On the graph: P axis (vertical), Q axis (horizontal).

- Sd (supply curve), Dd (demand curve)
- $\$120$ and $\$90$ marked on P axis, with t (tax) bracket between them
- ΔPS (yellow region)
- ΔCS (green region)
- "imports pre" bracket
- Quantities: $\$3B$, $3.25B$, $5.8B$, $6B$
- $\Delta Q_s = 0.25$
- $\Delta Q_d = 0.2$
- imports post $= 2.55$

a)

How do we get ΔQ_s? From formula for PEoS: $\varepsilon_s = \dfrac{\Delta Q_s}{\Delta P} \cdot \dfrac{P}{Q}$

$\rightsquigarrow \Delta Q_s = \dfrac{\varepsilon_s \cdot Q_s \Delta P}{P} = \dfrac{0.25 \cdot 3 \cdot 30}{90} = 0.25$

$\Delta Q_d : \quad \varepsilon_d = \dfrac{\Delta Q_d \cdot P}{\Delta P \cdot Q_d} \rightsquigarrow \Delta Q_d = \dfrac{\varepsilon_d \cdot Q_d \Delta P}{P} = \dfrac{0.1 \cdot 6 \cdot 30}{90} = 0.2$

New imports: $5.8B - 3.25B = 2.55$

Change in PS $= \dfrac{\$30 \cdot 0.25}{2} + \$30 \cdot 3 = \$93.75$ benefit

Change in CS $= \$30 \cdot 5.8 + \dfrac{0.2 \cdot 30}{2} = \$177$ cost

Change in tax revenue $= \$30 \cdot \text{imports} = \$30 \cdot 2.55 = 76.5$ benefit

Less the admin cost $= \$0.25B$ cost

$$\boxed{\text{Net benefits:} \quad 93.75 + 76.5 - 0.25 - 177 = -7}$$

b) 20% of the producer surplus $\longrightarrow$ tax revenue

So $\triangle$ PS $= 0.8 \cdot \$93.75 = 75$
benefit

$\triangle$ CS $=$ same, i.e. -177
cost

$\triangle$ tax revenue $= 76.5 + 0.2 \cdot 93.75 - 0.25 = \$95B$
   benefit   same as before   tax on producer   admin
                             surplus   cost

METB $= 0.25 \cdot 95 = 23.75$
benefit

$$\boxed{\text{NB} = 75 - 177 + 95 + 23.75 = 16.75}$$

Additional exercise: how low would the METB have to be to make NB switch back to 0?