

## Calculator

12. **1.25** Increasing a number by 60% is equivalent to multiplying it by 1.60, and decreasing a number by 50% is equivalent to multiplying it by 0.50. Therefore, performing both changes in succession is equivalent to multiplying by  $1.60 \times 0.50 = 0.80$ . Multiplying by 0.80 is equivalent to dividing by its reciprocal:  $1/(0.80) = 1.25$ .

13. **2,550** The sum of the first 50 positive even integers is  $2 + 4 + 6 + 8 + \dots + 100$ . As with the example in Lesson 2, these numbers can be regrouped into 25 pairs of numbers each of which has a sum of  $2 + 100 = 102$ . Therefore, their sum is  $25(102) = 2,550$ .

14. **14** Let  $n$  = Nora's age now, and  $m$  = Mary's age now. If 3 years ago, Nora was half as old

as Mary is now:  $n - 3 = \frac{1}{2}m$

If Mary is 4 years older than Nora:  $m = 4 + n$

Subtract 4:  $m - 4 = n$

Substitute  $n = m - 4$ :  $m - 4 - 3 = \frac{1}{2}m$

Simplify:  $m - 7 = \frac{1}{2}m$

Multiply by 2:  $2m - 14 = m$

Subtract  $m$  and add 14:  $m = 14$

15. **4,200** Let  $x$  = the total number of seats in the

stadium.  $\frac{2}{3}x - 1,000 = \frac{3}{7}x$

Subtract  $\frac{3}{7}x$ :  $\frac{2}{3}x - \frac{3}{7}x - 1,000 = 0$

Add 1,000:  $\frac{2}{3}x - \frac{3}{7}x = 1,000$

Combine like terms:  $\frac{5}{21}x = 1,000$

Multiply by  $\frac{21}{5}$ :  $x = \frac{21,000}{5} = 4,200$

16. **0.20** Let  $g$  = the cost, in dollars, of one gumdrop, and  $c$  = the cost, in dollars, of one candy bar.

$$4c + 2g = 2.80$$

$$3c + 2g = 2.20$$

Subtract:  $c = 0.60$

Substitute  $c = 0.60$ :  $4(0.60) + 2g = 2.80$

Simplify:  $2.40 + 2g = 2.80$

Subtract 2.40:  $2g = 0.40$

Divide by 2:  $g = 0.20$

17. **6**  $\frac{x^2 - 2x + 1}{2 - 2x} = -3$

Factor:  $\frac{(x-1)(x-1)}{2(1-x)} = -3$

Multiply by  $-1$ :  $\frac{(x-1)(x-1)}{2(x-1)} = -3$

Simplify:  $\frac{x-1}{2} = -3$

Multiply by 2:  $x - 1 = -6$

18. **12** We can just choose a number to work with, like 10. If we subtract 3 from this number then multiply the result by 4, we get  $4(10 - 3) = 28$ . If we multiply it by 4 and then subtract a mystery number, we get  $4(10) - x = 40 - x$ .  $28 = 40 - x$

Subtract 40:  $-12 = -x$

Multiply by  $-1$ :  $12 = x$

19. **A** If 5 green chips are worth  $m$  dollars, then each green chip is worth  $m/5$  dollars. If a red chip is worth 2 dollars more than a green chip, then each red chip is worth  $m/5 + 2$  dollars. If each blue chip is worth 2 dollars more than a red chip, then each blue chip is worth  $m/5 + 4$  dollars. Therefore, 10 blue chips and 5 red chips are worth  $10(m/5 + 4) + 5(m/5 + 2) = 2m + 40 + m + 10 = 3m + 50$  dollars.

20. **B** The average speed is equal to the total distance divided by the total time. The total distance is 200 miles. The time for the first hundred miles is  $(100 \text{ miles} / 50 \text{ mph}) = 2$  hours, and the time for the second hundred miles is  $(100 \text{ miles} / 75 \text{ mph}) = 4/3$  hours. Therefore the total time of the trip is  $2 + 4/3 = 10/3$  hours, and the average speed is

$$\frac{200}{\frac{10}{3}} = 200 \times \frac{3}{10} = 60 \text{ mph}$$

21. **D**  $3m(m^2 \times 2m)$

Parentheses:  $3m(2m^3)$

Multiply:  $6m^4$

22. **C** Assume the cost of living in 1980 was \$100. If this increased by 20% from 1980 to 1990, then the cost of living in 1990 was  $1.20(\$100) = \$120$ . If the increase from 1980 to 2000 was 50%, then the cost of living in 2000 was  $1.50(\$100) = \$150$ . The percent increase from 1990 to 2000 is therefore

$$\frac{150 - 120}{120} \times 100\% = \frac{30}{120} \times 100\% = 25\%$$