

4.1. Systems of linear Equations in 2 variables

① Solve systems of linear equations by substitution.

② _____ elimination.

③ _____ graphing

using TI-84.

④ Solve application problems

Method of Substitution.

$$3x + 5y = -9$$

$$x + 4y = -10$$

① $x = -10 - 4y \longrightarrow$ Solve one of the equations for either x or y

② $3(-10 - 4y) + 5y = -9 \longrightarrow$ Substitution

③ $-30 - 12y + 5y = -9$

$$-30 - 7y = -9$$

$$-7y = -9 + 30 = 21$$

$$y = -3$$

Solve the equation for that variable

④ $x = -10 - 4(-3)$
 $= -10 + 12 = 2$

Find the other variable

$$x = 2 ; y = -3$$

$$(2, -3)$$

Method of Elimination

$$3x + 5y = -9$$

$$x + 4y = -10$$

① Multiply second equation by -3 .

$$3x + 5y = -9$$

$$-3x - 12y = 30$$

② Add 2 equations side-by-side:

$$-7y = 21 \quad ; \quad y = -3$$

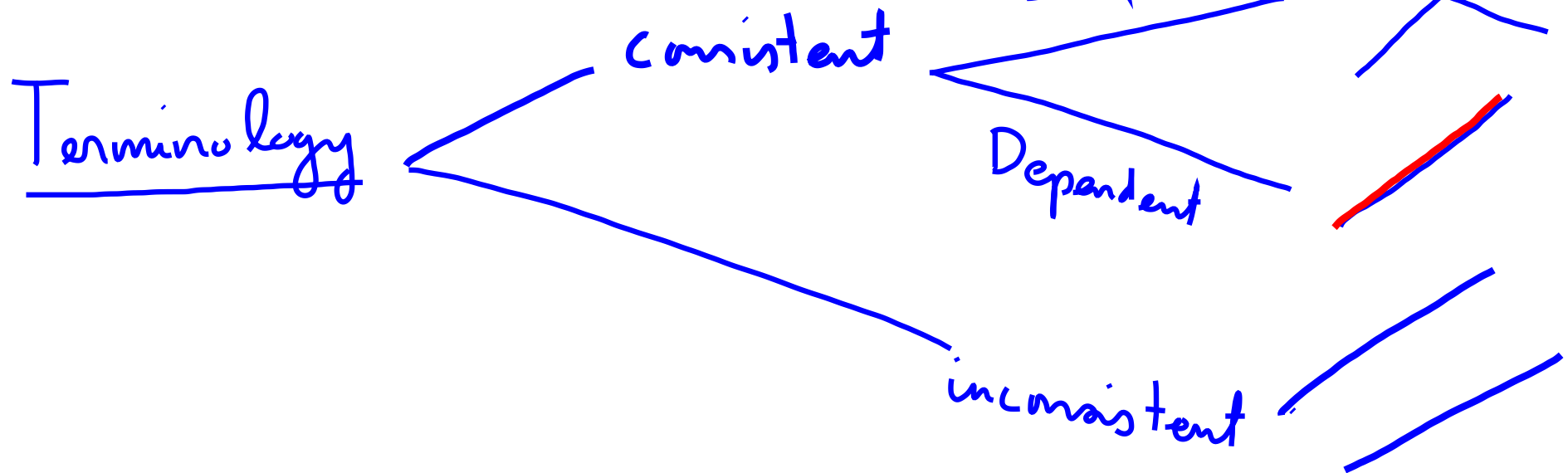
③ Find x .

$$x + 4(-3) = -10$$

$$x - 12 = -10 \quad ; \quad x = 2$$

$\left. \begin{array}{l} -7y = 21 \quad ; \quad y = -3 \\ x + 4(-3) = -10 \\ x - 12 = -10 \quad ; \quad x = 2 \end{array} \right\} (2, -3)$

