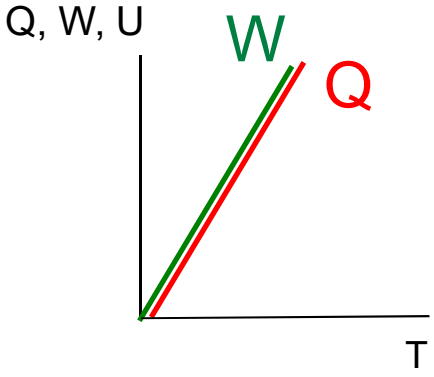
A



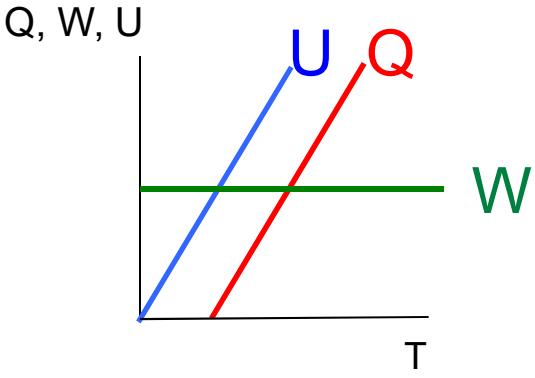
B



C

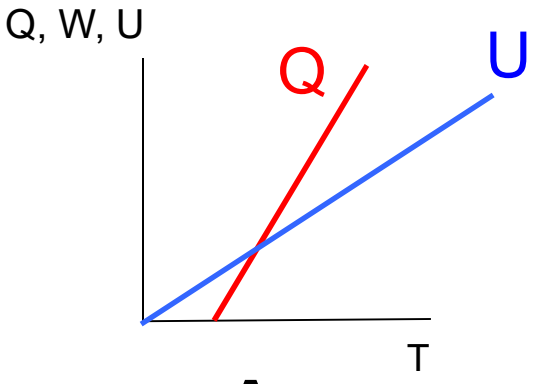


D

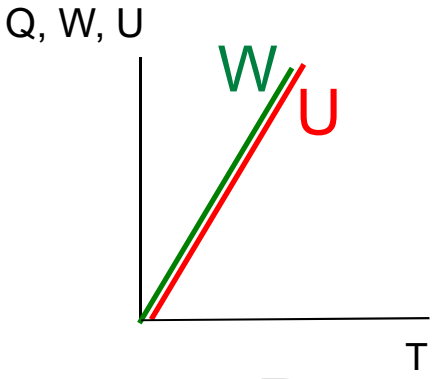


E

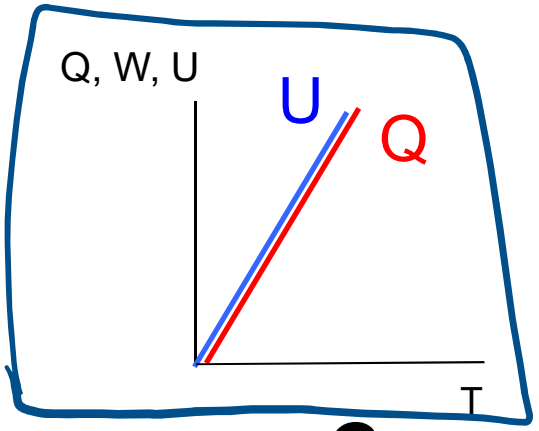
Given an isochoric process for an ideal gas with heat transfer Q, work W, and internal energy U, which is the best plot as the gas is heated?



