

1.4.D2

Table 1.29 gives the cost, $C(n)$, of producing a certain good as a linear function of n , the number of units produced. Use the table to answer Problems 35–37.

Table 1.29

n (units)	100	125	150	175
$C(n)$ (dollars)	11000	11125	11250	11375

35. Evaluate the following expressions. Give economic interpretations for each.

- (a) $C(175)$ (b) $C(175) - C(150)$
 (c) $\frac{C(175) - C(150)}{175 - 150}$

36. Estimate $C(0)$. What is the economic significance of this value?

37. The *fixed cost* of production is the cost incurred before any goods are produced. The *unit cost* is the cost of producing an additional unit. Find a formula for $C(n)$ in terms of n , given that

$$\text{Total cost} = \text{Fixed cost} + \text{Unit cost} \cdot \text{Number of units}$$

38. In a college meal plan you pay a membership fee; then all your meals are at a fixed price per meal.

- (a) If 90 meals cost \$1005 and 140 meals cost \$1205, write a linear function that describes the cost of a meal plan, C , in terms of the number of meals, n .
 (b) What is the cost per meal and what is the membership fee?
 (c) Find the cost for 120 meals.
 (d) Find n in terms of C .
 (e) Use part (d) to determine the maximum number of meals you can buy on a budget of \$1285.

39. An empty champagne bottle is tossed from a hot-air balloon. Its upward velocity is measured every second and recorded in Table 1.30.

- (a) Describe the motion of the bottle in words. What do negative values of v represent?
 (b) Find a formula for v in terms of t .
 (c) Explain the physical significance of the slope of your formula.
 (d) Explain the physical significance of the t -axis and v -axis intercepts.

Table 1.30

t (sec)	0	1	2	3	4	5
v (ft/sec)	40	8	-24	-56	-88	-120

DO

#s 37-44
(skip #40)

41. The demand for gasoline can be modeled as a linear function of price. If the price of gasoline is $p = \$3.10$ per gallon, the quantity demanded in a fixed period is $q = 65$ gallons. If the price rises to \$3.50 per gallon, the quantity demanded falls to 45 gallons in that period.

- (a) Find a formula for q in terms of p .
 (b) Explain the economic significance of the slope of your formula.
 (c) Explain the economic significance of the q -axis and p -axis intercepts.

42. The solid waste generated each year in the cities of the US is increasing.¹⁸ The solid waste generated, in millions of tons, was 88.1 in 1960 and 239.1 in 2000. The trend appears linear during this time. 1960 = year 0

- (a) Construct a formula for the amount of municipal solid waste generated in the US by finding the equation of the line through these two points.
 (b) Use this formula to predict the amount of municipal solid waste generated in the US, in millions of tons, in the year 2020.

43. Find the equation of the line l , shown in Figure 1.31, if its slope is $m = 4$.

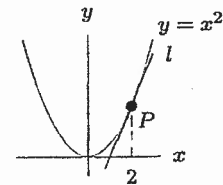


Figure 1.31

44. Find a formula for the line intersecting the graph of $f(x)$ at $x = 1$ and $x = 3$, where

$$f(x) = \frac{10}{x^2 + 1}$$

¹⁸<http://www.epa.gov/osw/nonhaz/municipal/pubs/msw2008rpt.pdf>, accessed November 23, 2009.