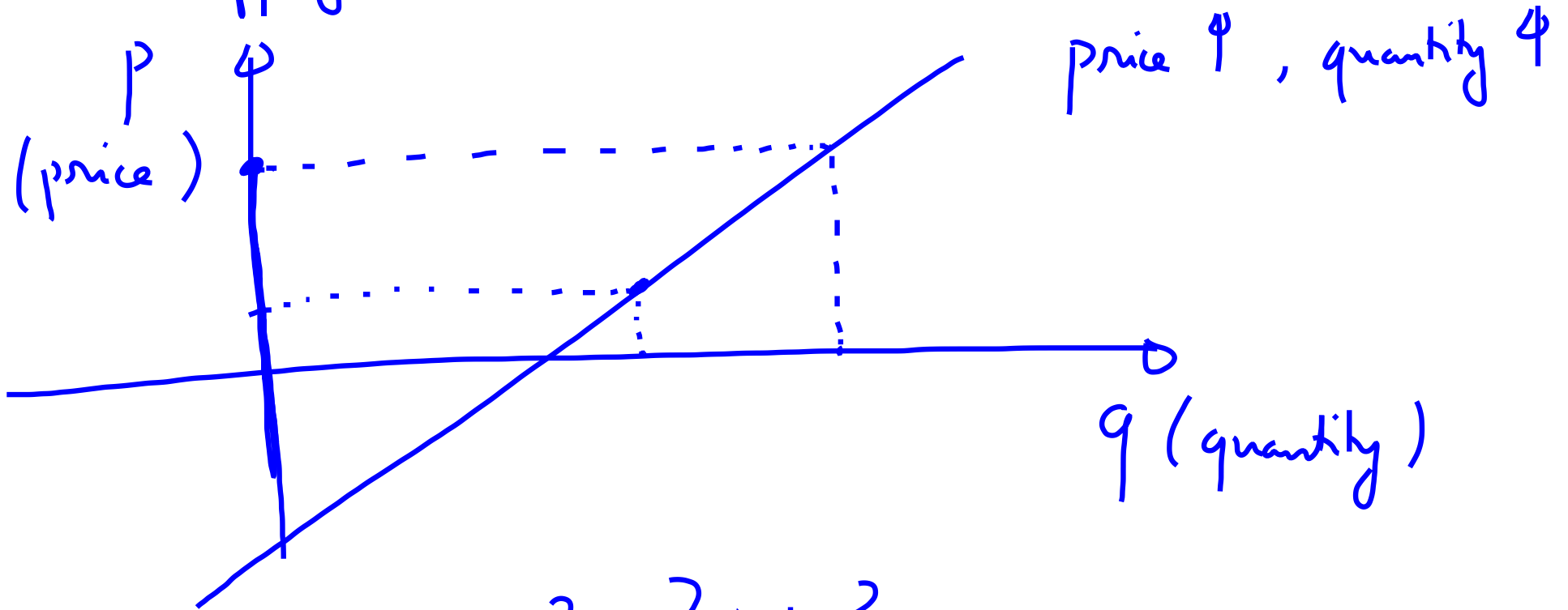
Graphing using TI - 84



Applications:

