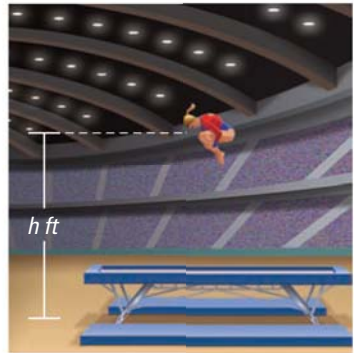48. SCIENCE Between the months of April and September, the number y of hours of daylight per day in Seattle, Washington, can be modeled by $y = -0.00046x^2 + 0.076x + 13$ where x is the number of days since April 1.

a. Do any of the days between April and September in Seattle have 17 hours of daylight? If so, how many?

b. Do any of the days between April and September in Seattle have 14 hours of daylight? If so, how many?

49. MULTI-STEP PROBLEM During a trampoline competition, a trampolinist leaves the mat when her center of gravity is 6 feet above the ground. She has an initial vertical velocity of 32 feet per second.

a. Use the vertical motion model to write an equation that models the height h (in feet) of the center of gravity of the trampolinist as a function of the time t (in seconds) into her jump.

b. Does her center of gravity reach a height of 24 feet during the jump? If so, at what time(s)?

c. On another jump, the trampolinist leaves the mat when her center of gravity is 6 feet above the ground and with an initial vertical velocity of 35 feet per second. Does her center of gravity reach a height of 24 feet on this jump? If so, at what time(s)?

h ft

50. CHALLENGE Last year, a manufacturer sold backpacks for $24 each. At this price, the manufacturer sold about 1000 backpacks per week. A marketing analyst predicts that for every $1 reduction in the price of the backpack, the manufacturer will sell 100 more backpacks per week.

a. Write a function that models the weekly revenue R (in dollars) that the manufacturer will receive for x reductions of $1 in the price of the backpack.

b. Is it possible for the manufacturer to receive a weekly revenue of $28,000? $30,000? What is the maximum weekly revenue that the manufacturer can receive? *Explain* your answers using the discriminants of quadratic equations.

MIXED REVIEW FOR TAKS

51. ⬥ **TAKS PRACTICE** Which equation describes a line that has a slope of 3 and passes through the point (2, 5)? *TAKS Obj. 3*

ⓐ $y = 3x - 13$ ⓑ $y = 3x - 1$ ⓒ $y = 3x + 11$ ⓓ $y = 5x + 3$

52. ⬥ **TAKS PRACTICE** The first five numbers in a sequence are $\frac{2}{5}$, 1, $\frac{5}{2}$, $\frac{25}{4}$, and $\frac{125}{8}$. If this pattern continues, what is the seventh number in the sequence? *TAKS Obj. 10*

ⓕ $\frac{625}{32}$ ⓖ $\frac{625}{16}$ ⓗ $\frac{3125}{32}$ ⓙ $\frac{3125}{16}$