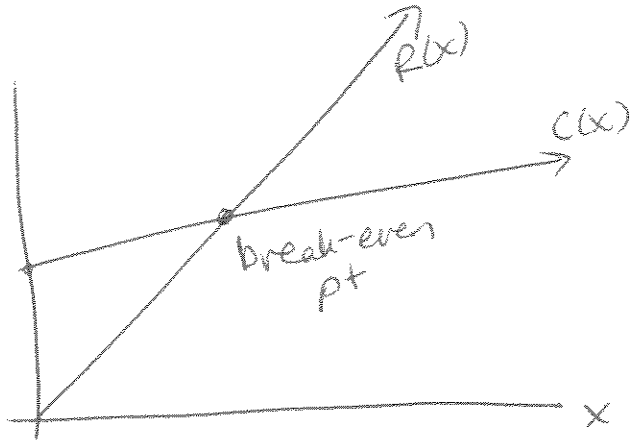
1.5 Linear Business Applications

Two Main Types

Profit / Revenue / Cost

$P = R - C$

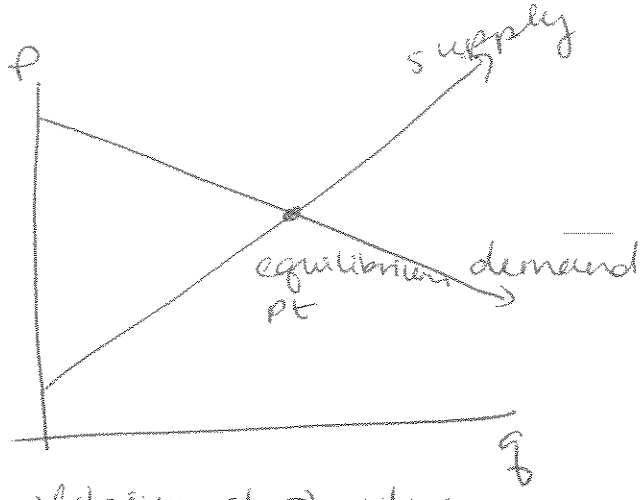
x = # units produced & sold



break-even pt ⇒ where profit is zero

Supply / Demand

p = price
q = quantity



equilibrium pt ⇒ where quantity demanded = quantity supplied at a certain price

Ex 1 (#4) Market research has shown for a sporting event, supply for tickets is $20p - q = 100$ & demand is $4p = 6260 - 5q$.

(a) How many tickets will be purchased if price is \$30? \$100?

Ex 1 (cont) (b) How many tickets will the sponsors of the event be willing to sell if the ticket price is
$30? 100

(c) What is the equilibrium pt for this market?

1.5 (cont)

Ex 2 Fixed costs are $92,000 to publish a certain cookbook and variable costs are $2.10 per book. If the book sells for $15 each, (a) how many books must be sold to break even?

(b) what is marginal revenue, MR?

MR = slope of revenue line

(c) what is marginal profit? (MP)

1.5 (cont)

Ex 3 Find market equilibrium pt for these demand + supply curves.

demand: $p = -4q + 300$

supply: $p = 2q + 50$

Ex 4 (#20) A distributor will supply 10,000 calendars if the price is $2 each or will supply 8,000 calendars if the price is $1.25. What is the supply equation?

1.6 Linear Inequalities in Two Variables

Vocab **Linear Inequality** ⇒ can be written in form $ax + by < c$, $a, b, c \in \mathbb{R}$

Linear System of Inequalities ⇒ two or more linear inequalities we want to solve simultaneously.

Solution Set ⇒ the region that solves all inequalities.

Ex 1 Graph solns.

(a) $2x - \frac{3}{5}y \geq \frac{-2}{5}$

(b) $4x + 3y \leq 9$

1.6 (cont)

Ex 2 Solve + graph solutions (on 2d plane).

$$x+y \leq \frac{1}{2}$$

$$2x+\frac{3}{4}y<3$$

$$\frac{1}{3}x+\frac{1}{2}y>-2$$

$$\frac{1}{3}y-\frac{2}{3}x<5$$

1.6 (cont)

Ex 3 Solve + graph solutions.

$$x + 7y < -15$$
$$5x - y > -3$$
$$x - 2y \leq 12$$

1.6 (cont)

Ex 4 (#40) A furniture company makes and sells 2 types of tables, one small + one large. Each large table requires two hours of assembly and two hours of finish work. Each small table requires 3 hours of assembly and $1\frac{1}{4}$ hours of finish work. The assembly shop is open a maximum of 12 hours per day. The finishing shop is available for 10 hours per day. Find the system of linear inequalities to represent this and graph solutions.