

# Exponential functions



An exponential function is in which a constant base is raised to a variable power. Exponential functions are used to model changes in population size, in the spread of diseases, and the growth of investments. They can also accurately predict types of decline typified by radioactive decay. The essence of exponential growth, and a characteristic of all exponential growth functions, is that they double in size over regular intervals. The most important exponential function is  $e^x$ , the inverse of the natural logarithmic function.

Some examples of exponential functions in the real world are Ponzi Schemes, Pyramid Schemes, and Chain Letters. Ponzi Schemes are named after Charles Ponzi. They are fraudulent investment plans in which one person takes people's money as an "investment" and doesn't necessarily tell them how their returns will be generated, meaning that people's returns on investments could be generated by anything. Pyramid Schemes are also fraudulent investment plans. They are structured like a pyramid, starting with one initial recruiter who recruits someone and requires them to pay a fee.

In order to make their money back, the new recruit must recruit others under him. This continues until it becomes impossible for the newest layer of recruits to recruit enough people to make their money back. Chain letters are letters that can be received electronically or through snail mail. They aren't illegal on their own but they can take the form of a pyramid scheme when they ask you to donate a certain amount of money to the people on a list, then delete the name of the first person on the list, add your name, and forward to a certain amount of people.

By forwarding, you are asking people to give money with the promise of making money. The schemes work because they seem like they can go on forever but in reality, the scheme can only go on for a certain amount of time before it exceeds the population. When the cycle exhausts itself, participants lose money. These schemes should not be participated in because it is impossible to continue to make more money than you invest.