Problem 1. Consider the market for second-hand cars. The quality of a car is denoted by q. There are three possible quality levels: A, B, and C. Sellers value quality 10% less than buyers, as shown in the following table:

Quality (q)	A	B	C
Worth to Buyer	\$3000	\$2000	\$1000
Worth to Seller	\$2700	\$1800	\$900
Number of Cars	120	90	30

Each seller knows the quality of her own car, while the buyers have the preceding information and cannot discover the quality of any particular car before buying. Everyone is risk-neutral.

Determine how many cars are traded if the price of a second-hand car is:

(a) \$2750 **(b)** \$1850 **(c)** \$910

Problem 2. Second-hand meteorite fragments differ in quality q and are sold at price p. Each seller knows the quality of her meteorite fragment, while the buyer does not. Everyone is risk neutral. The proportions of meteorite fragments are as follows:

Quality (q)	1	2	3	4
Proportion	$\frac{2}{10}$	$\frac{1}{10}$	$\frac{4}{10}$	$\frac{3}{10}$

Find the proportion of meteorite fragments that are offered for sale and their average quality when the price is in the following regions:

(a) $p \geq 4$ **(b)** $3 \leq p < 4$ **(c)** $2 \leq p < 3$ **(d)** $1 \leq p < 2$ **(e)** $p < 1$

Problem 3. Consider the market for a second-hand durable good which can be of quality A or B. The seller knows the quality while the buyer only knows the following:

Quality	A	B
Value to Seller	\$496	\$180
Probability	$\frac{3}{5}$	$\frac{2}{5}$

The buyer knows that if she buys a good of quality A (which she learns after purchasing), she will be able to re-sell it for \$960; while if the good turns out to be of quality B, then she will be able to re-sell it for \$280. Suppose that the buyer's initial wealth is \$8,000 and that she is risk averse with utility-of-money function $U(x) = \sqrt{x}$.

Should the buyer offer to buy the good and, if so, at what price?