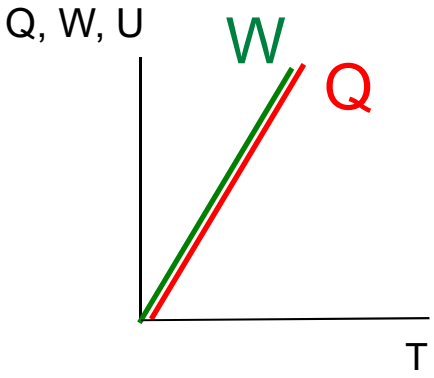
A



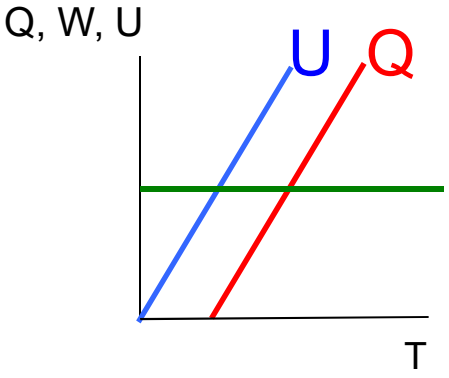
B



C



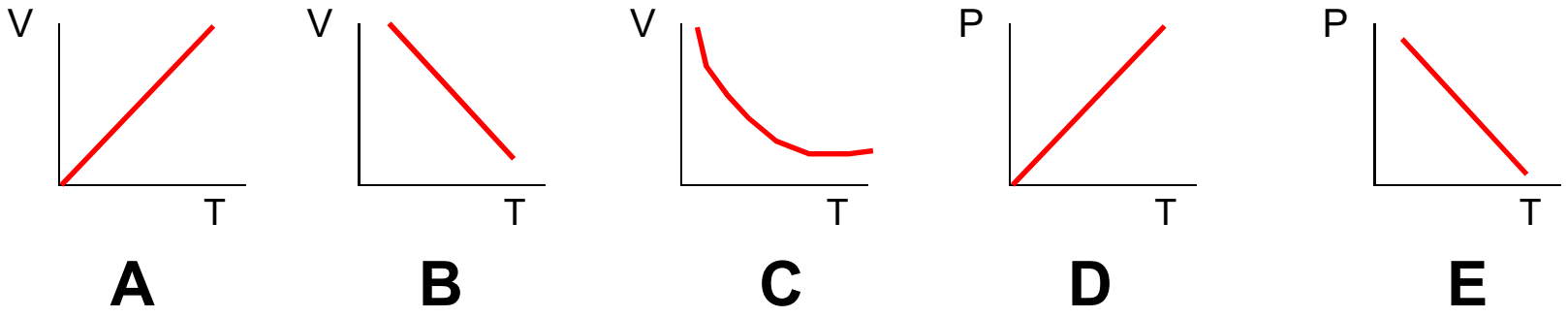
D



E

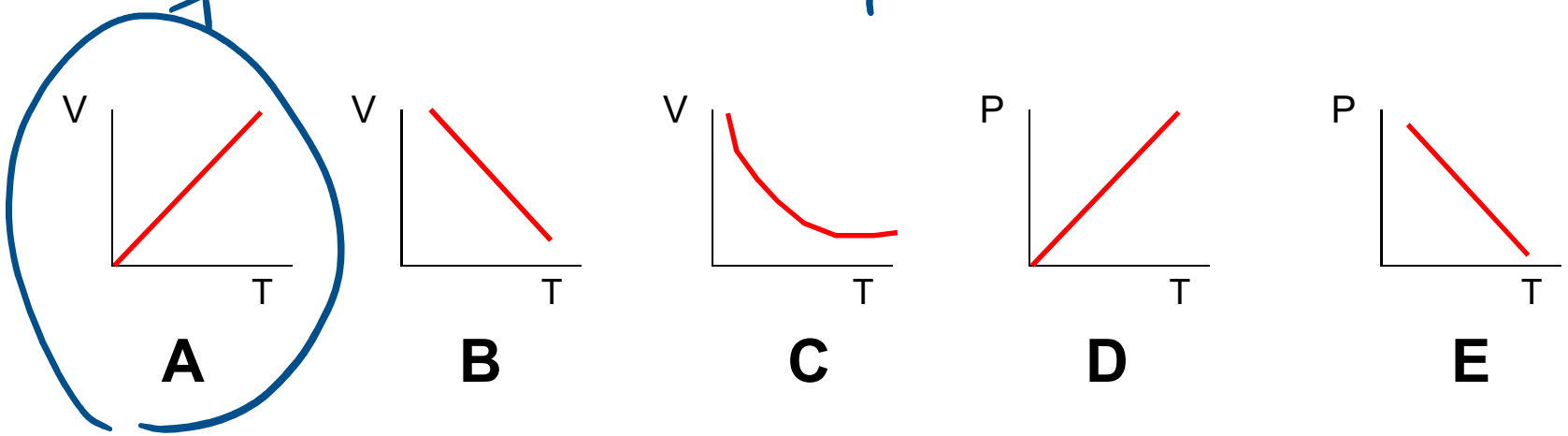
const V:
W = 0
so $\Delta U = Q$

Use the ideal gas law to select from the graphs below the ***one that best represents the relation between thermodynamic state variables for an isobaric process*** in which heat is added***.***

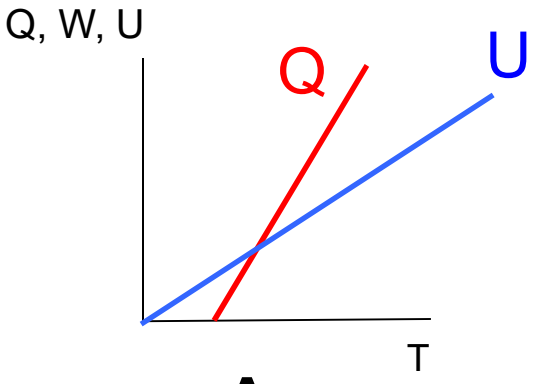


Use the ideal gas law to select from the graphs below the ***one that best represents the relation between thermodynamic state variables for an isobaric process*** in which heat is added.

