Panel 1

Last Time

Solving equations <

Equilibrium point.

Quadratic function:

Revenue Function:

1

Panel 2

Quiz #2 (Warm-up)

① If the price of a product is $10, they sell 20 units, but if the price drops to $5, they sell 40 units

a) Assuming the relationship is linear, find the price as a function of quantity, $p(q)$

b) Is this a demand or a supply function?

2

Panel 3

Suppose the demand function for a product, which gives the price per unit for a given production level, is p(q) = 1000 – 4q. Find the level of production that maximizes the revenue, and determine that maximum revenue.

3

Panel 4

Quiz #2

Name: _____

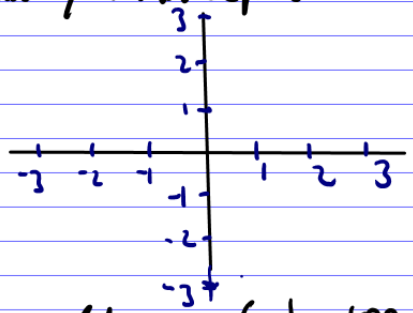
① Find equation of line through (2,4) and (6,12]

② Suppose $p(q) = 2q + 5$ is a supply equation, while $p(q) = -3q + 10$ is the demand equation.
Find equilibrium point

4

Panel 5

③ Graph $f(x) = x^2 - 2x - 3$ and mark the vertex and all x- and y-intercepts



④ If the price per quantity sold is $p(q) = 100 - q$ find the quantity that yields maximum profit.

5

Panel 6

Not all systems of equations are linear:

Solve $x^2 - 2x + y - 7 = 0$

$3x - y + 1 = 0$

$x^2 + x - 6 = 0$

$(x+3)(x-2) = 0$

$x = 2, -3$

Solve $y = \sqrt{x+2}$

$x + y = 4$

$0 = x^2 - 8x + 16$

$x + 2 = x^2 - 8x + 16$

$x + 2 = (4-x)^2$

$\sqrt{x+2} = 4 - x$ $\quad | (\ )^2$

$x + \sqrt{x+2} = 4$

$(x-7)(x-2) = 0$ $\quad | \sqrt{\ }$

$x = 7$

$x = 2$

6

Panel 7

Cost, Revenue, Profit

$R(q) = p(q) \cdot q$ Revenue

Cost function has 2 parts: fixed cost (for $q=0$ items) FC
variable cost VC

Profit: $P(q) = R(q) - C(q)$

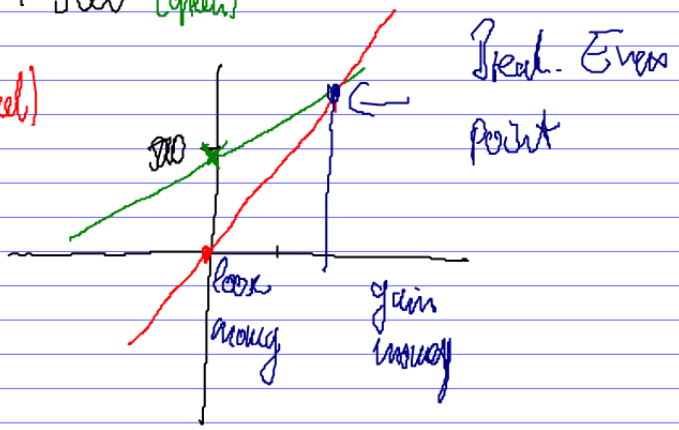
7

Panel 8

Example: A company sells a product for \$8 per unit. Fixed costs are \$5000 and variable costs are \$3. Graph cost and revenue functions.

$C(q) = 3q + 5000$ (green)

$R(q) = 8q$ (red)



8

Panel 9

Break-Even Point:

That point for which

$R(q) = C(q)$.

Previous example. $8q = 3q + 5000$

$5q = 5000$

$q = 1000$ — at least produce this much to make a profit

Panel 10

A cost function is given as $C(q) = 2q^2 + 10$. Each item sells for \$20. What is the fixed cost? \$10

Find the profit function. What is the break-even point?

Fixed cost $C(0) = 10$

$P(q) = R - C = 20q - (2q^2 + 10) = -2q^2 + 20q - 10 = 0$

$q^2 - 10q + 5 = 0$

$q = \frac{10 \pm \sqrt{100 - 20}}{2} = \frac{10 \pm \sqrt{80}}{2}$ = HW