Instructions: Write the answers clearly and concisely on these sheets in the spaces provided.

1. What shifts (left or right) in demand and supply curves would produce the following effects? (Assume in each case that only one of the two curves has shifted.)
   a. The price of smartphones has fallen over the past few years while the quantity exchanged has increased greatly.
      A rightward shift of the supply curve reduces equilibrium price and increases equilibrium quantity. We call this an "increase in supply."
   b. Summer sublets in Davis, California, are at rents well below the regular rentals.
      This would be caused by a leftward shift of demand which reduces equilibrium price and quantity. We call this a "decrease in demand."
   c. The gourmet coffee market grows as influencers indulge.
      This would be caused by a rightward shift of demand which increases equilibrium price and quantity. We call this an "increase in demand."

2. What would be the effect on the equilibrium price and quantity of marijuana if its sale and consumption were legalized? Explain using a supply and demand model.
   This would likely increase both supply and demand (shifting both curves to the right) increasing equilibrium quantity but having an indeterminate effect on equilibrium price. The effect on price will depend on how far each curve shifts.

3. "In the corn market, demand often exceeds supply and supply often exceeds demand." "The price of corn rises and falls in response to changes in supply and demand." In which of these two statements are the terms "supply" and "demand" used correctly? Explain
   In the second. "Demand" doesn't exceed "supply," rather, it is the "quantity demanded" that "exceeds the quantity supplied" at a given price. It is true that "changes" (or shifts) in demand and supply cause changes in price.
4. “As the price of beef rises, the demand of consumers will begin to decline. Economists estimate that a 5 percent rise in beef prices will cause the demand to decline by 1 percent.” Indicate the two errors in this statement.

When price rises, quantity demanded falls not demand. Along the same lines, to be correct, the statement should read, “Economists estimate that a 5 percent rise in beef prices will cause the quantity demanded to decline by 1 percent.”

5. The table below presents data on the price of fuel oil, the quantity of it demanded, and the demand for insulation:

<table>
<thead>
<tr>
<th>Fuel Oil</th>
<th>Insulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price per Gallon (dollars)</td>
<td>Quantity Demanded (millions of gallons)</td>
</tr>
<tr>
<td>2.25</td>
<td>100</td>
</tr>
<tr>
<td>3.75</td>
<td>90</td>
</tr>
<tr>
<td>5.25</td>
<td>60</td>
</tr>
</tbody>
</table>

a. Calculate the arc price elasticity of demand for fuel oil as it price increases from $2.25 to $3.75 per gallon and from $3.75 to $5.25 per gallon.

For a change in price from $2.25 to $3.75, price elasticity of demand is as follows:

\[ E = \frac{(90 - 100)(3.75 + 2.25)}{(90 + 100)(3.75 - 2.25)} = \frac{(-10)(6)}{(190)(1.5)} = \frac{-60}{285} = -0.211 \]

Price elasticity of demand is the absolute value of this number or 0.211, indicating very inelastic demand.

For a change in price from $3.75 to $5.25 we calculate

\[ E = \frac{(60 - 90)(5.25 + 3.75)}{(60 + 90)(5.25 - 3.75)} = \frac{(-30)(9)}{(150)(1.5)} = \frac{-270}{225} = -1.2 \]

Price elasticity of demand is again the absolute value of this number or 1.2, this time indicating elastic demand.

b. Are fuel oil and insulation substitutes or complements? How can you tell from the figures in the table alone?

To answer this question, look at the sign of the cross price elasticity, the percentage change in the demand for insulation given a one percent change in the price of oil. Given that as the price of oil rises (%ΔP > 0) the quantity demanded of insulation also increases (%ΔQ > 0), we conclude that the cross price elasticity is positive, indicating the two goods are complements. Note that you do not need to, nor are you asked to actually calculate the elasticity.
6. What are the major determinants of a product’s price elasticity of demand? Studies indicate that the demands for Florida oranges, Bayer aspirin, water melons, and airfares to Europe are elastic. Why?

The major determinants of a product’s price elasticity of demand are the number and closeness of substitutes. Additionally, the importance of the item in the consumer’s budget, the time period under consideration and whether the good is a necessity or luxury influence elasticity. Of the above items, the first three have many substitutes. The last is a luxury good for most. Trips to Europe can be delayed until fares are lower.

7. Sue loves ice cream but cannot stand frozen yogurt deserts. In contrast, Carole cannot tell the difference between ice cream and frozen yogurt deserts. Who will have the more elastic demand for frozen yogurt? Explain.

