

MA 2051 Calculus Review Sampler

Questions like these arise throughout MA 2051. Your calculus skills must be sharp enough to answer them quickly and accurately.

1. Let $y(t) = 7 \cos 3\pi t$; t is time in seconds.
 - (a) Sketch a graph of y .
 - (b) What is the maximum value of y ? At which time(s) is the maximum achieved?
 - (c) What is the period of y ? How many times does y repeat itself each second?
 - (d) Calculate y'' . Then show that y is a solution of the differential equation $y'' + 9\pi^2 y = 0$. Repeat the process to show that $Y(t) = A \cos 3\pi t$ solves the same DE for *any* value of the constant A .
 - (e) Answer the same questions for $z(t) = 7 \sin 3\pi t$.
2. Find the antiderivative. Differentiate to verify your result.

(a) $\int \frac{du}{u}$

(b) $\int e^u du$

(c) $\int \frac{dx}{1+4x}$

(d) $\int e^{3t-1} dt$

(e) $\int t e^{3t^2-1} dt$

(f) $\int \frac{dv}{(1-v)^2}$

(g) $\int \frac{dv}{g + kv/m}$, where g, k, m are constants

3. Solve for C : $e^{kt+C_1} = C e^{kt}$.
4. Solve for y : $\ln |y| = kt + C$.
5. Solve for v : $\ln |g + kv/m| = kt/m + C$.
6. Find value(s) of the constant r that make e^{rt} a solution of $y'' + y' - 2y = 0$.