Exercise 1A Q8

a) $y = 0.09 + 0.05x$

$\log g = 0.09 + 0.05t$

$g = ab^t$

$\log g = \log ab^t$

$\log g = \log a + \log b^t$

$\log g = \log a + t \log b$

$\Rightarrow \log a = 0.09$

$a = 10^{0.09}$

$\underline{a = 1.23}$

$\log b = 0.05$

$b = 10^{0.05}$

$\underline{b = 1.12}$

$g = 1.23 \times 1.12^t$

b) b is the rate of change of the growth rate per degree C

b) Not reliable as 35°C is outside the range of data on which the model was based

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Q5 $y = -0.301 + 0.6x$

$\log t = -0.301 + 0.6 \log n$

$t = an^k$

$\log t = \log an^k$

$\log t = \log a + \log n^k$

$\log t = \log a + k \log n$

$\Rightarrow k = 0.6$ $\log a = -0.301 \Rightarrow a = 10^{-0.301} \approx 0.5$

$$\therefore \quad t = 0.5n^{0.6}$$

Measuring Correlation

Ex 1B Q4

	T	1	2	4	5	7
a)	Atoms n	231	41	17	7	2
	log n	2.364	1.613	1.230	0.845	0.301

b) $r = -0.9795$

c) Strong negative correlation for coded data indicates linear relationship between coded data which in turn indicates support for exponential model

d) $y = 2.487 - 0.320x$

$\log n = 2.487 - 0.320t$

$n = ab^t$

$\log n = \log a + t \log b$

$\Rightarrow \log a = 2.487$

$a = 10^{2.487}$

$a = 307$

$\log b = -0.320$

$b = 10^{-0.320}$

$b = 0.479$

$$n = 307 \times 0.479^t$$

Q5

	Width w	3	4	6	8	11
	Mass m	23	40	80	147	265

a) log w

log m

b) $r = 0.9996$

c) strong linear correlation for coded data so $y = kx^n$ good fit

d) $y = 0.464 + 1.878x$

$\log m = 0.464 + 1.878 \log w$

$y = kx^n$

$\log y = \log k + n \log x$

$\log k = 0.464$

$k = 2.91$ $\quad$ $n = 1.878$

$$\underline{m = 2.91 w^{1.878}}$$