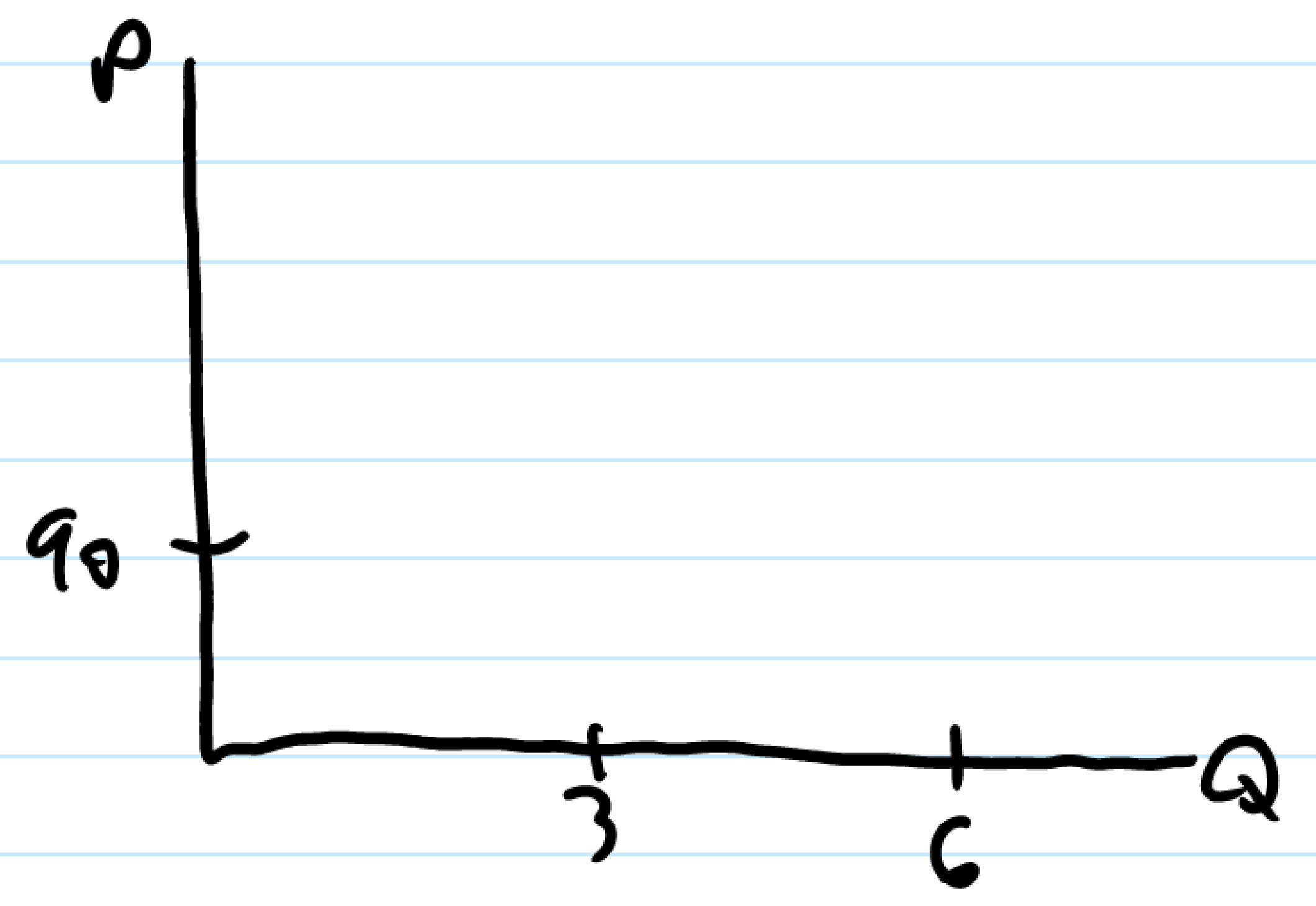
HW 5.2

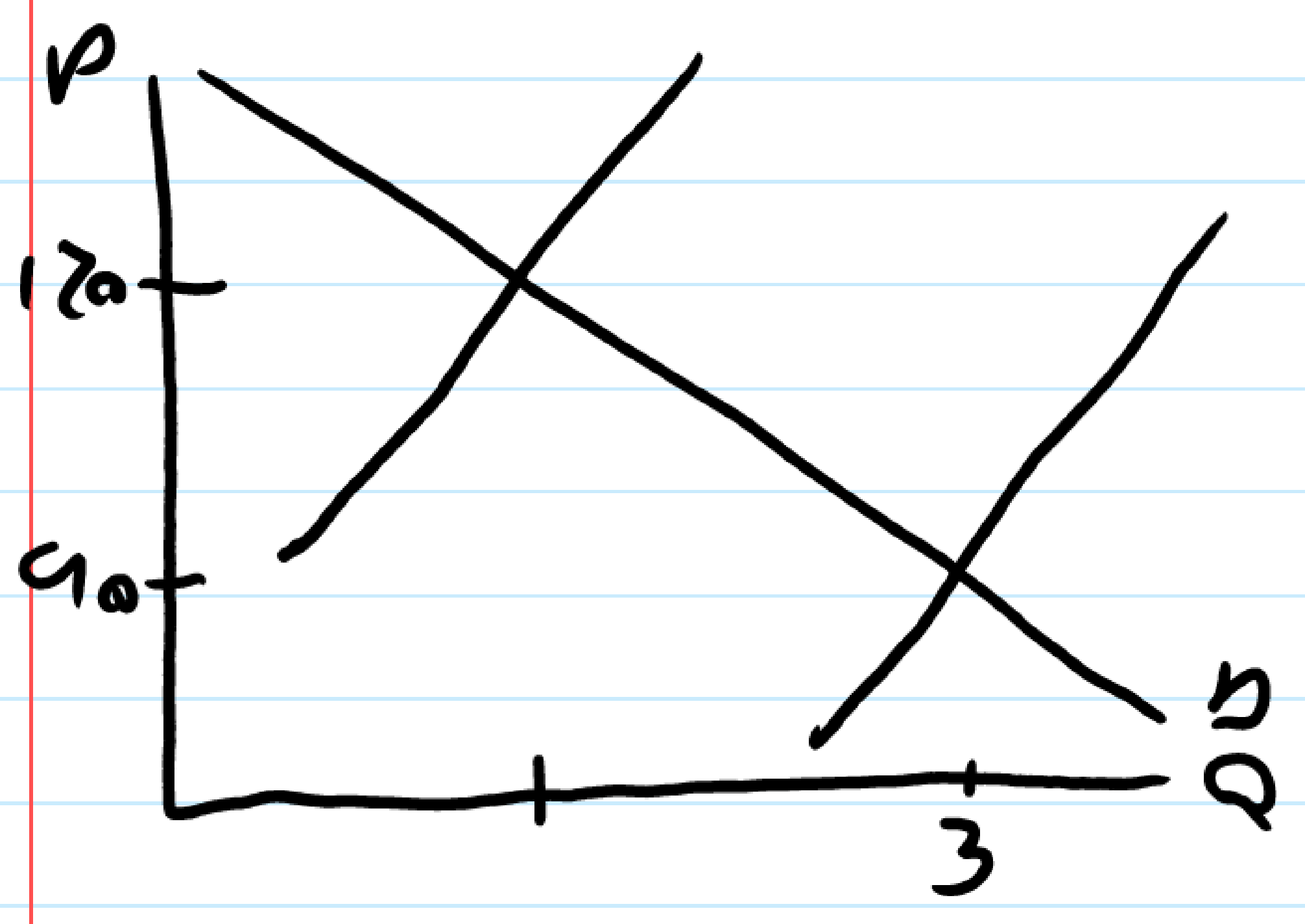
Friday, September 11, 2020 4:14 PM

Passed Solution review

A country imports 3 billion barrels of crude oil per year and domestically produces another 3 billion barrels of crude oil per year. The world price of crude oil is $90 per barrel. Assuming linear curves, economists estimate the price elasticity of domestic supply to be 0.25 and the price elasticity of domestic demand to be 0.1 at the current equilibrium.



a. Consider the changes in social surplus that would result from imposition of a $30 per barrel import fee on crude oil that would involve annual administrative costs of $250 million. Assume that the world price will not change as a result of the country imposing the import fee, but that the domestic price will increase by $30 per barrel. Also assume that only producers, consumers, and taxpayers within the country have standing. Determine the quantity consumed, the quantity produced domestically, and the quantity imported after the imposition of the import fee. Then estimate the annual social benefits of the import fee.



$\varepsilon^D = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} = -.1$

$\Delta Q = 30\left(\frac{-.1}{15}\right)$

$\Delta Q = -.2$ consumed

$\varepsilon^S = \frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q} = .25$