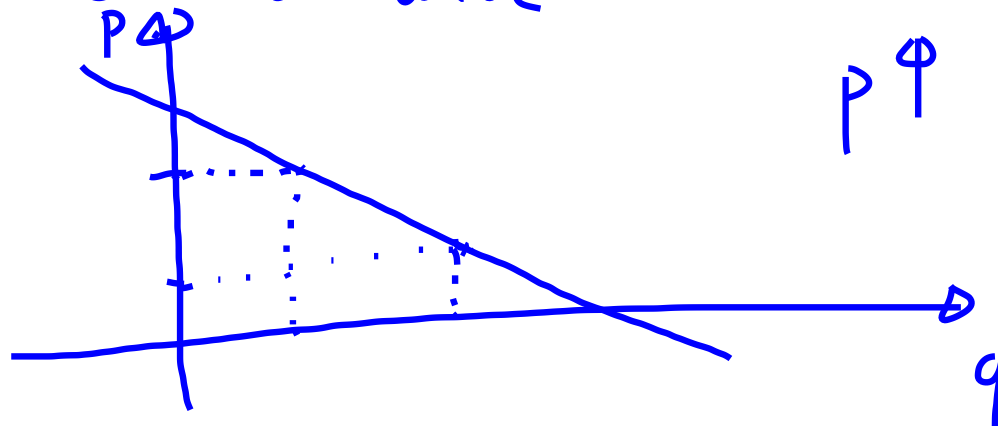
Supply / Demand

Linear Supply curve : From supplier perspective



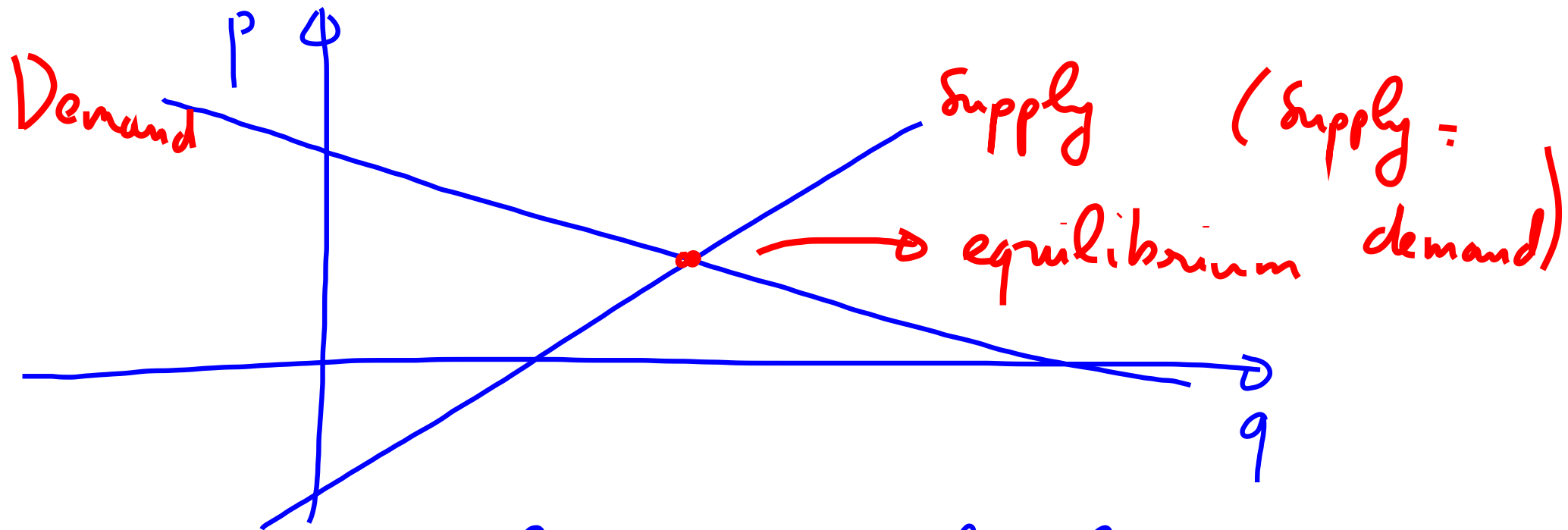
$$P = 2Q + 3$$

Linear Demand Curve : Consumer perspective



$P \downarrow$, $Q \uparrow$

negative slope



E.g. Supply equation for light bulbs:

$$P = 1.04Q - 7.03 \quad (Q \text{ is in thousands of units})$$

Demand equation:

$$P = -0.81Q + 7.5$$

Find the equilibrium point? $Q \approx 7.8$; $P \approx 1.1$
 7800 : \$1.1

#9, #10 h/w