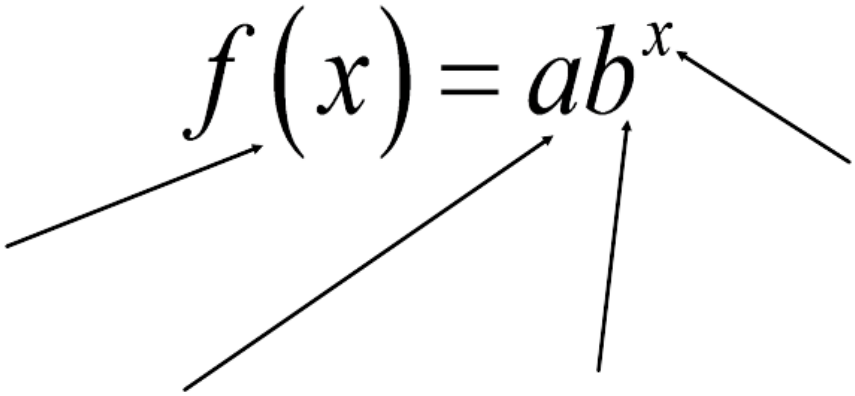
Applications of Exponential Functions



Exponential Growth

The ***b*-value is** _____

Another equation for exponential growth is $y = a \times (\_\_\_\_\_)^x$ where r is the growth rate.

Exponential Decay

The ***b*-value is** _____

Another equation for exponential decay is $y = a \times (\_\_\_\_\_)^x$ where r is the growth rate.

1. In 1950, the world population was 2.5 Billion and increasing at a rate of 1.8% per year. If this trend continued

a) What would be the world population today?

b) What will be the world population in 2050?

2. You pour yourself a cup of coffee from a fresh pot. The temperature of the coffee is decreasing by 37% every 8 minutes.

If the initial temperature of the coffee was 80 degrees celsius

a) Write a function that models this situation.

b) Determine the temperature of the coffee after 16 minutes.

c) Determine the temperature of the coffee after 20 minutes.

3. The pesticide DDT was widely used in the United States until its ban in 1972. DDT is toxic to a wide range of animals and aquatic life, and is suspected to cause cancer in humans. The half-life of DDT is about 15 years.
How much of a 100 gram sample of DDT would remain

a) after 5 years?
b) after 100 years?

4. According to an old legend, vizier Sissa Ben Dahir presented an Indian King Sharim with a beautiful, hand-made chessboard. The king asked what he would like in return for his gift and the courtier surprised the king by asking for one grain of rice on the first square, two grains on the second, four grains on the third etc. The king readily agreed and asked for the rice to be brought.

How many grains of rice were to be placed on

a) the 10th square?

b) the nth square?