



MATH 140: WEEK-IN-REVIEW 2 (2.2 & 2.3)

Problem 1 You bought a gadget for \$17,000. According to the depreciation schedule, the value of the gadget will drop by the same amount every year until the gadget reaches salvage, or scrap, value. The value of the gadget after two years is \$15,300.

(a) Determine $V(t)$, the value of the gadget (in dollars) after t years.

(b) What is the rate of depreciation of the gadget?

(c) After how many years does the gadget reach scrap value?

(d) Determine the value of the gadget after 8 years.

(e) Determine the value of the gadget after 25 years.



Problem 2 *An item was purchased in 2010 for \$12,000. If the item depreciates linearly over a 15 year period with a scrap value of \$6000,*

(a) Determine the value of the item in 2018.

(b) Determine the value of the item in 2026.



Problem 3 *A company making keys has fixed costs of \$15,000 each month. It costs this company \$1 to make each key and each key sells for \$5.*

(a) Determine the linear cost, revenue, and profit functions for this company.

(b) How much will the company profit if 2500 keys are made and sold?

(c) How many keys must be sold in a month in order to have a profit of \$10,000?



Problem 4 *A gadget company finds that the daily total cost of producing 200 gadgets is \$14,000. It also finds that if no gadgets are produced, the company still has daily costs of \$10,000. Each gadget sells for \$26.*

(a) *What is the production cost per gadget?*

(b) *Determine the company's linear cost, revenue, and profit functions.*



Problem 5 *A manufacturer of clocks, has a monthly fixed cost of \$48,000 and a production cost of \$8 for each clock manufactured.*

(a) *What is the selling price of the clocks, if the company has a profit of \$112,000 when selling 5,000 clocks?*

(b) *What is the profit function for the company?*



Problem 6 Given $x =$ the number of figurines supplied or demanded per month and $p =$ the unit price of a figurine (in dollars), Equation 1 is $-5x + 2p = 60$ and Equation 2 is $3x + 2p = 300$, answer the following:

(a) Which equation is the demand equation? How do you know?

(b) How many units will consumers demand if the figurines are free?

(c) What is the highest price consumers are willing to pay for the figurines?

(d) Suppliers will only provide the figurines if the price is above what value?



Problem 7 Producers will market 500 books when the price is \$25 per book. Consumers will take 10,000 books if they are free. For each dollar rise in the price of a book, consumers will buy 200 fewer books, while producers will provide 100 additional books.

(a) Determine the linear supply and demand equations, $p(x)$, where x is the number of books provided or bought at a price of p dollars.

(b) At what price will 1625 books be supplied?

(c) How many books will be demanded at a price of \$13.50?



Problem 8 Find the exact intersection point of the lines $13x - 7y = 11$ and $-3x + 8y = 15$.

Problem 9 Given the system:

$$-2x + 3y = 9$$

$$kx - 2y = -6$$

For what value(s) of k is/are there

(a) infinitely many solutions?

(b) no solutions?

(c) exactly one solution?



Problem 10 Solve the following system of equations.

$$-2y + 3x = 15$$

$$-6x + 4y = 10$$

Problem 11 Solve the following system of equations.

$$8x - 4y = 20$$

$$-2x + y = -5$$



Problem 12 Given a company has a cost function of $C(x) = 20x + 10000$ and a profit function of $P(x) = 6x - 10000$, where x represents the number of gadgets made/sold by the company, and cost and profit are given in dollars,

(a) Determine the company's break-even point.

(b) Is this a "true" (or realistic) break-even point? Why or why not?



Problem 13 Determine the equilibrium point for a marketplace with demand and supply for x record players (in units of 100) given by $p(x) = -1.5x + 150$ and $p(x) = 2.5x + 30$, respectively, where p is in dollars. Then, write a sentence explaining the meaning of the coordinates of the point found, in the context of the problem.