

# P101 Coursework 3

Name:

Fill in the final answer in the boxes on this sheet. Make sure that you attach this page, containing your **name**, as well as your final answers, to your worked answers. Staple all pages together and do not use red ink. Please return this assessment before Tuesday 3 December, 2pm, in the departmental office, room H15.

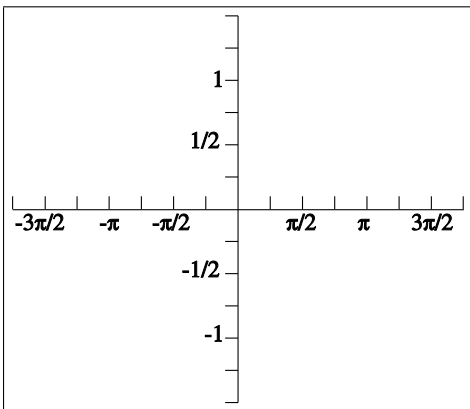
1. Differentiate  $f(t) = \sqrt{1 + 2 \cos^2 \omega t}$  w.r.t.  $t$ . Now find the minimum and maximum for  $t$  between 0 and  $\pi/(2\omega)$ . Sketch the curve.

(i) derivative

(ii) minimum

(iii) maximum

(iv) graph:



(i)  $\int \frac{1}{x^2} dx$

(ii)  $\int_{-1}^2 \frac{1}{x^2} dx$

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

(iv)  $\int x(3x + 2)^4 dx$

(v)  $\int \frac{z}{4 - z^2} dz$

(vi)  $\int \frac{\sqrt{9 - x^2}}{x^2} dx$

(vii)  $\int_{-\infty}^0 \frac{1}{25 + x^2} dx$

(viii)  $\int x^2 e^{-x} dx$

(ix)  $\int x(\ln x)^2 dx$

(x)  $\int_0^{3/2\pi} e^{-2x} \sin(x/2) dx$


2. Evaluate