

Applications

What is more agreeable than one's home?

—Marcus Tullius Cicero, ancient Roman writer, scholar, and statesman

- Explain how this quote can be interpreted in light of what you have learned.
- Use the interval 25–30% to find the monetary range that is recommended for the monthly rental budget in each situation. Round to the nearest dollar.
 - Mark makes \$86,000 per year. **\$1,792–2,150**
 - Linda makes \$7,000 per month. **\$1,750–2,100**
 - Meghan makes \$1,500 per week. **\$1,625–1,950**
- Jessica's financial advisor believes she should spend no more than 28% of her gross monthly income for her rent. She has determined that amount is \$1,400 per month. Based on this amount and her advisor's recommendation, what is Jessica's annual salary? **\$60,000**
- Abe makes \$18.50 per hour. He works 37 hours a week. He pays 23% of his gross earnings in federal and state taxes and saves 5% of his monthly gross income. He is considering renting an apartment that will cost \$1,500 per month.
 - Is this monthly rental fee within the recommended 25–30% housing expense range? **No**
 - Based on his expenses, can he make the monthly payments? **He probably cannot, since he will have only about \$600 for all other expenses.**
- Rachel is considering moving into a one-bedroom apartment in Glen Gardens. The apartment has a monthly rent of \$1,300. At the right are the fees that she has been quoted. How much is she expected to pay up front in order to rent this apartment? **\$5,808**
- Milena has a gross biweekly income of \$2,200. She pays 18% in federal and state taxes, puts aside 10% of her income to pay off her school loan, and puts 5% of her income aside for savings. She is considering an apartment that rents for \$1,200 per month.
 - Is this monthly rental fee within the recommended 25%–30% housing expense range? **Yes**
 - Based on her expenses, can she make the monthly payments? **Yes**
- A moving helper company gave Mike these two quotes. Use a system of equations to determine the hourly rates for loading/unloading and packing/unpacking. **See margin.**
- Jaden received these two estimates from a moving company. Write and solve a system of equations to determine the hourly loading/unloading fee and the mileage charge for the truck rental. **See margin.**

ANSWERS

- Perhaps this is the earliest version of the phrase "There is no place like home." Cicero felt the same sentiment that Americans feel today.
- \$100 per hour for loading and unloading and \$90 per hour for packing and unpacking
- $$5x + 80y = 780;$$

$$6x + 100y = 960;$$

$$x = \$60 \text{ (per helper),}$$

$$y = \$6 \text{ (per mile)}$$

Application fee: 2% of 1 month's rent
 Credit application fee: \$10
 Security deposit: 1 month's rent
 Last month's rent
 Broker's fee: 12% of 1 year's rent

3 hours of loading/unloading	5 hours of loading/unloading
2 hours of packing/unpacking	2 hours of packing/unpacking
Total cost: \$480	Total cost: \$680

Situation A: He hires five helpers to load and unload the truck and travels 80 miles on back roads, for a total cost of \$780.
 Situation B: He hires six helpers to load and unload the truck and takes a highway route, which adds 20 miles to the trip but gets the truck to the destination faster, for a total cost of \$960.

9. Ann obtained this list of apartments.
- Use linear regression analysis to determine if there is a correlation between the square footage and the monthly rent. $r = 0.987$; there is a strong positive correlation.
 - Determine the regression equation. Round the numbers in the equation to the nearest hundredth. $y = 1.74x + 299.46$
 - Use your regression equation to determine the price you might expect to pay for an 810-square-foot apartment. \$1,708.86

Square Feet	Monthly Rent	Square Feet	Monthly Rent
400	\$980	500	\$1,200
1,000	\$2,000	700	\$1,600
650	\$1,500	900	\$1,900
800	\$1,700	750	\$1,550
850	\$1,725	480	\$1,050

10. Use the information from Exercise 9.
- Determine the correlation coefficient and linear regression equation that expresses the square footage as a function of the monthly rent. Round the numbers in the equation to the nearest hundredth. $r = 0.987$; $y = 0.56x - 142.2$
 - Use your linear regression equation to determine the square footage you might expect if renting a \$1,710 apartment. Approx. 809 square feet

Application fee: 1.5% of 1 month's rent
 Credit application fee: \$10
 Security deposit: 1 month's rent
 Last month's rent
 Broker's fee: 9% of 1 year's rent

11. Dave wants to rent a two-bedroom apartment in City Fields. The apartment has a monthly rent of D dollars. Here are the fees that he has been quoted. Write an algebraic expression that represents the amount he is expected to pay before renting the apartment. $D + 0.015D + 10 + D + D + 0.09(12D) = 4.095D$

12. The square footage and monthly rental of 10 similar one-bedroom apartments yield the linear regression equation $y = 0.775x + 950.25$, where x represents the square footage of the apartment and y represents the monthly rental price. Grace can afford \$1,500 per month rent. Using the equation, what size apartment should she expect to be able to rent for that price? Approx. 709 square feet
13. The square footage and monthly rental of 10 similar two-bedroom apartments yield the linear regression equation $y = 1.165x + 615.23$, where x represents the square footage of the apartment and y represents the monthly rental price.
- Use the equation to determine the monthly rent for an apartment that has 1,500 square feet. \$2,362.73
 - Based on the recommendation that you should spend no more than 28% of your monthly gross income on housing, can Jacob afford this rental if he makes \$8,000 each month? Explain. No, the recommendation is to spend no more than \$2,240.

\$85 per hour for loading/unloading service
 \$70 per hour for packing/unpacking service
 \$5 per mile for truck rental

L dollars per hour for loading and loading service
 P dollars per hour for packing and unpacking service
 M dollars per mile for truck rental

14. WeMoveU charges for moving according to the rate schedule shown. Nicky is moving a distance of 150 miles and needs 7 hours of loading/unloading and 5 hours of packing/unpacking. What will her moving cost be if the service also charges 8% tax on the total? \$1,830.60

15. Van4Hire charges for moving according to this rate schedule. Nicky is moving a distance of D miles and needs A hours of loading/unloading and B hours of packing/unpacking. Write an algebraic expression that represents her total moving cost. $AL + BP + MD$