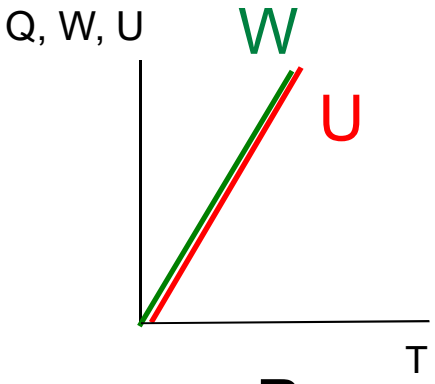
$\frac{PV}{T}$ const, P const so $\frac{V}{T}$ const V is proportional to T



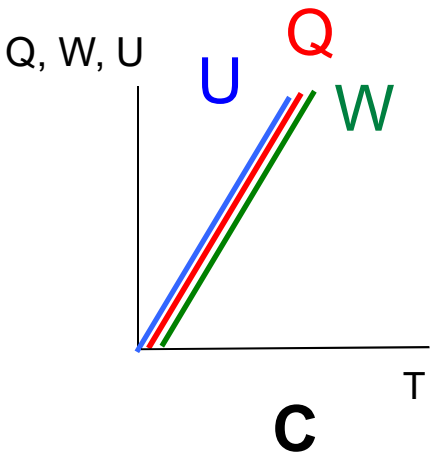
Given an isobaric process for an ideal gas with heat transfer Q, work W, and internal energy U, which is the best plot as the gas is heated?



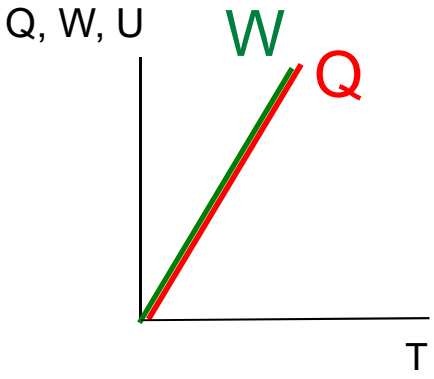
A



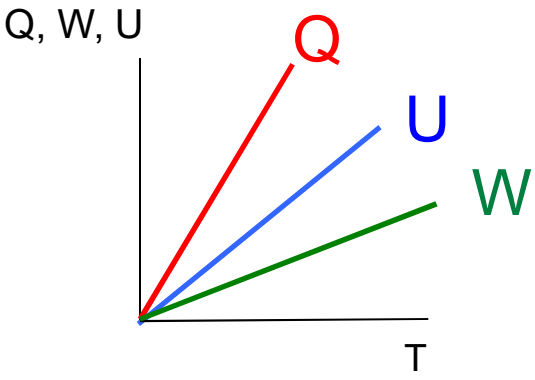
B



C

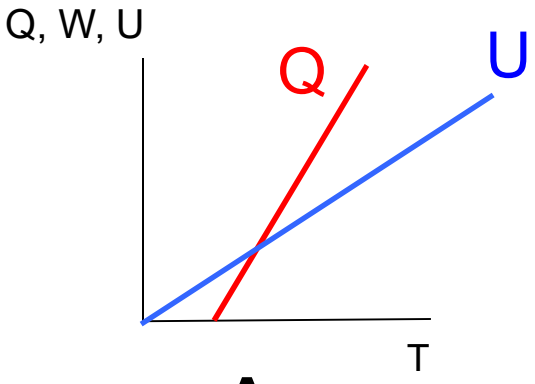


D

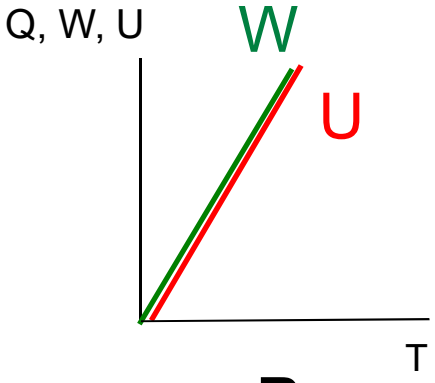


E

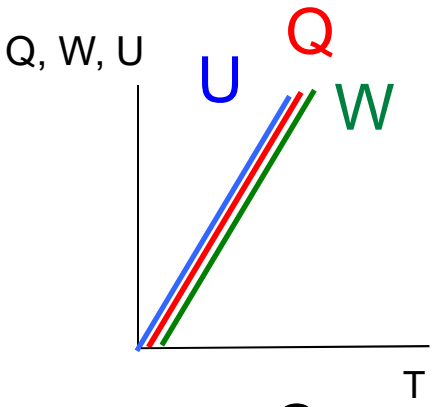
Given an isobaric process for an ideal gas with heat transfer Q, work W, and internal energy U, which is the best plot as the gas is heated?



