

```

n = 30000; % sample size
m = 0;    % number of points inside the circle

for i = 1 : n
    % Generate two random numbers
    R1 = rand;
    R2 = rand;
    % Get (x,y) coordinates
    x = -4 + 10 * R1;
    y = -3 + 10 * R2;
    % Check if (x,y) is inside the circle
    if (x - 1)^2 + (y - 2)^2 < 25
        m = m + 1;
    end
end

area_approx = m/n * 100

```

```
area_approx = 78.3467
```

```
area_truth = pi * 25
```

```
area_truth = 78.5398
```

```

N = 5;    % number of replications
n = 30000; % sample size
area = zeros(N, 1);

for rep = 1 : N
    m = 0;
    for i = 1 : n
        % Generate two random numbers
        R1 = rand;
        R2 = rand;
        % Get (x,y) coordinates
        x = -4 + 10 * R1;
        y = -3 + 10 * R2;
        % Check if (x,y) is inside the circle
        if (x - 1)^2 + (y - 2)^2 < 25
            m = m + 1;
        end
    end
    area(rep) = m/n * 100;
end

area

```

```

area = 5×1
    78.6533
    78.8700
    78.2967

```

```
78.7967
78.6800
```

```
estimation = sprintf('%.4f (±%.4f)', mean(area), std(area))
```

```
estimation =
'78.6593 (±0.2209)'
```

```
N = 5;          % number of replications
n = 100000;    % sample size
area = zeros(N, 1);

for rep = 1 : N
    m = 0;
    for i = 1 : n
        % Generate two random numbers
        R1 = rand;
        R2 = rand;
        % Get (x,y) coordinates
        x = -4 + 10 * R1;
        y = -3 + 10 * R2;
        % Check if (x,y) is inside the circle
        if (x - 1)^2 + (y - 2)^2 < 25
            m = m + 1;
        end
    end
    area(rep) = m/n * 100;
end

area
```

```
area = 5×1
    78.4230
    78.4160
    78.3910
    78.5190
    78.6160
```

```
estimation = sprintf('%.4f (±%.4f)', mean(area), std(area))
```

```
estimation =
'78.4730 (±0.0936)'
```