Carole will have the more elastic demand for yogurt. If the price falls, she will quickly substitute yogurt for ice cream. On the other hand, a decrease in the price of yogurt will likely have no effect on the quantity demanded by Sue because she is not interested in buying and eating it at any price.

8. Given that a price change remains in effect over a period of time, will price elasticity of demand increase or decrease over time? Why?

Price elasticity of demand will increase over time because consumers will be able to find more and/or better substitutes and change behavior.

9. The following table shows the demand curve for denim jeans:

<table>
<thead>
<tr>
<th>Price Per Unit</th>
<th>Quantity Demanded Per Year</th>
<th>Total Expenditure (Revenue)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$30</td>
<td>400,000</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>35</td>
<td>380,000</td>
<td>13,300,000</td>
</tr>
<tr>
<td>40</td>
<td>350,000</td>
<td>14,000,000</td>
</tr>
<tr>
<td>45</td>
<td>320,000</td>
<td>14,400,000</td>
</tr>
<tr>
<td>50</td>
<td>300,000</td>
<td>15,000,000</td>
</tr>
<tr>
<td>55</td>
<td>260,000</td>
<td>14,300,000</td>
</tr>
<tr>
<td>60</td>
<td>230,000</td>
<td>13,800,000</td>
</tr>
<tr>
<td>65</td>
<td>190,000</td>
<td>12,350,000</td>
</tr>
</tbody>
</table>

a. Complete the last table of the above table to show the total expenditure or revenue for each given price.

b. Over what range of prices is demand for denim jeans elastic? Over what range is it inelastic? Answer without calculation of the elasticity. Explain your answer.

This is an application of the total revenue test. If when price increases total revenue also increases, we know that demand is inelastic. From the above table we see this is the case until price reaches $50. On the other hand, if when price increases total revenue falls, we know demand is inelastic. This is the case for prices of $55 and above. We conclude that demand is inelastic at prices of $50 and below and elastic at prices of $55 and above.
10. Match the following words with the appropriate statement about elasticity:
   a. Luxury__3__ 1. Cross price elasticity of demand is negative.
   b. Complement__1__ 2. Income elasticity of demand is negative.
   c. Necessity__4__ 3. Income elasticity of demand is greater than one.
   d. Substitute_6__ 4. Income elasticity of demand is less than one.
   e. Inferior good_2__ 5. Income elasticity of demand is positive.
   f. Normal good__5__ 6. Cross-price elasticity of demand is positive.

11. Kean University Professor Henry Saffer and Bently University Professor Dave Dhaval estimated that if the alcohol industry increased the price of alcoholic beverages by 100 percent underage drinking would fall by 28 percent and underage binge drinking would fall by 51 percent.
   a. What is the price elasticity of demand for underage drinking and for underage binge drinking?

   The price elasticity of demand for underage drinking is
\[ E_d = \left| \frac{\% \Delta Q}{\% \Delta P} \right| = \left| \frac{-28}{100} \right| = 0.28 \]

   The price elasticity of demand for underage binge drinking is
\[ E_d = \left| \frac{\% \Delta Q}{\% \Delta P} \right| = \left| \frac{-51}{100} \right| = 0.51 \]

   b. What might explain the difference in elasticities?
   *Underage binge drinking requires a substantial amount of alcohol and hence a larger proportion of one’s budget than just drinking. The larger budget share results in greater price elasticity.*

12. A newspaper recently lowered its price from 50 cents to 30 cents. As it did, the number of newspapers sold increased from 240,000 to 280,000.
   a. What was the newspapers price elasticity of demand?

   \[ E_d = \left| \frac{\% \Delta Q}{\% \Delta P} \right| = \left| \frac{280,000 - 240,000}{280,000 + 240,000} \cdot \frac{0.30 + 0.50}{0.30 - 0.50} \right| = \left| \frac{40,000}{520,000} \cdot \frac{0.8}{-0.20} \right| = \left| \frac{32,000}{-104,000} \right| \approx 0.308 \]

   b. Given the elasticity, did it make sense for the newspaper to lower its price? Explain.
   *Probably not. They have reduced their total revenue because prices elasticity at 0.308 is in the inelastic range of the demand curve. Total revenue has fallen from $120,000 to $84,000, a reduction of $36,000. The only way this would increase their profits, is if total costs fell by more than $36,000 which as we will see when we discuss the firms costs is an exceptionally unlikely case.*

   c. How might your answer to part b change if much of the publisher’s revenue came from advertising and the higher the circulation, the more it could charge for advertising?
   *We would need to know exactly what the numbers are. If they are large enough, this could change the answer.*