1) On its face, this tax is more regressive than the current system because poorer taxpayers would pay exactly the same marginal tax rate as wealthier taxpayers. This system might be more progressive than it looks, however, given the elimination of exemptions and deductions. Wealthier taxpayers would lose their home interest deductions, tax-preferred savings mechanisms, and other benefits; wealthy entrepreneurs would lose their business expense deductions. The anti-progressive nature of tax deductions—the fact that deductions are more valuable to high-bracket taxpayers—would end. As a result, some wealthier taxpayers may be more harmed by this change than the less wealthy.

2) If the tax is on the sale of rutabagas, the seller bears the statutory incidence, since the “sticker price” of rutabagas does not include the tax. Economic incidence is determined by relative elasticities. In this case, the quantity supplied is more responsive to a change in price, so the less elastic consumers will bear most of the economic incidence. To calculate the relative burdens, solve the equilibrium condition with and without the tax. Without the tax: \[2,000 – 100P = – 100 + 200P]\.

\[
\begin{align*}
2,000 – 100P &= 200(P – 2) – 100 \\
2,000 – 100P &= 200P – 500 \\
2,500 &= 300P \\
\text{Price} &= \$8.33
\end{align*}
\]

The consumers’ tax burden = (posttax price – pretax price) + tax payments by consumers = \$8.33 – \$7.00 + 0 \approx \$1.33.

The producers’ tax burden = (pretax price – posttax price) + tax payments by producers = \$7.00 – \$8.33 + \$2.00 \approx \$6.7.

In this case the consumer bears a larger share of the tax burden than the producer.

3) a. Deadweight loss is calculated as the area of a triangle, the height of which is the dollar amount of the tax and the base of which is the change in quantity purchased resulting from the tax. First, determine the change in quantity associated with this tax. Without the tax, equilibrium is \[240 – 6P = – 60 + 4P\], or \[300 = 10P\]. Equilibrium price is \$30, so equilibrium quantity is \(-60 + (4 \times 30) = 120 – 60 = 60\).

A tax levied on producers changes the supply function to \[Q = –60 + 4(P – 4)\] because the price the producers can keep from any sale is reduced by \$4. Recalculating equilibrium, \[240 – 6P = –60 + 4P – 16\], or \[316 = 10P\]. Equilibrium price is \$31.60, so equilibrium quantity is \[240 – 6(31.60) = 50.4\].

The change in quantity is \(60 – 50.4 = 9.6\), so the area of the deadweight triangle is \(\frac{1}{2} (9.6)(4) = 19.2\).

b. Intuitively you would expect the deadweight loss to be exactly the same. The legal liability for the tax does not change the economic incidence of the tax. In this case, the
height of the triangle is still the $4 tax. When the tax increases the price a consumer must pay, the new demand function is \( Q = 240 - 6(P + 4) \). The new equilibrium condition is \( 240 - 6P - 24 = -60 + 4P \), or \( 276 = 10P \). Price is $27.60, and quantity is \(-60(4 \times 27.60) = 50.4\), exactly the quantity that resulted when the tax was imposed on the producer.

4) The 20-year tax will be more efficient. As a general rule, a short-term, higher tax increase will impose more deadweight loss than a lower tax spread out over a longer period of time. This result follows from the fact that the efficiency loss of taxes increases at an increasing rate as the tax rate increases. A 1% tax is minimal, so distortions, in terms of otherwise beneficial transactions being deterred, are also minimal. In terms of the area of the deadweight loss triangle, transactions that would no longer take place are the ones closest to the non-tax equilibrium. Because these transactions are so close to the non-tax equilibrium, the total surplus they would have generated (the height of the deadweight loss triangle) is fairly small.

5) a. The maximum weekly consumption, in dollars, without a tax is \( 80 \times \$16 = \$1,280 \). A 10% tax reduces that amount to \( .9 \times \$1,280 = \$1,152 \), and a 20% tax reduces it to \( .8 \times \$1,280 = \$1,024 \). These give the \( y \)-intercepts of the budget constraints. The \( x \)-intercept, measuring leisure, is always 80 hours.

b. When the income effect outweighs the substitution effect, a lower tax leads to more leisure because a higher income allows a person to acquire more of a normal good, in this case leisure: