

# Linear Models - Word Problems

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Write an equation, in slope-intercept form, to model each situation.

1. You rent a bicycle for \$20 plus \$2 per hour.
2. An auto repair shop charges \$50 plus \$25 per hour.
3. A candle is 6 inches tall and burns at a rate of  $\frac{1}{2}$  inch per hour.
4. The temperature is  $15^{\circ}$  and is expected to fall  $2^{\circ}$  each hour during the night.
5. A computer technician charges \$75 for a consultation plus \$35 per hour.
6. The population of Pine Bluff is 6791 and is decreasing at the rate of 7 per year.

7. In 1995, Orlando, Florida, was about 175,000. At that time, the population was growing at a rate of about 2000 per year. Write an equation, in slope-intercept form to find Orlando's population for any year.
8. Predict what Orlando's population will be in 2010.
9. Couples are marrying later. The median age of men who tied the knot for the first time in 1970 was 23.2. In 1998, the median age was 26.7. Write an equation, in slope-intercept form to predict the median age that men marry  $M$  for any year  $t$ .
10. Use the equation in #9 to predict the median age of men who marry for the first time in 2005.

11. The cost for 7 dance lessons is \$82. The cost for 11 lessons is \$122. Write a linear equation, slope-intercept form, to find the total cost  $C$  for  $L$  lessons.

12. Use the equation in #11 to find the cost of 4 lessons.

13. It is  $76^\circ$  F at the 6000-foot level of a mountain, and  $49^\circ$  F at the 12,000-foot level of the mountain. Write a linear equation, in slope-intercept form, to find the temperature  $T$  at an elevation  $e$  on the mountain, where  $e$  is in thousands of feet.

14. Use the equation in #13 to predict the temperature at an elevation of 20,000 feet.

15. Between 1990 and 1999, the number of movie screens in the United States increased by about 1500 each year. In 1996, there were 29,690 movie screens. Write an equation of a line, in slope-intercept form, to find the total number of screens  $y$  for any year  $x$ .

16. Predict the number of movie screens in the United States in 2005.

17. A construction company charges \$15 per hour for debris removal, plus a one-time fee for the use of a trash dumpster. The total fee for 9 hours of service is \$195. Write an equation of a line, in slope-intercept form, to find the total fee  $y$  for any number of hours  $x$ .

18. What is the fee for the use of a trash dumpster for 5 hours?

19. The population of Jose's town in 1995 was 2400 and the population in 2000 was 4000. Let  $x$  represent the number of years since 1995. Write a linear equation, in slope-intercept form, that represents this data.

20. Use the equation in #19 to predict the population in Jose's town in 2010.

21. Randy owns a computer store. In 1990, he sold 150 monitors. In 2000, he sold 900 monitors. Let  $x$  represent the number of years since 1990. Write a linear equation, in slope-intercept form, that represents this data.

22. Use the equation in #21 to predict the number of monitors Randy will sell in 2007.

23. Romi opened a gift shop in 1995 and closed it in 2000. In 1995, her inventory of stuffed animals was 350. In 2000, her inventory of stuffed animals was 0. Let  $x$  represent the number of years since 1995. Write an equation, in slope-intercept form, that represents that data.

24. Use the equation in #23 to estimate Romi's inventory of stuffed animals in 1998.