

Issues from P3

Which sections of the specification do students need to know to do the question?

Is the question suitable (with rigorous wording etc) for a written examination.

Is the question better suited to classroom use.

Avoid this question!

1 Draw a sketch of the graphs of $y = 3 - |4-x|$ and of $y = 3 - x/2$

Write down the coordinates of any points where the graphs cut the axes.

Use your completed graphs to

(i) help solve $3 - |4-x| > y = 3 - x/2$

(ii) decide for what values of k the equation $3 - |4-x| = k$ has 2 real solutions.

2 For fitting straight lines to data of the form $y = ax^n$ and $y = ab^x$ is it preferable to use log (base 10) or \ln ?

Why?

3 This is a generalisation of a question from June 17 C34.

Let N be the number of individuals in a population.

Consider an equation of the form $N = p - \frac{e^{kt}}{a + be^{\lambda t}}$ with $p, a, b, k, \lambda > 0$

Under what conditions on k and λ does N have a minimum?

4 Find these integrals.

(a) $\int \frac{1 - \tan x}{1 + \tan x} dx$

(b) $\int \frac{\sin x}{\cos^2 x} dx$

(c) $\int_0^\pi \cos^3 x dx$

(d) $\int \frac{4x}{1+x^2} \ln(1+x^2) dx$