Math 6b/c: Homework 25
Homework #25 is due May 6.

Geometric progression

The n^{th} term: $b_n = b_1 \times q^{n-1}$

Sum of the first n terms: $S = \frac{b_1 q^n - b_1}{1-q} = \frac{b_1(1-q^n)}{1-q}$

Sum of infinite geometric progression, $0 < q < 1$, $S = \frac{b_1}{1-q}$

System linear equations, solved by substitution

1. Simplify both equations.
2. From one of the 2 equations, express one of the unknowns (for example, x) in terms of the other one (x = …) .
3. Substitute the obtained expression in the other equation - you have an equation with one unknown (linear equation for y).
4. Solve this equation (find y).
5. Substitute the value for the second unknown (the y-value) back in the first equation (in x = …).

Homework

1. Solve by using substitution:

   a) $\begin{vmatrix} x = 5 \\ 20x + 5y = 100 \end{vmatrix}$

   b) $\begin{vmatrix} -8x + y = -4 \\ -21x + 2y = -13 \end{vmatrix}$

   c) $\begin{vmatrix} 7x - 3y = 27 \\ 5x - 6y = 0 \end{vmatrix}$

   d) $\begin{vmatrix} 2(x-2) - 3(x+y) = 3 \\ (x+1)(y-2) = xy - 9 \end{vmatrix}$

   e) $\begin{vmatrix} \frac{2x-1}{5} + \frac{3y-2}{4} = 2 \\ \frac{3x+1}{5} - \frac{3y+2}{4} = 0 \end{vmatrix}$

2. Solve the system equations both by substitution and graphically:

   a. $\begin{cases} 3x - 2y = -1 \\ x + y = 3 \end{cases}$

   b. $\begin{cases} x + 3y = -4 \\ x - y = 0 \end{cases}$

3. The sum of the digits in a two-digit number is 9. The ratio of this number and the number with switched digits is $\frac{3}{8}$. Find the number.

4. In an infinite geometric progression, the n^th term is defined as $b_n = 6\left(\frac{1}{3}\right)^n$. Find the sum.

   Optional: Sketch the function $y = 6\left(\frac{1}{3}\right)^x$ for the first few terms – what do you observe?

5. Find the second term in the geometric progression for which:
   $b_2 + b_5 - b_4 = 10$ and $b_3 + b_6 - b_5 = 20$.