

Miscellaneous systems of equations (in some problems it may pay you to look for some shortcuts)

$$1. \begin{cases} 4x + 2y = 50 \\ y + z = 6 \\ x + z = 11 \end{cases}$$

$$2. \begin{cases} \frac{1}{2x} + \frac{1}{2y} + \frac{1}{2z} = \frac{13}{24} \\ \frac{1}{3x} - \frac{1}{5y} + \frac{1}{z} = \frac{7}{20} \\ \frac{1}{4x} - \frac{1}{y} - \frac{1}{3z} = \frac{-7}{24} \end{cases}$$

$$3. \begin{cases} x + y + z = 6 \\ y + z + u = 9 \\ z + u + x = 8 \\ u + x + y = 7 \end{cases}$$

Use two or three variables (as needed) to solve these word problems.

4. A number consists of three digits. the sum of the first and second digits (from the left) exceeds the third digit by 4. The sum of the three digits is 10. When the order of the digits is reversed, the original number is increased by 99. What is the number?
  5. Adam, Brian, and Carl together have 80 CD's. If Adam gives  $\frac{1}{2}$  of his CD's to Brian and Carl in equal shares then Adam and Carl will have exactly the same number of CD's and Brian will have as many as Adam and Carl together. How many CD's did each boy start off with.
- ... and finally a *really* challenging problem ...
6. A swimming pool can be filled with water from three pipes in 2 hours. If only the first and second pipes are open, the pool can be filled in 2 hours 24 minutes. If only the first and third pipes are open, the pool can be filled in 3 hours. How long would it take each pipe *alone* to fill the pool?