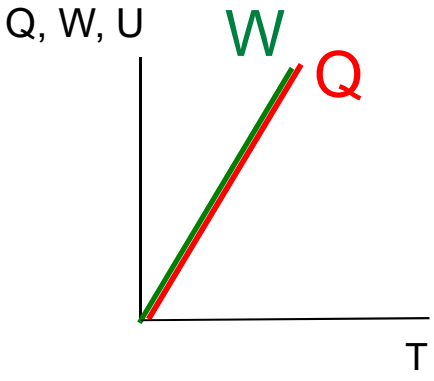
A



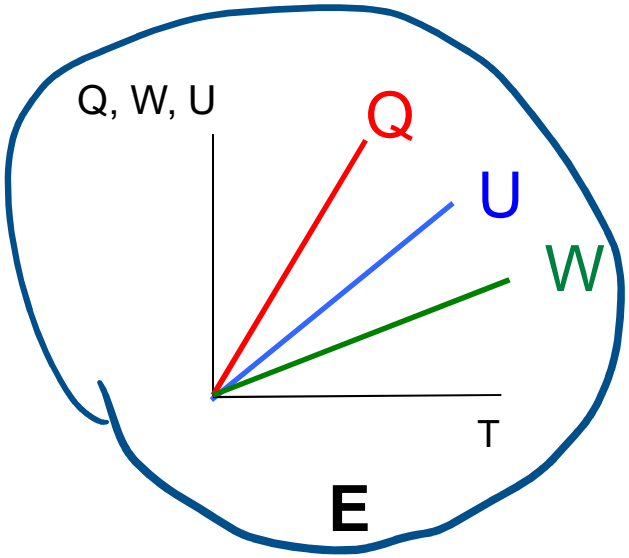
B



C



D



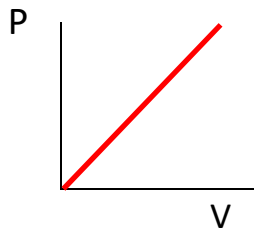
E

$Q = \Delta U + W$

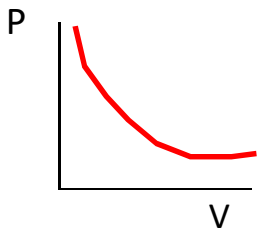
$Q > 0$,

$W > 0$ since it will expand to keep P constant

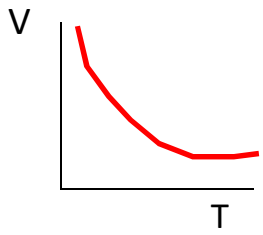
Use the ideal gas law to select from the graphs below the one that best represents the relation between ***between thermodynamic state variables*** for an ***isothermal*** process in which heat is added.



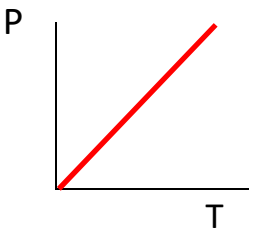
A



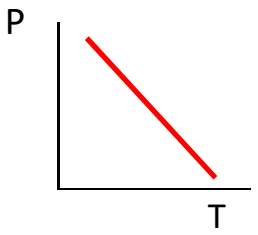
B



C



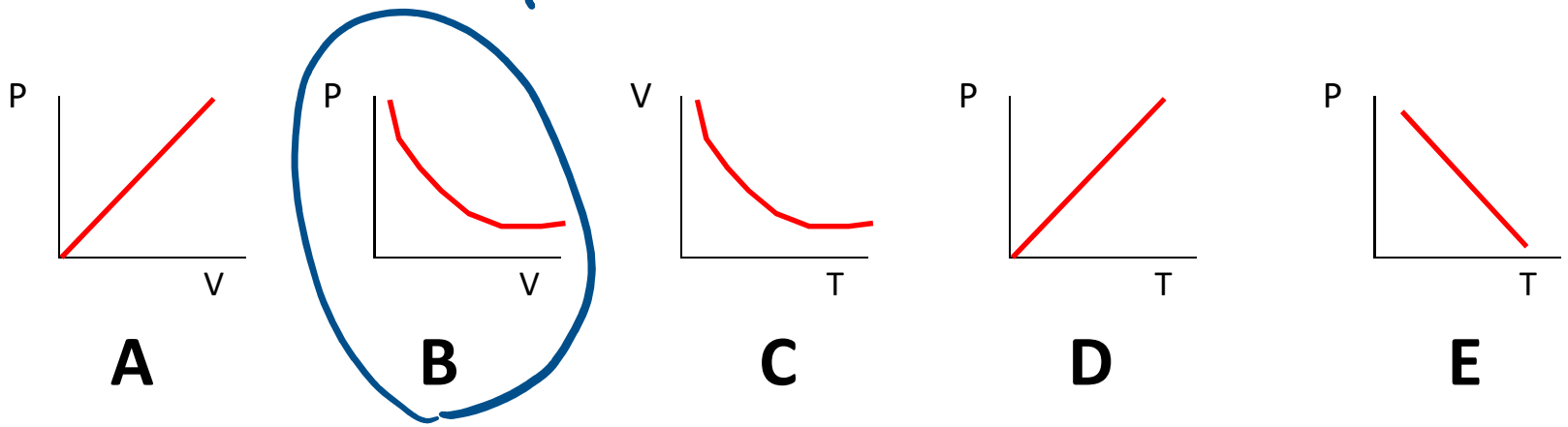
D



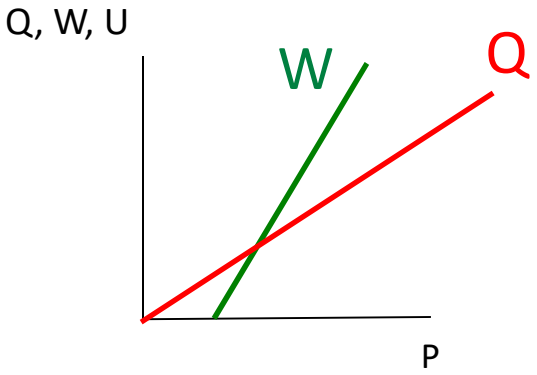
E

Use the ideal gas law to select from the graphs below the one that best represents the relation between ***between thermodynamic state variables*** for an ***isothermal*** process in which heat is added.