$\Delta Q = 30\left(\frac{.25}{30}\right) = .25$ Produced

$Q_D = 6 - .2 = 5.8$

$Q_S = 3 + .25 = 3.25$

$Q_D - Q_S = Q_I$

$5.8 - 3.25 = 2.55$

Forgot to do Parts B + C

b. Economists have estimated that the marginal excess burden of taxation in the country is 0.25 (see Chapter 3). Reestimate the net social benefits assuming that 20 percent of the increase in producer surplus is realized as tax revenue under the existing tax system. In answering this question, assume that increases in tax revenues less the cost of administrating the import fee are used to reduce domestic taxes.

CS = -177b

After tax P_S = 75b

Net tax gain = 95b

Net tax gain • MEFB = 23.75b

Net benefits = 16.75b

c. The reduction in the country's demand for imports may affect the world price of crude oil. Assuming that the import fee reduces the world price from $90 to $80 per barrel, and thus, the after-tax domestic price is $80 + $30 = $110 per barrel, a net increase in domestic price of $20 per barrel, repeat the analysis done in parts a and b.

$-.1 = (\Delta Q/\Delta P)(P/Q)$ ← quantity consumed

$\Delta q = (-.1)(\Delta P)(q/P)$

$\Delta q = (-.1)(20)(6b)(90)$

$\Delta q = -.133$ b

Change in domestic Supply

$\Delta q = (.25)\Delta P(q/P)$

$\Delta q = (.25)(20)(3b)(90)$

$\Delta q = .167b$

CS = 118.68 b

PS gain = 61.67 b

Net tax gain = 80.75b

Net social benefits = 47.01b