a) The fugacity contains the same information as the chemical potential. It is in units of pressure and reflects the pressure of an ideal gas with the same chemical potential and temperature as the real gas. One advantage of the fugacity is that in mixtures, the chemical potential of an extremely dilute component goes to infinity while the fugacity goes to 0. Fugacity is used by convention by Chemical Engineers to talk about equilibrium. Chemical potential is used by convention by Chemists and Physicists and Material Scientists, and most other scientists to describe equilibrium.

	Part (1)	**Part (2)**
***T*, K**	**400**	**400**
***P*, MPa**	**0.1**	**8.0**
T_r	**.941**	**.941**
P_r	**.0231**	**1.85**
Short-Cut Appropriate?	**Yes**	**Yes**
P^{sat}**, MPa**	**2.90**	**2.90**
State of Matter	**Vapor**	**Compressed Liquid**
Virial EOS Appropriate?	**Yes**	**No**
f^{sat}**, MPa**	**2.19**	**2.19**
PREOS f^{sat}**, MPa**	**2.04**	**2.04**
***f*, MPa**	**0.0990**	**2.64**
***PREOS f*, MPa**	**0.0993**	**2.46**
Ideal Gas Approximation Good?	**Yes**	**No**