The following graph of 
$\Delta G^\circ = \Delta H^\circ - T\Delta S^\circ$ describes a reaction in which:

1. $\Delta H^\circ > 0$ and $\Delta S^\circ > 0$
2. $\Delta H^\circ < 0$ and $\Delta S^\circ < 0$
3. $\Delta H^\circ < 0$ and $\Delta S^\circ > 0$
4. $\Delta H^\circ > 0$ and $\Delta S^\circ < 0$
The following graph of \( \Delta G^\circ = \Delta H^\circ - T\Delta S^\circ \) describes a reaction in which:

1. \( \Delta H^\circ > 0 \) and \( \Delta S^\circ > 0 \)
2. \( \Delta H^\circ < 0 \) and \( \Delta S^\circ < 0 \) [Corrected]
3. \( \Delta H^\circ < 0 \) and \( \Delta S^\circ > 0 \)
4. \( \Delta H^\circ > 0 \) and \( \Delta S^\circ < 0 \)
\[ \text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightarrow 2\text{NH}_3(\text{g}) \]

\[ K = 1.9 \times 10^{-4} \text{ at } 400^\circ\text{C} \]

\[ \text{PN}_2 = 5.5 \text{ bar, PH}_2 = 2.2 \text{ bar, PNH}_3 = 1.1 \text{ bar at } 400^\circ\text{C} \]

Which direction will the reaction go?

1. toward products, since \( Q < K \)
2. toward products, since \( Q > K \)
3. toward reactants, since \( Q > K \)
4. toward reactants, since \( Q < K \)
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Which direction will the reaction go?

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2. toward products, since Q > K
3. toward reactants, since Q > K
4. toward reactants, since Q < K
Which is the correct expression for K for the following reaction:

\[ 2\text{NO}_2 \,(g) \rightarrow \text{N}_2\text{O}_4\,(g) \]

1. \(\frac{(\text{PNO}_2)}{(\text{PN}_2\text{O}_4)}\)
2. \(\frac{(\text{PNO}_2)^2}{(\text{PN}_2\text{O}_4)}\)
3. \(\frac{(\text{PN}_2\text{O}_4)}{(\text{PNO}_2)}\)
4. \(\frac{(\text{PN}_2\text{O}_4)}{(\text{PNO}_2)^2}\)
Which is the correct expression for K for the following reaction:

$$2\text{NO}_2 \ (g) \rightarrow \text{N}_2\text{O}_4\ (g)$$

1. $\left(\text{PNO}_2\right)/\left(\text{PN}_2\text{O}_4\right)$
2. $\left(\text{PNO}_2\right)^2/\left(\text{PN}_2\text{O}_4\right)$
3. $\left(\text{PN}_2\text{O}_4\right)/\left(\text{PNO}_2\right)$
4. $\left(\text{PN}_2\text{O}_4\right)/\left(\text{PNO}_2\right)^2$

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$\Delta G^\circ = -RT \ln K$ or $K = \exp \left[ -\Delta G^\circ / RT \right]$

K is large if $\Delta G^\circ$ is...

1. negative and small
2. negative and large
3. positive and small
4. positive and large
\[ \Delta G^\circ = -RT \ln K \quad \text{or} \quad K = \exp \left[ -\frac{\Delta G^\circ}{RT} \right] \]

K is large if \( \Delta G^\circ \) is...

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2. negative and large
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Removing Product

If you remove product, what happens?

1. $Q<K$. The reaction shifts to the right toward product.
2. $Q>K$. The reaction shifts to the right toward product.
3. $Q<K$. The reaction shifts to the left toward reactants.
4. $Q>K$. The reaction shifts to the left toward reactants.
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