# Growth and Decay.
# Downloadable Resource - Exponential Growth.

# Try this

Starting with 1 bacterium, how many would there be after 1 hour, if the bacterium increases by:

1) 100% every hour?

2) 50% every half hour?

3) 33.3̇% every third of an hour?

4) 25% every quarter of an hour?


… Keep going with this pattern. What do you notice?

# Independent Task

**1** Using integer $x$ values from 1-9, find values of $y$ when

$$y = \left(1 + \frac{1}{x}\right)^x$$

How can you organise your answers in a table?

What happens if you try to find the value when $x = 0$?

Sketch the results of your table on a graph.

**2** With a calculator, find the following:

$1.01^{100}$

$1.001^{1000}$

$1.0001^{10000}$

$1.00001^{100000}$

Continue this until the answer is 2.718282 to 7 significant figures.

# Explore

Repeat the try this task with these numbers.

Can you spot a pattern? (It's quite hard to spot)

What would come next? →

Starting with 1 bacterium, how many would there be after 1 hour, if the bacterium increases by:

200% every hour?

100% every half hour?

66.6̇% every third of an hour?

50% every quarter of an hour?

Starting with 1 bacterium, how many would there be after 1 hour, if the bacterium increases by:

300% every hour?

150% every half hour?

100% every third of an hour?

75% every quarter of an hour?

Starting with 4 bacteria, how many would there be after 1 hour, if the bacterium increases by:

400% every hour?

200% every half hour?

133.3̇ % every third of an hour?

100% every quarter of an hour?