## Important Terms

**math of least resistance**: Choosing the easiest mental calculating strategy among several possibilities. For example, to do the problem $43 \times 28$, it is easier to do $43 \times 7 \times 4 = 301 \times 4 = 1204$ than to do $43 \times 4 \times 7 = 172 \times 7$.

**squaring**: Multiplying a number by itself. For example, the square of 5 is 25.

**subtraction method**: A method for multiplying numbers by turning the original problem into a subtraction problem. For example, $9 \times 79 = (9 \times 80) - (9 \times 1) = 720 - 9 = 711$, or $19 \times 37 = (20 \times 37) - (1 \times 37) = 740 - 37 = 703$.

## Suggested Reading

Benjamin and Shermer, *Secrets of Mental Math: The Mathemagician's Guide to Lightning Calculation and Amazing Math Tricks*, chapter 3.

Kelly, *Short-Cut Math.*

## Problems

Calculate the following 2-digit squares. Remember to begin by going up or down to the nearest multiple of 10.

**1.** $14^2$

**2.** $18^2$

**3.** $22^2$

**4.** $23^2$

**5.** $24^2$

**6.** $25^2$

**7.** $29^2$

**8.** $31^2$

**9.** $35^2$

**10.** $36^2$

**11.** $41^2$

**12.** $44^2$

**13.** $45^2$

**14.** $47^2$

**15.** $56^2$

**16.** $64^2$

**17.** $71^2$

**18.** $82^2$

**19.** $86^2$

**20.** $93^2$

**21.** $99^2$

Do the following 2-digit multiplication problems using the addition method.

**22.** $31 \times 23$

**23.** $61 \times 13$

**24.** 52 × 68

**25.** 94 × 26

**26.** 47 × 91

Do the following 2-digit multiplication problems using the subtraction method.

**27.** 39 × 12

**28.** 79 × 41

**29.** 98 × 54

**30.** 87 × 66

**31.** 38 × 73

Do the following 2-digit multiplication problems using the factoring method.

**32.** 75 × 56

**33.** 67 × 12

**34.** 83 × 14

**35.** 79 × 54

**36.** 45 × 56

**37.** 68 × 28

Do the following 2-digit multiplication problems using the close-together method.

**38.** 13 × 19

**39.** 86 × 84

**40.** 77 × 71

**41.** 81 × 86

**42.** 98 × 93

**43.** 67 × 73

Do the following 2-digit multiplication problems using more than one method.

**44.** 14 × 23

**45.** 35 × 97

**46.** 22 × 53

**47.** 49 × 88

**48.** 42 × 65

*Solutions for this lecture begin on page 116.*