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2-4   Fixed and Variable Expenses

Exercises

1. The fixed expenses for producing widgets are $947,900. The labor and materials required for each widget produced costs $16.44. Represent the total expenses as a function of the quantity produced.

2. A widget manufacturer's expense equation is $E = 14q + 29,000$. What are the variable costs to produce one widget?

3. The Catania Cat Corporation manufactures litter boxes for cats. Their expense function is $E = 4.18q + 82,000$. Find the average cost of producing 10,000 litter boxes.

4. The expense function for a certain item is $E = 2.95q + 712,000$. Express the average cost of producing q items algebraically.

5. The Mizzi Corporation has created a demand function for one of its wrench sets. It expresses the quantity demanded in terms of the wholesale price p, and was found by surveying retailers and using linear regression. The demand function is $q = -98p + 5,788$. Their expense function is $E = 23q + 68,000$. Express the expense function as a function in terms of p.

6. A corporation's expense function is $E = 7.50q + 34,000$. The demand function was determined to be $q = -5.5p + 6,000$. Express the expense function in terms of the price.

7. Wexler's manufactures widgets. They create a monthly expense equation of all expenses in one month of manufacturing. The expense equation is $E = 2.10q + 7,600$. They plan to sell the widgets to retailers at a wholesale price of $3.50 each.

   a. How many widgets must be sold so that the income from the widgets is equal to the expenses of producing them? Round to the nearest widget.

   b. If the company sells 2,900 widgets, how much money will they lose?

8. Find the break-even point for the expense equation $E = 6.25q + 259,325$ and the revenue function $R = 12q$.

9. The NFW Corporation produces a product with fixed expenses of f dollars and variable expenses of v dollars per item. If q represents quantity produced, write the expense function.

10. The Burden Corporation manufactures racquets. The racquets have the expense equation $E = rq + f$. What is the average cost of producing x racquets?

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11. The DiMonte Corporation invented a new type of sunglass lens. Their variable expenses are $12.66 per unit, and their fixed expenses are $111,200.

    a. How much does it cost them to produce one lens? 15,000 lenses?

    b. Express the expense function algebraically. What is the slope of the expense function?

    c. If the slope is interpreted as a rate, give the units to use.

    d. What is the average cost, to the nearest cent, of producing 15,000 lenses?

    e. What is the average cost, to the nearest cent, of producing 17,000 lenses?

    f. As the number of widgets increased from 15,000 to 17,000, did the average expense per lens increase or decrease?

12. The expense equation for a new business venture is $E = 4.55q + 28,500$. If the owners have $100,000 to start up this operation, what quantity can they produce initially if they spend all of this money on production? Round to the nearest hundred units.

13. The graph shows Expense (E) and Revenue (R) functions and several different levels of quantity produced.

    a. What are the coordinates of the break-even point?

    b. If U units are produced, will there be a profit or a loss?

    c. Compare the profit made if W units are produced to the profit made if T units are produced. Which level of production yields a greater profit? How can you tell?
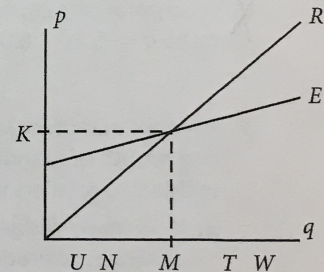
14. The fixed costs of producing a Winner Widget are f dollars. The variable costs are v dollars per widget. If the average cost of producing q Winner Widgets is a, express the fixed cost f in terms of a, v, and q.

15. Explain why the y-intercept of the expense function is never 0, while the y-intercept of the revenue function is always 0.