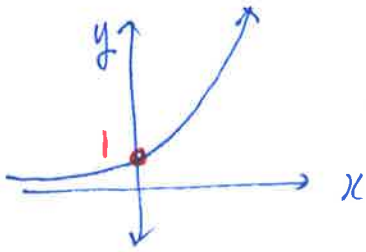
IB Pre HL 3G Exponential Growth and Decay

Growth: $y = a^x$ where $a > 1$



D: $x \in \mathbb{R}$

R: $y \in (0, \infty)$

H.A: $y = 0$ (x-axis)

Example)

↑ · 2

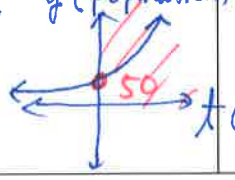
Bacteria is growing 20% per hour, starting with 50. Write the mathematical equation modeling the population of bacteria after t hours.

t: time (hrs)

y: population.

1 + .2

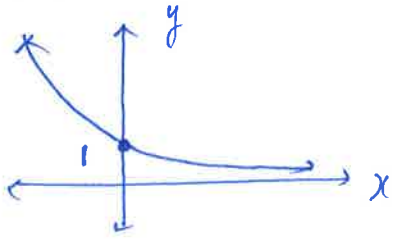
$y = (50)(1.2)^t$



asymptote

H.A: $y = 0$

Decay: $y = a^x$ where $0 < a < 1$



D: $x \in \mathbb{R}$

R: $y \in (0, \infty)$

H.A: $y = 0$ (x-axis)

Example)

↑ · 2

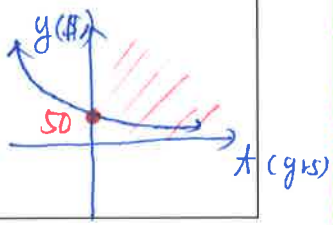
A video game loses 20% of its value each year starting value at \$50. Write the mathematical equation modeling the value of the game after t years.

t: time (yrs)

y: $.

1 − .2

$y = (50)(.8)^t$



H.A: $y = 0$

Example)

When a diesel-electric generator is switched off, the current dies away according to the formula $I(t) = 24 \times (0.25)^t$ amps, where t is the time in seconds after the power is cut.

a Find $I(t)$ when $t = 0$, 1, 2 and 3.

b What current flowed in the generator at the instant when it was switched off?

c Plot the graph of $I(t)$ for $t \geqslant 0$ using the information above.

d Use your graph or technology to find how long it takes for the current to reach 4 amps.

a) $I(0) = 24$ amps

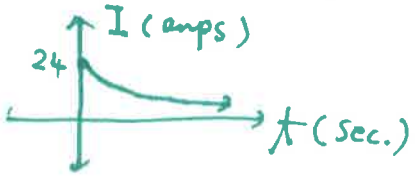
$I(1) = 6$ amps

$I(2) = 1.5$ amps

$I(3) = 0.375$ Amps

b) I-int: 24 amps

c)



d) $4 = 24(0.25)^t$

$y_1 = 24(0.25)^t$, $y_2 = 4$.