Econ 362, Hanes
First problem set on graphing

1) The graph below depicts a competitive market with an upward-sloping supply curve and a downward-sloping demand curve.

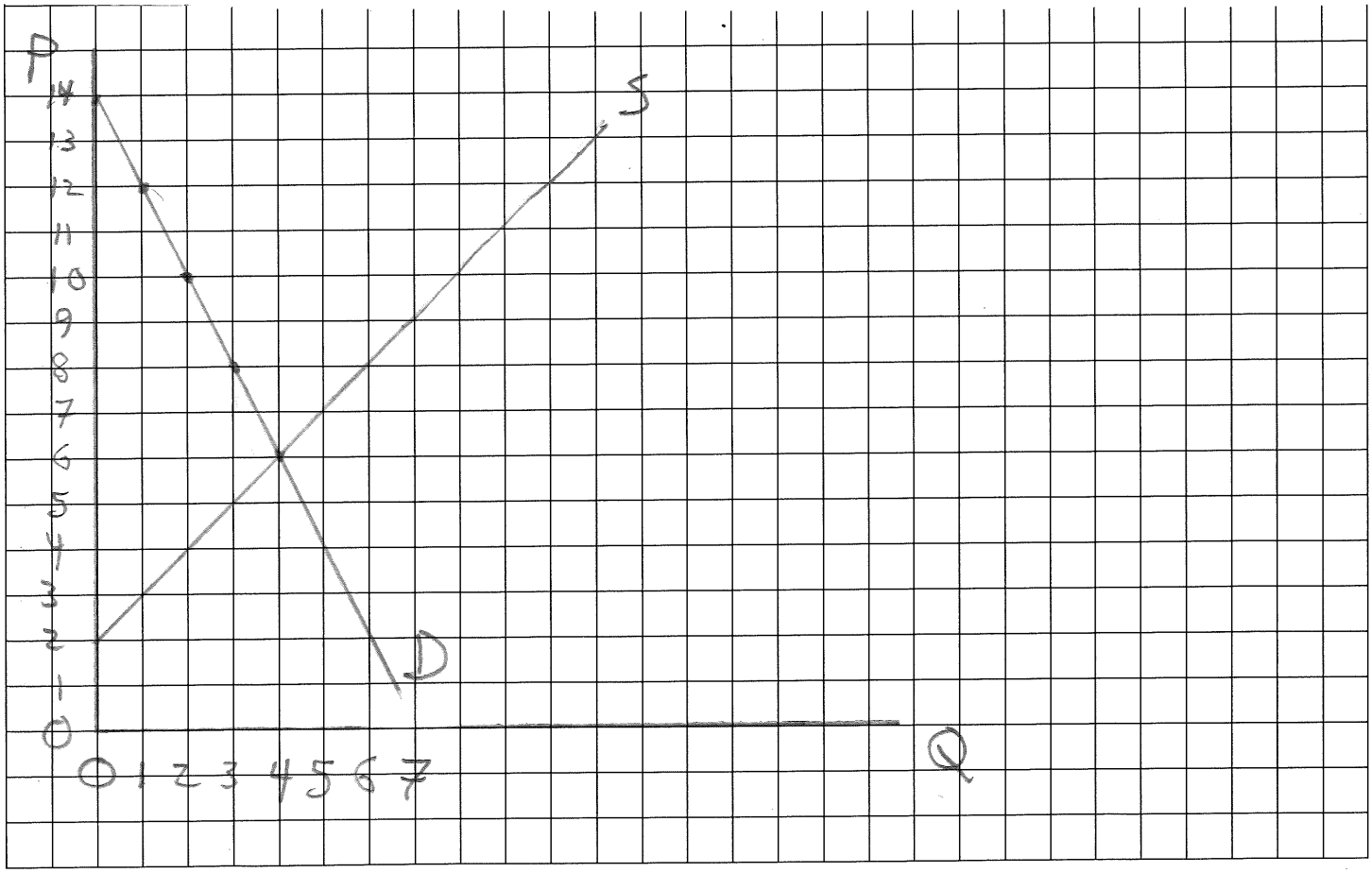
a) What is the equation that is plotted out as the supply curve? $P =$ _____ + _____ Q^S

b) What is the equation that is plotted out as the demand curve? $P =$ _____ - _____ Q^D

c) The equilibrium price P^* is the price that makes $Q^S = Q^D$. What is P^*? _____

d) Rearrange your answer to a) to get the "supply equation." The supply equation is an equation that gives the quantity supplied as a function of the price.
$Q^S =$ _____ + _____ P (Note: the constant in this equation might be a negative number.)

e) Rearrange your answer to b) to get the "demand equation." The demand equation is an equation that gives the quantity demanded as a function of the price.
$Q^D =$ _____ - _____ P (Note: the constant in this equation might be a negative number.)



2) Now I ask you to reverse the process. Consider a competitive market with a supply curve given by the equation $Q^S = -2 + \frac{1}{2}P$ and a demand curve given by the equation $Q^D = 4 - \frac{1}{4}P$.

