

MA162: Finite mathematics

Jack Schmidt

University of Kentucky

September 24, 2012

SCHEDULE:

- HW 2.6 is due Wednesday, Sep 26th, 2012.
- HW 3.1 is due Friday, Sep 28th, 2012.
- Exam 1 is Monday, Sep 24th, 5:00pm-7:00pm in BS107 (Tuesday REC) and BS116 (Thursday REC).
- Alternate exam (appt. only) Monday, Sep 24th, 3:00pm-5:00pm in CB212.

Today we will review the practice exam, chapter 1 style.

Practice exam: chapter 1.3

1. Producing 15 items costs \$300, but producing 20 items costs \$320. Assuming a linear model of production costs, how much would producing 16 items cost?

Practice exam: chapter 1.3

1. Producing 15 items costs \$300, but producing 20 items costs \$320. Assuming a linear model of production costs, how much would producing 16 items cost?
 - Answer: How much more did we produce? How much more did it cost? Now use proportion.
 - $20 - 15$ is 5 more items, $\$320 - \300 is \$20 more dollars
 - That is \$20 extra for 5 extra items
 - That is \$4 extra for 1 extra item
 - 16 is "1 extra" so we need "\$4 extra", that is, \$304

Practice exam: chapter 1.4

2. Where do the lines given by the following equations intersect?
 $x + y = 12$ and $2x + 3y = 31$

Practice exam: chapter 1.4

2. Where do the lines given by the following equations intersect?

$$x + y = 12 \text{ and } 2x + 3y = 31$$

- You can solve this many ways (be sure to show your work)
- Balancing is easy:

$$\begin{array}{l} x + y = 12 \\ 2x + 3y = 31 \end{array} \xrightarrow{2R_1} \begin{array}{l} 2x + 2y = 24 \\ 2x + 3y = 31 \end{array} \xrightarrow{R_2 - R_1} \begin{array}{l} 2x + 2y = 24 \\ 0x + 1y = 7 \end{array}$$

$$\xrightarrow{R_1 - 2R_2} \begin{array}{l} 2x + 0y = 10 \\ 0x + 1y = 7 \end{array} \xrightarrow{\frac{1}{2}R_1} \begin{array}{l} 1x + 0y = 5 \\ 0x + 1y = 7 \end{array}$$

- $(x = 5, y = 7)$

Practice exam: Chapter 1.3 (Cost,Revenue,Profit)

7. A company produces calculators. The fixed costs of production total to \$1000, while the marginal costs are only \$10 per calculator. If the calculators sell for \$50 each, what is the break-even production and the break-even cost?

Practice exam: Chapter 1.3 (Cost,Revenue,Profit)

7. A company produces calculators. The fixed costs of production total to \$1000, while the marginal costs are only \$10 per calculator. If the calculators sell for \$50 each, what is the break-even production and the break-even cost?
- Be sure to write out the cost function and revenue function and describe what “break-even” means

$C(X) = \$10X + \1000 is the cost

$R(X) = \$50X$ is the revenue

“Break-even” means $R = C$

- $\$50X = \$10X + \$1000$
- $\$40X = \1000
- Product $X = \$1000/\$40 = 25$ calculators to break-even
- Cost is $\$1000 + (25)(10) = \1250

Practice exam: 1.4 (Supply-demand)

9. Supply X is given by $X = 45P + 100$ when the price P remains between \$5 and \$10 per unit. You know that at \$5 per unit, 500 will be demanded, and at \$10 per unit only 100 will be demanded. What is the equilibrium price? What is the equilibrium quantity?

Practice exam: 1.4 (Supply-demand)

9. Supply X is given by $X = 45P + 100$ when the price P remains between \$5 and \$10 per unit. You know that at \$5 per unit, 500 will be demanded, and at \$10 per unit only 100 will be demanded.

What is the equilibrium price? What is the equilibrium quantity?

- First find the demand equation: $X = AP + B$ solve for A and B using the known values of (X, P) .

- $500 = A(\$5) + B$, $100 = A(\$10) + B$,

so subtract to get $\$400 = (-\$5)(A)$ and $A = -80$ so $B = 900$

$X = 900 - 80P$ is the demand equation

- Equilibrium has both X s equal:

$$45P + 100 = 900 - 80P$$

$$125P = 800,$$

- Equilibrium price is $P = \$6.40$, Equilibrium quantity is $X = 388$