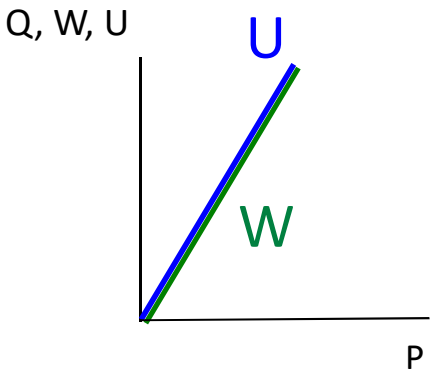
T const, $\frac{PV}{T}$ const so PV const → P is prop. to $\frac{1}{V}$



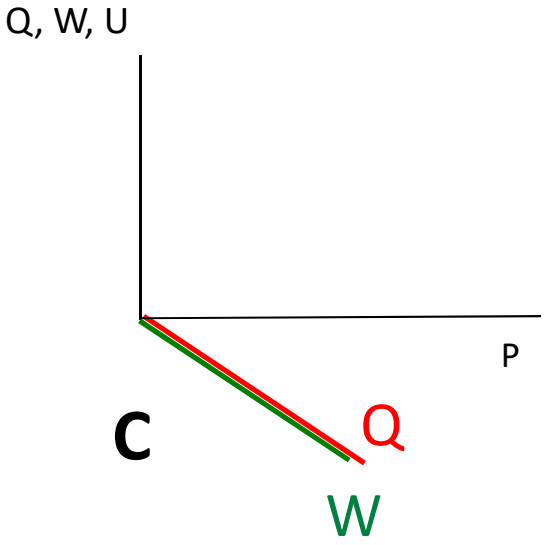
Given an isothermal process for an ideal gas with heat transfer Q, work W, and internal energy U, which is the best plot as the pressure increases?



