

Solutions to HW 4

1.3, 48 $T(20) = 2.25 * 20 + 17.69 = 57.69$. The per capita tax burden in 2000 was 5769 dollars.

1.3, 50 (a) The slope is -0.03, and the p -intercept is 32.88.

(b) The percentage of high school students smoking decreases by 0.03 per year.

(c) In 1975, the 32.88 percent of high school students were smoking.

1.3, 56 $y = 5.19 + 51.91x$.

1.3, 60 (a) Yes, it is 0.02.

(b) Use the point-slope form:

$$y - 0.11 = 0.02(x - 5) \Leftrightarrow y = 0.02x + 0.21.$$

1.3, 64 $y = -4000x + 960,000$.

1.5, 44 Let A be the amount in cc of the 40% solution, and B the amount in cc of the 10% solution. Since the final solution should be 25cc, we see that $A + B = 25$. Moreover, since the final solution should be 25cc of a 28% solution, it should contain 7cc of plant nutrient. On the other hand, A cc of a 40% solution contain $0.4A$ cc of plant nutrient and similarly B cc of a 10% solution contain $0.1B$ cc of plant nutrient. Hence we need that $0.4A + 0.1B = 7$. The solution to this system of equations is $A = 15, B = 10$.

1.5, 46 The total intake of medication is 56 mg, hence $A + B = 56$. The ratio of the dosage of A to the dosage of B is 5 to 8, hence $\frac{A}{B} = \frac{5}{8}$, i.e. $8A = 5B$. The total amount of medication A per day is 19.46, and the total amount of medication B per day is 31.13. Hence the dosage for A is 3.24mg, and the dosage for B is 15.565mg.

1.5, 48 Let P denote the pounds of peanuts, and C the pounds of Cashews. The wholesaler wants to make a mix of 100 pounds, i.e., $P + C = 100$. The total price of a mix of P pounds of peanuts and C pounds of Cashews is $2.8P + 5.3C$. The wholesaler wants the total mix to cost 330 dollars, so we get a second equation $2.8P + 5.3C = 330$. So he needs to use 20 pounds of Cashews and 80 pounds of peanuts.

1.5, 52 Let s be the glasses of skim milk, m the number of quarter-servings of beef, and b the number of 2-slice servings of bread. For each nutrient we get an equation. If one consumes s glasses of milk, m quarter servings of beef and b 2-slice servings of bread, one will get $0.1s + 3.4m + 2.2b$ mg of iron, $8.5s + 22m + 10b$ g of protein, and $1s + 20m + 12b$ g of carbohydrates. Hence we need to solve the system of linear equations

$$0.1s + 3.4m + 2.2b = 10.5$$

$$8.5s + 22m + 10b = 94.5$$

$$s + 20m + 12b = 61.$$

Solving this system of equations, we see that the person should drink 5 glasses of skim milk, eat 1 serving of meat, and 3 servings of bread.

1.6, 04 (a) $P(x) = R(x) - C(x) = 300x - 3300$.

(b) $P(351) = 102300$.

(c) The break even point is when $P(x) = 0$, i.e., $x = 11$. So at least 11 items have to be sold to avoid losing money.