Econ 362, Hanes
Second problem set on graphing

1) Consider a demand equation for a "normal" good. Q^D is the quantity demanded of the good. P is the price of the good.

I is the total income of potential buyers of the good.
$$Q^D = 10 - \frac{1}{2}P + 2I$$

a) Suppose $I = 5$. Enter that into the above equation and rearrange to get the equation that is plotted out as the demand curve.

$P = \underline{40} - \underline{2}\,Q^D$ Plot this curve on the graph below. Label the curve " D_a "

b) Now suppose $I = 10$. Enter *that* and rearrange to get the equation that is plotted out as the demand curve.

$P = \underline{60} - \underline{2}\,Q^D$ Plot this curve on the same graph below. Label the curve " D_b "

c) Draw an upward-sloping supply curve on the graph below, anywhere you like. Label the curve "S."

d) Consider the equilibrium price P^* that makes $Q^S = Q^D$. Does an increase in income I raise the equilibrium price, lower it, or have no effect on it?   Raise
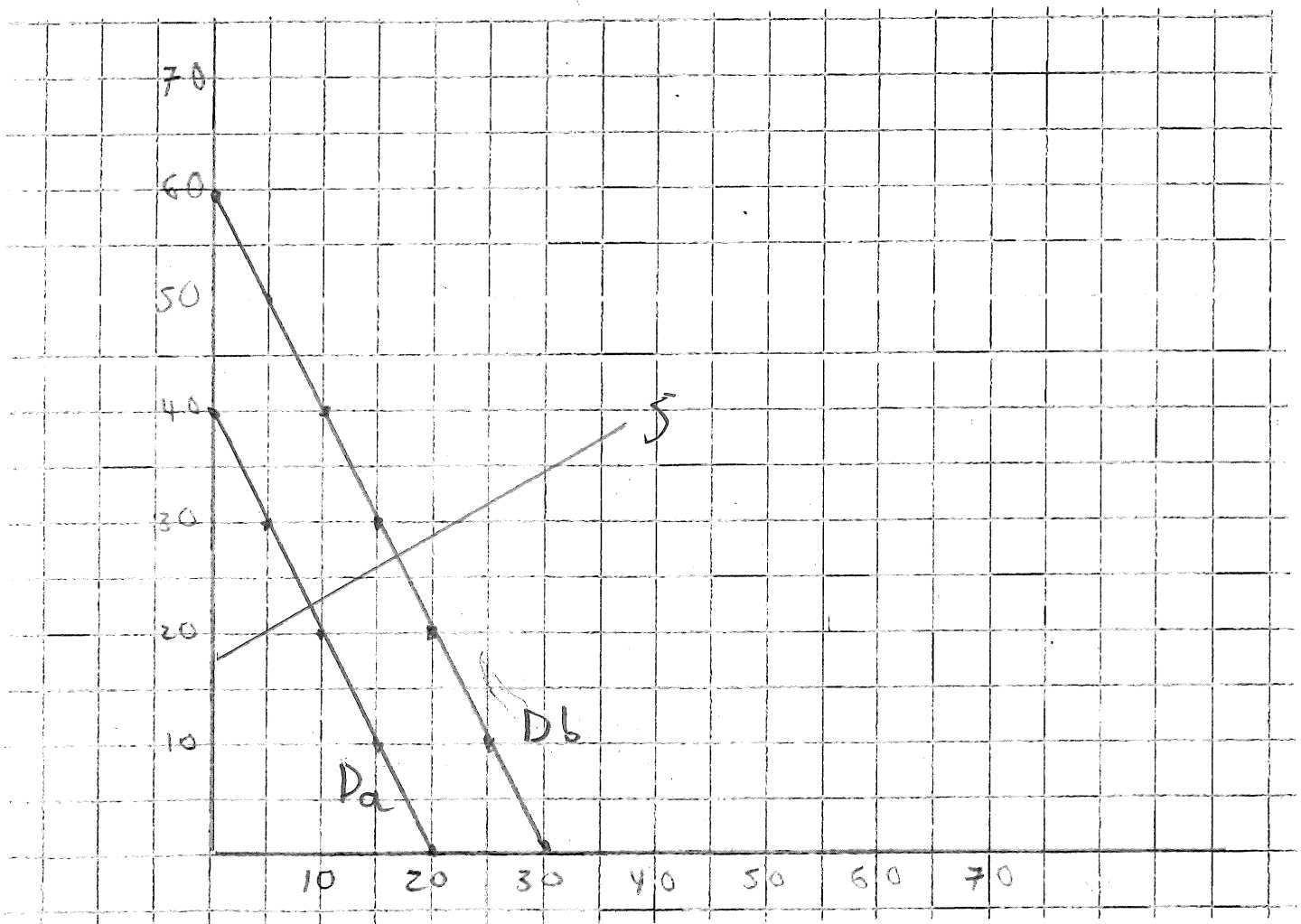
MORE ON NEXT PAGE

2) Now consider another demand equation with a constant (like *10* in the demand equation above), a coefficient on *P* (like *-1/2* in the demand equation above), and a coefficient on I (like *2* in the equation above). But now I don't want to be specific about the values of the constant and the coefficients. So I just write:

$$Q^D = a - bP + cI$$

I also don't want to be specific about the value of *I*.

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

$$P = \frac{a}{b} + \frac{c}{b}I - \frac{1}{b}Q^D$$

b) Imagine plotting this demand curve. What would the intercept be? Note: your answer is not going to be a number. It's going to be a collection of letters.

$$\frac{a}{b} + \frac{c}{b}I$$

What would the slope be? Again, your answer is not going to be a number. $-\frac{1}{b}$

c) What would happen to the demand curve if income *I* gets bigger? Does the demand curve shift up (often called "out"), or down (often called "back"), or stay in the same position? $\underset{\uparrow}{U_p}$

3) Take the same demand equation $Q^D = a - bP + cI$. Combine it with a supply equation written in the same vague way:

$$Q^S = d + eP$$

a) Using the supply equation together with the demand equation, solve for the equilibrium price *P**. Your answer is going to be a collection of letters.

$$P* = \frac{a + cI - d}{e + b} \quad \text{or} \quad \frac{a - d}{e + b} + \frac{c}{e + b}I$$

b) What does your answer to b) imply about the relationship between income *I* and the equilibrium price *P**? That is, does an increase in income tend to raise *P** or lower *P**?   Raise

Explain how your answer to b) tells you that.

Coeff on I is $\frac{c}{e+b}$, which is positive

c) Suppose income increases by exactly one unit, like from *10* to *11* or from *5* to *6*. What is the resulting change in *P**, exactly, in terms of the letters?

$$\triangle P = 1 \cdot \text{coefficient on } I = \frac{c}{e+b}$$