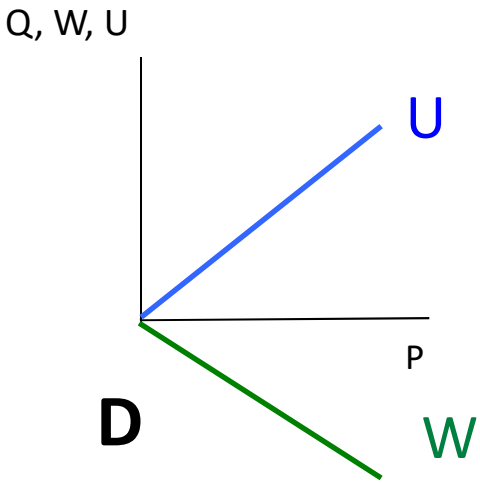
A



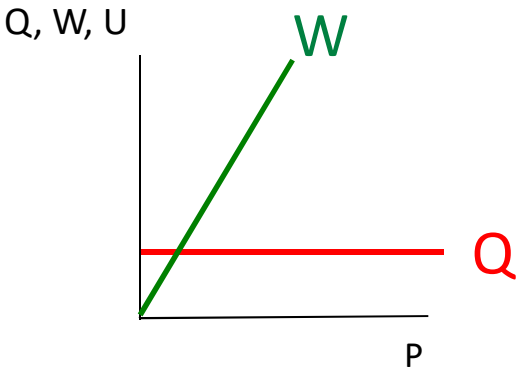
B



C

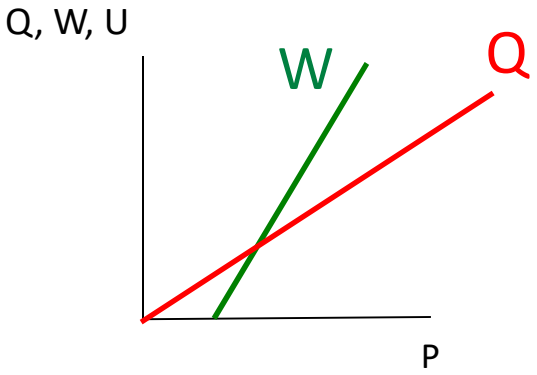


D

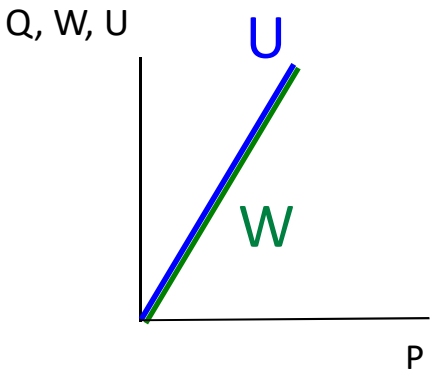


E

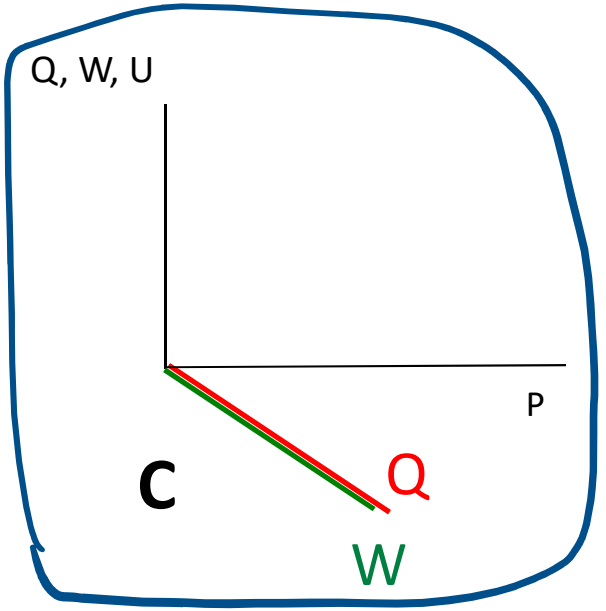
Given an isothermal process for an ideal gas with heat transfer Q, work W, and internal energy U, which is the best plot as the pressure increases?



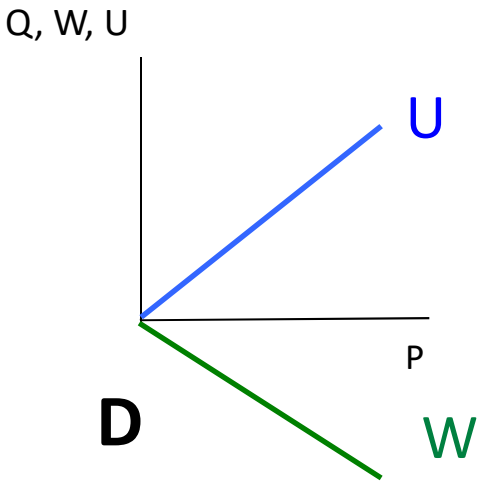
A



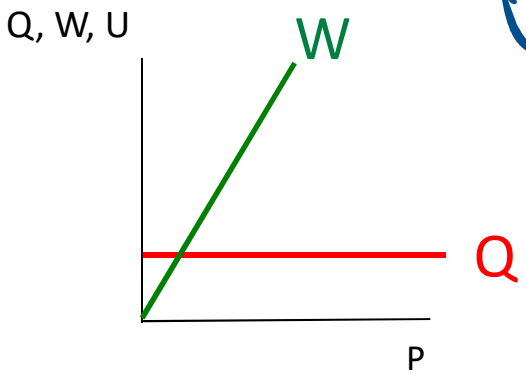
B



C



D



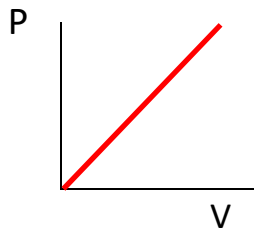
E

$\Delta T = 0$ so $\Delta U = 0$

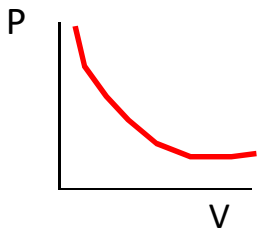
so $Q = W$

pressure increases so it is a compression, so $W < 0$

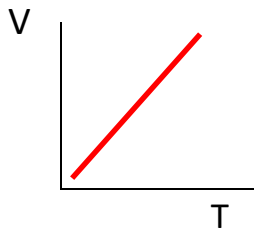
Use the ideal gas law to select from the graphs below the one that best represents the relation between ***between thermodynamic state variables*** for an adiabatic process.



