1. (2 points) What is today's ethane frac spread ($ per MMBtu)?

Price of natural gas?  

Price of ethane?  

Show your units in your answers. Attach your source for today's prices.

2. (3 points) What are two reasons to remove hydrocarbon liquids from produced gas?

3. (2 points) What is a primary usage for natural gas? (There may be only one, but choose only one.)
   a. Make electricity
   b. Make heat
   c. Use in transportation sector
   d. None of the above
   e. What is natural gas?

4. (2 points) A gas has a gross heating value of 980 Btu/scf and a molecular weight of 19.1. What is its specific gravity?
Solution

1. The figure below shows a custom portfolio for today’s (from ino.com). Using the February delivery Last prices of $3.509 per MMBtu for natural gas & $0.28375 per gal for ethane then the ethane Frac Spread is:

\[
\text{Spread} = \left( \frac{0.28375}{\text{gal}} \right) \left( \frac{1,000,000 \text{ Btu}}{66,340 \text{ gal}} \right) \left( \frac{\text{MMBtu}}{3.509} \right) - \left( \frac{0.28375}{\text{gal}} \right) \left( \frac{1,000,000 \text{ Btu}}{66,340 \text{ gal}} \right)
\]

\[
= 0.768 \text{ per MMBtu}
\]

### Custom Portfolio

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Price 1</th>
<th>Price 2</th>
<th>Price 3</th>
<th>Price 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>NN.M18.E</td>
<td>HENRY HUB NATURAL GAS FINCL Jun 2018 (E)</td>
<td>2.876</td>
<td>2.876</td>
<td>2.876</td>
<td>2.876</td>
</tr>
<tr>
<td>NN.K18.E</td>
<td>HENRY HUB NATURAL GAS FINCL May 2018 (E)</td>
<td>2.859</td>
<td>2.859</td>
<td>2.859</td>
<td>2.859</td>
</tr>
<tr>
<td>B0.G18.E</td>
<td>MONT BELVIEU LDH PROPANE Feb 2018 (E)</td>
<td>0.8575</td>
<td>0.8575</td>
<td>0.8575</td>
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<tr>
<td>B0.H18.E</td>
<td>MONT BELVIEU LDH PROPANE Mar 2018 (E)</td>
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<td>0.8750</td>
<td>0.8750</td>
<td>0.8750</td>
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<td>B0.J18.E</td>
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<td>0.79688</td>
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<tr>
<td>B0.K18.E</td>
<td>MONT BELVIEU LDH PROPANE May 2018 (E)</td>
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<td>0.7825</td>
<td>0.7825</td>
<td>0.7825</td>
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<tr>
<td>B0.M18.E</td>
<td>MONT BELVIEU LDH PROPANE Jun 2018 (E)</td>
<td>0.55000</td>
<td>0.55000</td>
<td>0.55000</td>
<td>0.77875</td>
</tr>
<tr>
<td>ACO.G18.E</td>
<td>MONT BELVIEU ETHANE Feb 2018 (E)</td>
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<td>0.28375</td>
<td>0.28375</td>
<td>0.28375</td>
</tr>
<tr>
<td>ACO.N18.E</td>
<td>MONT BELVIEU ETHANE Jul 2018 (E)</td>
<td>0.27125</td>
<td>0.27125</td>
<td>0.27125</td>
<td>0.27125</td>
</tr>
</tbody>
</table>

2. Some reasons to remove hydrocarbon liquids:
   a. Allow the produced gas to make a dew point spec for pipeline transmission.
   b. Allow the produced gas to make a heating value spec for final usage.
   c. Add value if the liquids are worth more.

3. Both a & b are acceptable.

4. Gas specific gravity:

\[
\gamma_g = \frac{M}{M_{air}} = \frac{19.1}{28.959} = 0.6596
\]