ii. $z = z_0 10^{-kt}$

$\log z = \log z_0 + \log 10^{-kt}$

$\log z = \log\phi - kt \log 10$

$\longrightarrow \log_{10} 10 = 1$

$\log z = \log\phi - kt$

$\log z = -kt + \log_{10} z_0$

iii. Room Temp $= 22°C$

so subtract room temp from all temp

$z =$

Time	10	20	30	40	50
Temp °C	68	53	42	36	31
After sub	46	31	20	14	9

Sub z into $\log_{10}(z)$ to get log value.

t	10	20	30	40	50
z	46	31	20	14	9
$\log_{10}(z)$	1.6628	1.4914	1.3010	1.1461	0.9542

graph on next page.

(Draw it!)

• Now to estimate k & z_0

look at log equation from part ii:

$y = mx + c$

$\log_{10} z = -kt + \log_{10} z_0$

z_0 must be y intercept. (on next page)

so $-k$ must be gradient we calculate

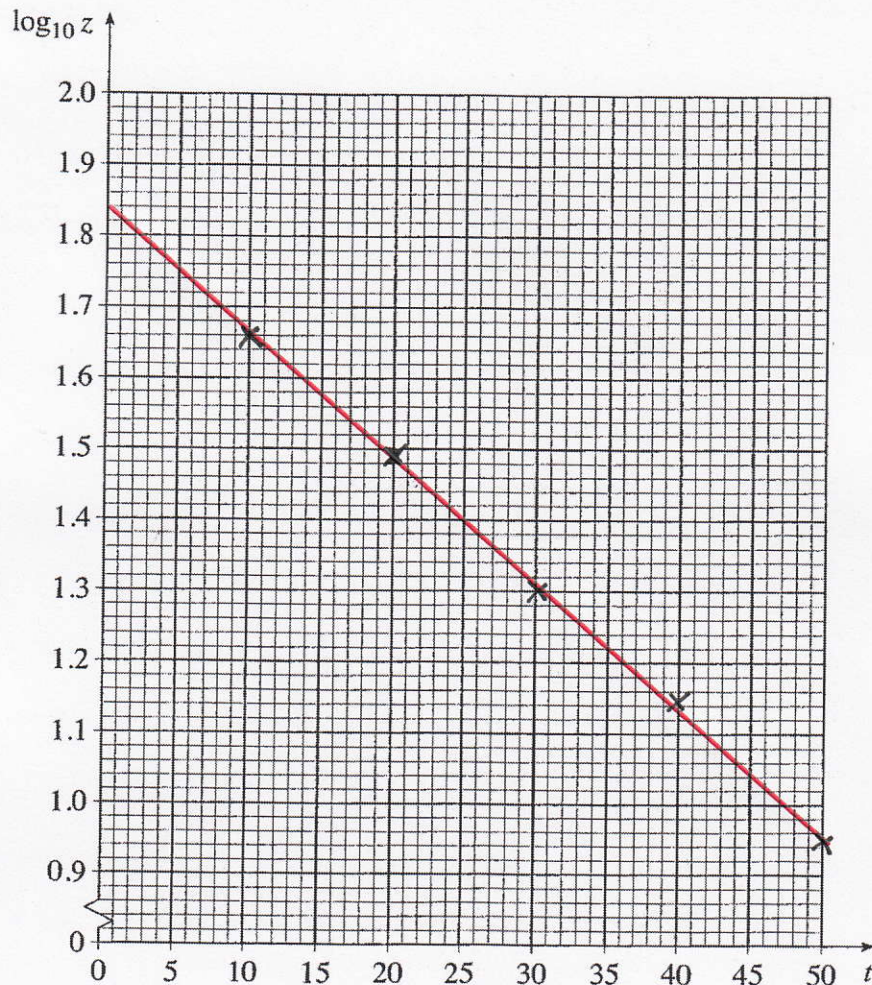gradient. $\dfrac{\Delta y}{\Delta x} = \dfrac{1.66 - 0.95}{10 - 50} = -0.$

≈ 0.01775

$-k = -0.01775$

$k = 0.01775$

This insert is to be used for question 11

11 (iii)

t	10	20	30	40	50
z	46	31	20	14	9
$\log_{10} z$	1.66	1.49	1.30	1.15	0.95

$\log_{10} z_0$ is y intercept.

$\log_{10}(1.84)$ ~~$\neq 0.02$~~

$\quad \hookrightarrow z_0 = 10^{(1.84)} \approx 69.183 \rightarrow z_0$

estimating temp 70 min after

$\left[\begin{array}{l} z = z_0 \, 10^{-kt} \\ \hookrightarrow z = 69.18 \times 10^{(-0.01775) \times (70)} \approx 3.958 \end{array}\right.$

You have to add room Temp. $3.958 + 22°C = 25.96°C$