FRACTIONS AND DECIMALS

21. REDUCING FRACTIONS

To reduce a fraction to lowest terms, **factor out and cancel** all factors the numerator and denominator have in common.

$$\frac{28}{36} = \frac{4 \times 7}{4 \times 9} = \frac{7}{9}$$

22. ADDING/SUBTRACTING FRACTIONS

To add or subtract fractions, first find a **common denominator,** and then add or subtract the numerators.

$$\frac{2}{15} + \frac{3}{10} = \frac{4}{30} + \frac{9}{30} = \frac{4 + 9}{30} = \frac{13}{30}$$

23. MULTIPLYING FRACTIONS

To multiply fractions, **multiply** the numerators and **multiply** the denominators.

$$\frac{5}{7} \times \frac{3}{4} = \frac{5 \times 3}{7 \times 4} = \frac{15}{28}$$

24. DIVIDING FRACTIONS

To divide fractions, **invert** the second one and **multiply.**

$$\frac{1}{2} \div \frac{3}{5} = \frac{1}{2} \times \frac{5}{3} = \frac{1 \times 5}{2 \times 3} = \frac{5}{6}$$

25. CONVERTING A MIXED NUMBER TO AN IMPROPER FRACTION

To convert a mixed number to an improper fraction, **multiply** the whole number part by the denominator, then **add** the numerator. The result is the new numerator (over the same denominator). To convert $7\frac{1}{3}$, first multiply 7 by 3, then add 1, to get the new numerator of 22. Put that over the same denominator, 3, to get $\frac{22}{3}$.

26. CONVERTING AN IMPROPER FRACTION TO A MIXED NUMBER

To convert an improper fraction to a mixed number, **divide** the denominator into the numerator to get a **whole number quotient with a remainder.** The quotient becomes the whole number part of the mixed number, and the remainder becomes the new numerator— with the same denominator. For example, to convert $\frac{108}{5}$ first divide 5 into 108, which yields 21 with a remainder of 3. Therefore, $\frac{108}{5} = 21\frac{3}{5}$.

27. RECIPROCAL

To find the reciprocal of a fraction, switch the numerator and the denominator. The reciprocal of $\frac{3}{7}$ is $\frac{7}{3}$. The reciprocal of 5 is $\frac{1}{5}$. The product of reciprocals is 1.

28. COMPARING FRACTIONS

One way to compare fractions is to re-express them with a **common denominator.**

$\frac{3}{4} = \frac{21}{28}$ and $\frac{5}{7} = \frac{20}{28}$, $\frac{21}{28}$ is greater than $\frac{20}{28}$, so $\frac{3}{4}$ is greater than $\frac{5}{7}$.

Another way to compare fractions is to convert them both to **decimals.** $\frac{3}{4}$ converts to .75, and $\frac{5}{7}$ converts to approximately .714.

29. CONVERTING FRACTIONS TO DECIMALS

To convert a fraction to a decimal, **divide the bottom into the top.** To convert $\frac{5}{8}$, divide 8 into 5, yielding .625.

30. REPEATING DECIMAL

To find a particular digit in a repeating decimal, note the **number of digits in the cluster that repeats.** If there are 2 digits in that cluster, then every 2nd digit is the same. If there are 3 digits in that cluster, then every 3rd digit is the same. And so on. For example, the decimal equivalent of $\frac{1}{27}$ is .037037037. . . , which is best written $.\overline{037}$.

There are 3 digits in the repeating cluster, so every 3rd digit is the same: 7. To find the 50th digit, look for the multiple of 3 just less than 50—that's 48. The 48th digit is 7, and with the 49th digit the pattern repeats with 0. The 50th digit is 3.

31. IDENTIFYING THE PARTS AND THE WHOLE

The key to solving most fractions and percents story problems is to identify the part and the whole. Usually you'll find the **part** associated with the verb *is/are* and the **whole** associated with the word *of.* In the sentence, "Half of the boys are blonds," the whole is the boys ("*of* the boys), and the part is the blonds ("*are* blonds").