

As a reminder, the following rules will be strictly enforced.

1. The front page must include your name, student number, your tutorial code (e.g. M3A) and the name of your teaching assistant. *Failure to put your name and/or your student number will result in a zero in your assignment. Failure to put your tutorial code and the name of your tutor will result in a 20% reduction of your assignment mark.* A cover page is not required as long as the necessary information is on the top of the first page.
2. Assignments must be submitted on letter-sized (8.5×11 inch) paper. *Using ripped notebook paper is unacceptable and will result in a zero in your assignment mark.* Assignments that are more than one page in length must be stapled in the top left corner. *Failure to staple such assignments will result in a 20% reduction of your assignment mark.* Do not use clear plastic binders.
3. You may hand your assignment to your instructor before the beginning of lecture, or deposit it into the MAT 137Y Assignment Box located at SS 1071 before the deadline. *Assignments handed in after 6:10 p.m. on Thursday will not be accepted for any reason, even if it is one minute late!*
4. As a courtesy to other students who are using the Math Aid Centre at SS 1071 to obtain help in other math courses, please do not occupy SS 1071 to complete your assignment on the due date.

Policy about Plagiarism. It is very helpful to have other students with whom to study, and we encourage you to work together. However, **it is extremely important that problem set solutions be written up independently, otherwise this constitutes plagiarism!** The teaching assistants will enforce this rule very strictly, and will apply severe penalties to any one in violation. In particular, the Department of Mathematics reminds all students that plagiarism, cheating, and all forms of academic misconduct will not be tolerated. Students in violation of the *Code of Student Conduct* will be dealt with severely by the Department of Mathematics and the Faculty of Arts & Science.

Suggested Problems. Do not hand in.

1. SHE 3.1: 1, 3, 9, 13, 25, 31, 41, 55, 63.
2. SHE 3.2: 7, 11, 13, 23, 31, 37, 41, 43, 53, 59.
3. SHE 3.3: 29, 37, 41, 53.
4. SHE 3.4: 3, 7.
5. SHE 3.5: 13, 19, 25, 43, 51, 69.
6. SHE 3.6: 3, 9, 11, 17, 27, 43.
7. SHE 3.7: 5, 9, 15, 19, 23, 31, 45, 51, 55, 57.
8. SHE 4.10: 3, 9, 13, 21, 25, 33, 39.

Required Problems. Hand in solutions to the problems below.

1. SHE 3.1: 16, 52.
2. SHE 3.2: 32, 42, 50.
3. SHE 3.3: 44.
4. SHE 3.4: 8, 12.
5. Differentiate the following functions.

(i) $f(x) = x^3 \sin(5x) \cos(\sqrt{x} + 2)$.

(ii) $f(x) = \sin^2(1 + \cos^3(1 + \tan^4(1 + x)))$.

(iii) $f(x) = (x^2 + (x^2 + (x^2 + 1)^{-1})^{-1})^{-1}$.

6. Find the equation of all tangent lines to the curve $y = x^3$ that intersect $(0, -16)$.
7. Find all points on the curve $x^2y^2 + xy = 2$ where the slope of the tangent line is -1 .
8. Using y as the independent variable and x as the dependent variable, use implicit differentiation to find dx/dy for the equation $(x^3 + y^3)^2 = 4x^2y$. What is $\frac{d^2x}{dy^2}$ when $x = 1$ and $y = 1$?
9. SHE 4.10: 24, 40.