

Calculus 1, Handwritten Homework 12 — Spring 2022

NAME _____ STUDENT NUMBER _____

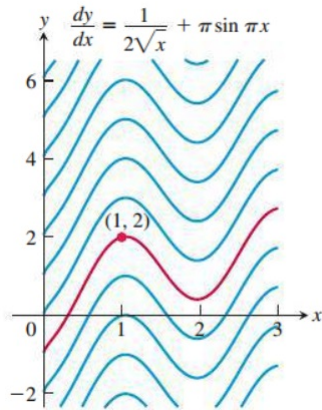
Write in complete sentences and use correct notation (such as equal signs). Give justifications for your claims using the definitions and theorems in the notes and book (quote them by name or number, as is done in the examples in the notes and videos, and in the solutions posted online). Give precise values, not numerical (calculator) approximations. If provided, put your final answer in the box. Each numbered problem is worth 5 points. Print out this document, work the problem, scan your solutions, and submit the scan of (in PDF) to the D2L DropBox by the deadline. See the [online syllabus](#) for deadlines. **Do not copy work from others or from the internet! This will result in you being charged with academic misconduct.**

1(a). Solve the initial value problem:

$$\frac{d^3\theta}{dt^3} = 0; \quad \theta''(0) = -2, \quad \theta'(0) = -\frac{1}{2}, \quad \theta(0) = \sqrt{2}.$$

This is Exercise 110 of Section 4.8.

- 1(b). The figure shows solution curves of the differential equation. Find an equation for the curve through the labeled point. Show your work and explain. This is Exercise 122 in Section 4.8.



2. Using rectangles each of whose height is given by the value of the function at the midpoint of the rectangle's base (*the midpoint rule*), estimate the area under the graph of the function $f(x) = 4 - x^2$ between $x = -2$ and $x = 2$ using two and then four rectangles. This is Exercise 8 in Section 5.1.



3. For the function $f(x) = 3x^2 + 2$, find a formula for the Riemann sum obtained by dividing the interval $[0, 2]$ into n equal subintervals and using the right-hand endpoint for each c_k . Then take a limit of these sums as $n \rightarrow \infty$ to calculate the area under the curve over $[0, 2]$.