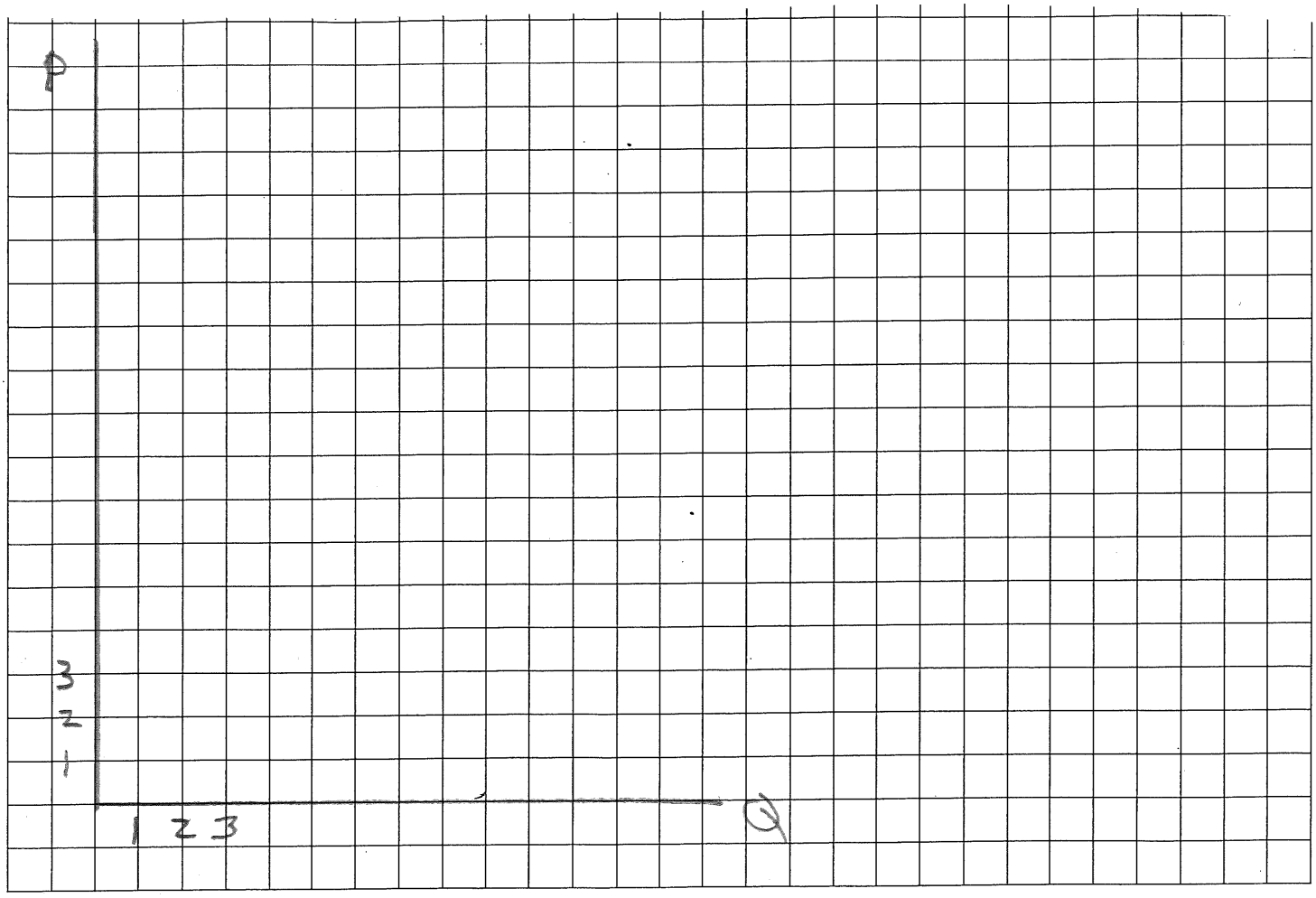
a) Rearrange the supply equation to get the equation that is plotted out as the supply curve.

$P =$ _____ + _____Q^S Plot this curve on the graph below.

b) Rearrange the demand equation to get the equation that is plotted out as the demand curve.

$P =$ _____ - _____Q^D Plot this curve on the graph below.

c) From the graph, what is the equilibrium price P^*? _____



d) You can get the equilibrium price without plotting out the supply and demand curves, using the supply equation and the demand equation. P^* is the value for P that makes Q^S in the supply equation equal to Q^D in the demand equation. That is, P^* is the value for P for which: $-2 + \frac{1}{2}P = Q^S = Q^D = 4 - \frac{1}{4}P$ which means $-2 + \frac{1}{2}P^* = 4 - \frac{1}{4}P^*$.

In the space below, use algebra to find the value for P^* that solves $-2 + \frac{1}{2}P^* = 4 - \frac{1}{4}P^*$. Show all the steps in your math.

3) Let's go back to the notion of a demand equation. As before let Q^D denote the quantity demanded of a good, and P denote the price of that good. Recall that the price of a good is not the only thing that affects quantity demanded. The quantity demanded for a good can also be affected by potential buyers' incomes, and by prices of *other* goods. Let I denote the total income of potential buyers of a good, and $\overline{P}$ denote the price of another good. Using these symbols, and equation that describes quantity demanded is:

$Q^D =$ _____ - _____ P + _____ $\overline{P}$ + _____ I

where the numbers that go in front of $\overline{P}$ and I might be positive or negative.

a) If the other good (with price $\overline{P}$) is a "substitute" for the first good, is the number that goes in front of $\overline{P}$ in the demand equation positive or negative? _____

b) If the other good (with price $\overline{P}$) is a "complement" for the first good, is the number that goes in front of $\overline{P}$ in the demand equation positive or negative? _____

c) Now consider the number that goes in front of income I. If the good with price P is a "normal" good, is the number that goes in front of I in the demand equation positive or negative? _____

d) If the good with price P is an "inferior" good, is the number that goes in front of I in the demand equation positive or negative? _____