Fractals and Scaling (2020)

8.7 Test » Test for Unit 8

Instructions 1

You may use any course materials, websites, calculators, etc. for this test. Just don't ask another person for the answers or share your with other people. If you have questions about the test, please send them to us via email.

For this test, assume that the urban scaling results hold exactly, so that the GDP of a city scales as $N^{7/6}$ and the length of roads in a city $N^{5/6}$, where N is the population of the city.

Question 2

Suppose a certain city has a GDP of 2 million pesos. Approximately what GDP would you expect for a city that has a population that is th **large**?

- A. 4.6 million pesos
- B. 5 million pesos
- C. 6 million pesos
- D. 7.2 million pesos

Question 3

Suppose a certain city has a GDP of 40 million pesos. Approximately what GDP would you expect for a city that has a population that is t **smaller**?

- A. 11.1 million pesos
- B. 13.3 million pesos
- C. 16.0 million pesos
- D. 17.5 million pesos

Question 4

Suppose a certain city has 2000km of roads. Approximately what length of roads would you expect to be in a city that had a population t times **larger**?

- A. 4000 km
- B. 4300 km
- C. 5000 km
- D. 5800 km

Question 5

New Dehli has a population of 21.8 million people and 32,000 km of roads. Approximately what length of roads would you expect for Ba which has a population of 8.5 million? (Both populations are for metropolitian areas.)

- A. 9,100 km
- B. 10,700 km
- C. 12,500 km
- D. 14,600 km

Question 6

Based on the ideas presented in this unit, how would you expect the number of AIDS cases to scale with a city's population size?

- A. sub-linearly
- B. linearly
- C. super-linearlly

Question 7

Based on the ideas presented in this unit, how would you expect the number of gas stations in a city to scale with the city's population s

- A. sub-linearly
- B. linearly
- C. super-linearly

Question 8

Based on the ideas presented in this unit, how would you expect the total number of housing units in a city to scale with the city's popul

- A. sub-linearly
- B. linearly
- C. super-linearly