Instructions:
You must answer all of the following questions. Each question is worth the same amount. You have the class period to complete the exam.

Answer each question clearly and concisely. You must show your work to receive credit.

This exam is given under the rules of the Montana State University. By printing your name above you acknowledge the University’s Honor Code and agree to comply with the provisions of the Honor Code. You may not use notes or receive any assistance. There is to be no talking during the exam. You may use a calculator, but are never allowed to use device allowing you to take photographs or transmit over a network. **No notes, no assistance, no talking, no cell phones, but you can use a calculator.**

Clearly print your name above, in the space provided on the next page and in your blue book(s). You must turn in your blue book(s). There are two versions of the exam. **Indicate your exam version on your blue book.** It is your responsibility to make sure your version of the exam is different from the students next to you. If you have the same version as any of the students next to you, you will be asked to move.
True/False/Uncertain Plus Explanation

1. For each of the following, state whether it is true, false or uncertain and explain your answer. No points are given without explanation.

(a) If the government subsidizes one good, this may cause consumers to purchase more of all goods.

(b) Rational consumers would rather have a 100% increase in income than a 50% reduction in all prices.

(c) Only in the case of perfectly elastic supply will firms pay the full amount of a tax.

(d) On February 13 the price of a rose was $1 and 80 roses were purchased. On Valentine’s Day (February 14), the price of a rose jumped to $2 and 200 roses were purchased. Therefore, the elasticity of demand is approximately 1.28.

Short Answer/Numerical

2. Consider the consumer’s problem, the foundation of consumer theory.

(a) Describe (in one or two sentences) how we model the consumer’s problem.

(b) Describe (in one or two sentences) the problem consumers actually solve (in the real world).

(c) What abstractions from reality do we make with our model and how do we justify those abstractions?

(d) Describe (in one or two sentences) two different assumptions we make about consumers and what the relevant consequences of those assumptions are.

3. A consumer has the following utility function.

\[ U(x, y) = (x + 2)^{\frac{1}{2}} y^{\frac{1}{2}} \]

Given prices \( p_x = 6, p_y = 1 \) and income \( m = 10 \):

(a) find the marginal rate of substitution,

(b) find the interior solution to the consumer’s utility maximization problem,

(c) find the corner solutions to the consumer’s utility maximization problem,

(d) find the optimal consumption bundle of \( x \) and \( y \).
4. The market supply and demand functions for a particular market are as follows.

\[ Q = 147 - 3p \]
\[ Q = 2p - 50 \]

(a) What are the equilibrium prices and quantity with the tax expressed as a function of \( \tau \)?

(b) What is the tax revenue collected as a function of \( \tau \)?

(c) What value of \( \tau \) maximizes tax revenue and how much tax revenue is generated?

(d) What is the lowest value of \( \tau \) that maximizes dead-weight loss and what is the dead-weight loss created?