In [3]:
```
# Given Data
city_area = 1300                  # Square Miles
cell_radius = 4                   # Miles
total_spectrum = 40 * 1e6         # 40 Mhz in Hz
channel_bandwidth = 60 * 1e3      # 60 Khz in Hz
GOS = 0.02                        # (Grade of Service - 2%)
offered_traffic_per_user = 0.03   # Erlang per user
```

In [4]:
```
# (a) Number of cells in the service area
cell_area = (3 * (3 ** 0.5) / 2) * cell_radius ** 2
number_of_cells = city_area / cell_area
```

In [5]:
```
# (b) Number of channels per cell
number_of_channels = total_spectrum / channel_bandwidth
channels_per_cell = number_of_channels / 7
```

In [6]:
```
# (c) Traffic Intensity of each cell
traffic_intensity_per_cell = channels_per_cell * GOS
```

In [7]:
```
# (d) Maximum carried traffic
maximum_carried_traffic = traffic_intensity_per_cell * channels_per_cell
```

In [18]:
```
# (e) Total number of users that can be served for 2% GOS
total_users = maximum_carried_traffic / offered_traffic_per_user
```

In [19]:
```
# (f) Number of mobiles per unique channel
mobiles_per_unique_channel = total_users / number_of_channels
```

In [20]:
```
# (g) Theoretical maximum number of users that could be served at one time b
theoretical_max_users = channels_per_cell * 7
```

In [21]:
```
#Output Results

print(f"Number of cells in the service area: {number_of_cells: .2f}")
print(f"Number of channels per cell: {channels_per_cell: .2f}")
print(f"Traffic intensity per cell: {traffic_intensity_per_cell: .2f} Erlang
print(f"Maximum carried traffic: {maximum_carried_traffic: .2f} Erlang")
print(f"Total number of users that can be served for 2% GOS: {total_users: .
print(f"Number of mobiles per unique channel: {mobiles_per_unique_channel: .
print(f"Theoretical maximum number of users that could be served at one time
```

```
Number of cells in the service area:  31.27
Number of channels per cell:  95.24
Traffic intensity per cell:  1.90 Erlangs
Maximum carried traffic:  181.41 Erlangs
Total number of users that can be served for 2% GOS:  6046.86
Number of mobiles per unique channel:  9.07
Theoretical maximum number of users that could be served at one time by the s
ystem:  666.67
```