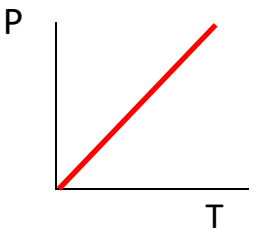
A



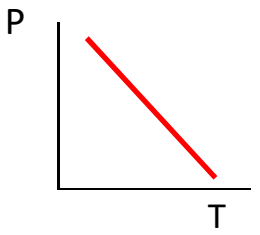
B



C



D

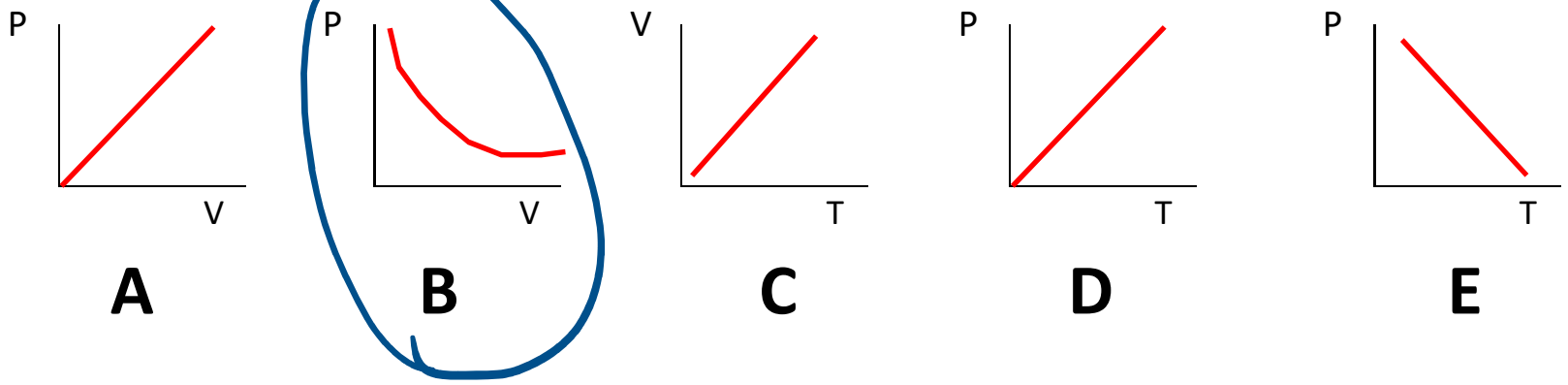


E

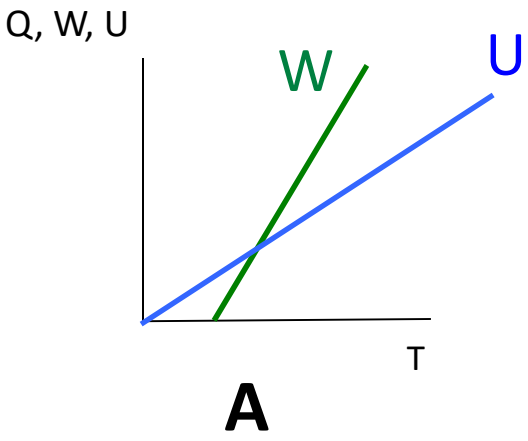
Use the ideal gas law to select from the graphs below the one that best represents the relation between ***between thermodynamic state variables*** for an adiabatic process.

PV^{γ} is constant

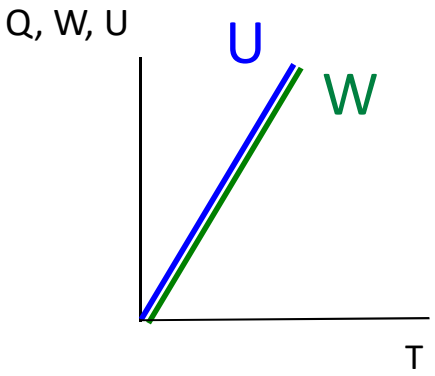
so $P \propto \frac{1}{V^{\gamma}}$



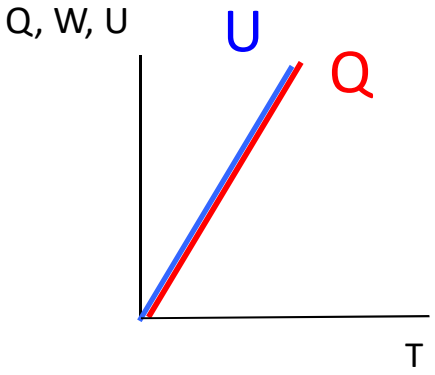
Given an adiabatic process for an ideal gas with heat transfer Q, work W, and internal energy U, which is the best plot as the temperature increases?



