

Exponential Functions and Graphs

- (a) Sketch the graph of $y = 2^x$, marking the coordinates of any points that cross the axes.
- (b) Sketch the graph of $y = 0.5^x$, marking the coordinates of any points that cross the axes.

The exponential growth of a bat population can be described by the equation $P = 20 \times 1.2^t$, where P is the population at time t in months.

- (a) What is the initial bat population?
- (b) Calculate the population of bats after 6 months.
- (c) What is the percentage increase in the bat population per month?
- (d) Sketch the graph of the bat population over time, marking the coordinates of any points where the graph crosses the axes.

A radioactive element decays according to the equation $m = 500 \times 0.5^t$ where m is the mass of the element in kg and t is the time in days.

- (a) What is the initial mass of the radioactive element?
- (b) What is the mass of the element after 2 days?
- (c) What is the mass of the element after 15 days? Give your answer in grams to 1 decimal place.
- (d) What is the half-life of the element? The half-life is the time it takes to decay to half its original mass.
- (e) Sketch the graph of the mass against time.

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