When dealing with fractions with larger denominators, we treat the fraction as a normal division problem, but we can occasionally take shortcuts, especially when the denominator is even. With odd denominators, you may not be able to find a shortcut unless the denominator is a multiple of 5, in which case you can double the numerator and denominator to make the problem easier.

Keep practicing the division techniques we've learned in this lecture, and you'll be dividing and conquering numbers mentally in no time. ■

Suggested Reading

Benjamin and Shermer, *Secrets of Mental Math: The Mathemagician's Guide to Lightning Calculation and Amazing Math Tricks*, chapter 5.

Julius, *More Rapid Math Tricks and Tips: 30 Days to Number Mastery.*

Kelly, *Short-Cut Math.*

Problems

Determine which numbers between 2 and 12 divide into each of the numbers below.

1. 4410

2. 7062

3. 2744

4. 33,957

Use the create-a-zero, kill-a-zero method to test the following.

5. Is 4913 divisible by 17?

6. Is 3141 divisible by 59?

7. Is 355,113 divisible by 7? Also do this problem using the special rule for 7s.

8. Algebraically, the divisibility rule for 7s says that $10a + b$ is a multiple of 7 if and only if the number $a - 2b$ is a multiple of 7. Explain why this works. (Hint: If $10a + b$ is a multiple of 7, then it remains a multiple of 7 after we multiply it by –2 and add $21a$. Conversely, if $a - 2b$ is a multiple of 7, then it remains so after we multiply it by 10 and add a multiple of 7.)

Mentally do the following 1-digit division problems.

9. $97 \div 8$

10. $63 \div 4$

11. $159 \div 7$

12. $4668 \div 6$

13. $8763 \div 5$

Convert the Fahrenheit temperatures below to Centigrade using the formula $C = (F - 32) \times 5/9$.

14. 80 degrees Fahrenheit

15. 65 degrees Fahrenheit

Mentally do the following 2-digit division problems.

16. $975 \div 13$

17. $259 \div 31$

18. 490 ÷ 62 (use overshooting)

19. 183 ÷ 19 (use overshooting)

Do the following division problems by first simplifying the problem to an easier division problem.

20. 4200 ÷ 8

21. 654 ÷ 36

22. 369 ÷ 45

23. 812 ÷ 12.5

24. Give the decimal expansions for 1/7, 2/7, 3/7, 4/7, 5/7, and 6/7.

25. Give the decimal expansion for 5/16.

26. Give the decimal expansion for 12/35.

27. When he was growing up, Professor Benjamin's favorite number was 2520. What is so special about that number?

Solutions for this lecture begin on page 103.