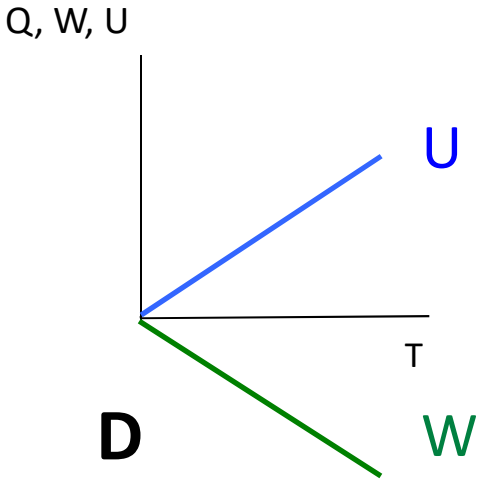
A



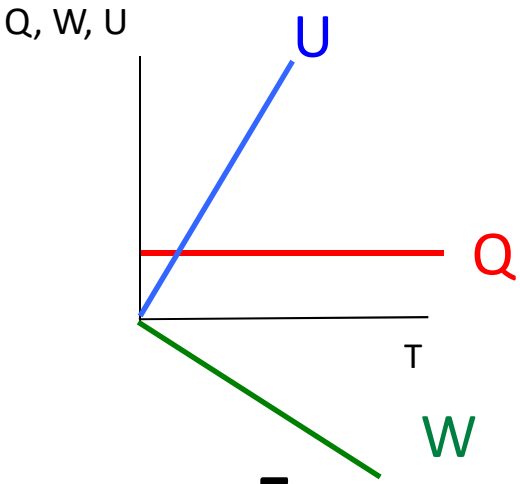
B



C

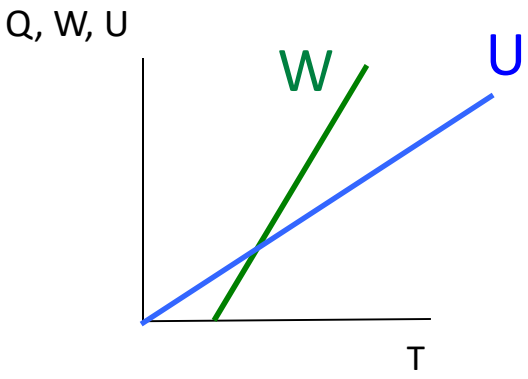


D

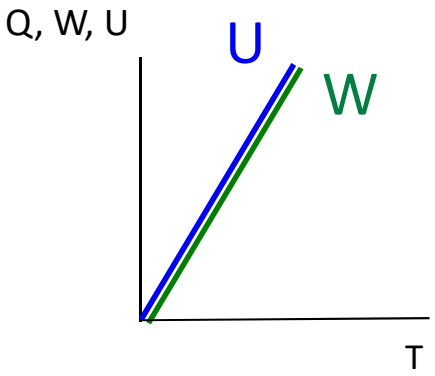


E

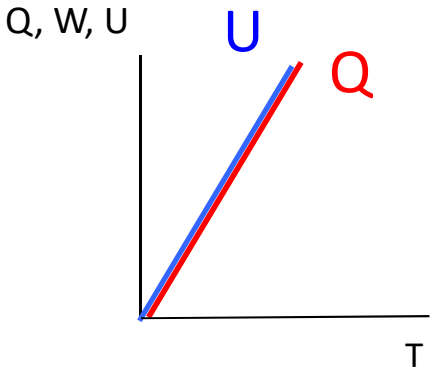
Given an adiabatic process for an ideal gas with heat transfer Q, work W, and internal energy U, which is the best plot as the temperature increases?



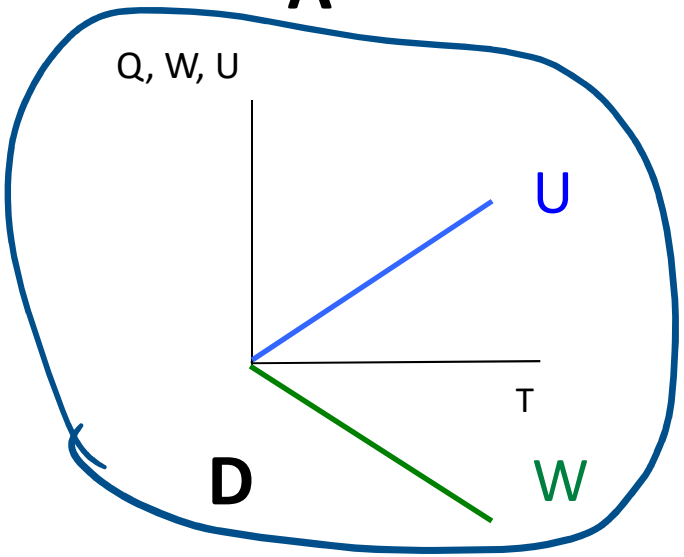
A



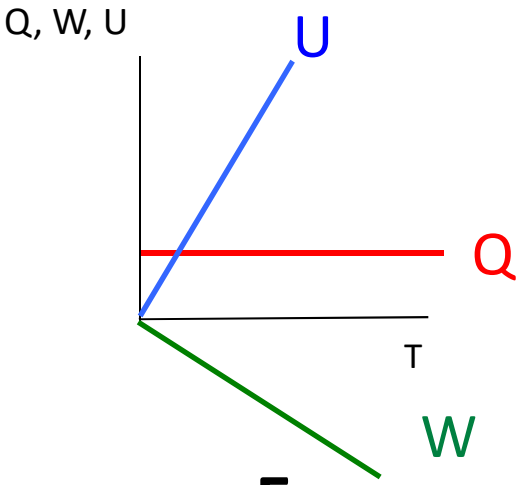
B



C



D



E

$Q = 0$ so

$\Delta U = -W$

How to calculate power?

We know the work done in one revolution. To calculate the power of the engine we need:

A. Change of pressure per one revolution
B. Change of volume per one revolution
C. Time of one revolution
D. Change of temperature per one revolution

How to calculate power?

We know the work done in one revolution. To calculate the power of the engine we need:

A. Change of pressure per one revolution
B. Change of volume per one revolution
C. Time of one revolution
D. Change of temperature per one revolution

$$\text{Power} = \frac{\text{Work}}{\text{time}}$$