1. Write code to determine the smallest number which is divisible by 11 and 19 whose square is greater than 100000000.

2. Suppose for the following problems that $x = -3$ and $y = [-4, 7, 1, 8, -2, 0]$. Give the output of the following MATLAB commands:
   
   (a) $8 - 12 | 6 + 6 / 2 & 2$
   (b) $-5 < x < -1$
   (c) $y < 0$
   (d) $y(y < 6)$

3. The monthly payment $M$ of a loan of amount $P$ for $N$ years and an annual interest rate $r$ percent can be calculated by the formula:
   
   $$M = P \left( \frac{r}{100} \frac{1}{1 + \frac{r}{1200}}^{-N} \right)$$

   Write a MATLAB function that calculates the monthly payment of a loan. For the function name and arguments, use $M = \text{amort}(P, r, N)$, where $P$ is the loan amount, $r$ is the annual interest rate, $N$ is the length of years in the loan, and $M$ is the amount of a monthly payment.

4. Consider a vector $x$. Write a script which computes the average value in the array and then calculates how many of the values in $x$ are less than or equal to that average value.

5. (a) Recall that if $(x, y)$ is the Cartesian coordinates of a point in the plane, the polar coordinates of the same point are $(r, \theta)$, where $r^2 = x^2 + y^2$ and $\tan \theta = y/x$. Write a script to determine the polar coordinates of a point from the Cartesian coordinates. For the function name and arguments use $[\theta \ \text{radius}] = \text{CartesianToPolar}(x, y)$.
   
   (b) Write a script which calculates the polar coordinates for the points $(15, 3)$ and $(-4, 2)$.

6. Write code to plot the polynomial $2x^2 - 6x + 2$ and its derivative in the range $[-10, 10]$.

7. Suppose that a sequence of numbers $a_1, a_2, \ldots$ if defined as follows:
   
   $$a_1 = 5$$
   $$a_n = 2a_{n-1} + 1 \text{ if } a_n \text{ is a multiple of } 4$$
   $$a_n = a_{n-1} + 1 \text{ if } a_n \text{ is not a multiple of } 4$$

   Write code to calculate the first 100 values of the sequence.

8. Write a function that takes an array and calculates the standard deviation of its values. The standard deviation can be calculated using the following formula:
   
   $$\sigma = \sqrt{\frac{\sum_{i=1}^{N} (x_i - \bar{x})^2}{N}}$$

   where $\bar{x} = \frac{1}{N} \sum_{i=1}^{N} x_i$ is the average of the values.

9. Rewrite the following statement using a for loop:
   
   $$a(2:n-1) = b(1:n-2) + c(2:n-1) \cdot d(3:n);$$