7.8 Exponential functions

Today we looked at exponential

functions: $f(x) = Aa^x$

if a > 1 ⇒ decreasing

if a > 1 ⇒ increasing

We looked at 3 examples in 7.8

(see website video) and did Q.12

12. In an experiment involving a population of flies, the model $P(t) = 40b^t$ was established for the population $P(t)$ after t days from the beginning of the experiment, $t \geqslant 0$.

  (i) How many flies were there initially?

  (ii) After 1 day, there were 48 flies. Find the value of b and interpret it.

  (iii) Sketch a graph of $P(t)$ versus t for $0 \leqslant t \leqslant 5$.

(i)

Initially ⇒ t=0

$P(t) = 40b^t$

$P(0) = 40b^0 = 40$

note: anything to the power of 0 is 1

(ii) $P(1) = 48$

⇒ $40b^1 = 48 = 40b$

⇒ $b = \dfrac{48}{40} = 1.2$

Interpret?

since $b > 1$ the function is increasing

Function is:

$P(t) = 40(1.2)^t$

$f(0) = 40$

$f(1) = 48$

$f(2) = 57.6$

$f(5) = 99.5$

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