

**Information for Students about the MATH 104 December
Final Examination**

December 4, 2017

1. The MATH 104 final exam will be held from noon to 2:30 p.m. on Friday, December 15, 2017. Check the exam schedule for the locations for each section.
2. This is a closed-book exam. Students may not bring notes or books to the exam room.
3. Students may NOT have cell phones, or any other electronic devices on or near them during this exam. **A cell phone that goes off during the exam will be treated as an attempt by the student to disrupt the exam.**
4. No calculators are permitted.
5. Students may NOT have a pencil case on or around them during this exam. Students may have a reasonable number (≤ 4) of pens and/or pencils on their exam table.
6. Students are encouraged to write the exam in pencil and to be **neat and organized** in the presentation of their answers. **Graders will not mark work that is illegible or otherwise unreadable in their judgment.**
7. Students may not wear ball caps or hoodies or other head coverings that obscure the face during the exam. Head coverings worn for religious reasons are acceptable, of course.
8. **Students are encouraged to leave their backpacks, purses, and other personal bags at home. The invigilators WILL NOT be responsible for lost and/or stolen items.**
9. Question 1 consists of short answer problems worth up to 3 marks each. Part marks are possible for each short problem. Final answers without any supporting work will receive a grade of 0. A student may receive 1 or 2 marks based on correct partial solutions. Only scores of 0,1,2, or 3 are possible on each part.
10. The remaining problems are long answer problems and students will be graded on their entire solutions.
11. The final exam is based on the MATH 104 syllabus, as published in the form of the Course Outline and the Course Learning Outcomes on the main MATH 104 website. Hence, you should know the topics in this posted syllabus. More details are posted as the weekly learning goals.
12. The 2017W MATH 104 final exam DOES NOT have a question involving inverse trigonometric functions.

13. The following common high school formulae may be needed. You need to memorize these formulae.

- The volume of a rectangular box: $V = xyz$, where x, y , and z are the dimensions of the box.
- The volume of a sphere: $V = \frac{4}{3}\pi r^3$, where r is the radius of the sphere.
- The area of a circle: $A = \pi r^2$, where r is the radius of the circle.
- The circumference of a circle: $C = 2\pi r$, where r is the radius of the circle.
- The Pythagorean Theorem: $a^2 + b^2 = c^2$, where a and b are the sides of a right triangle, and c is the hypotenuse.
- The quadratic formula: The roots of $ax^2 + bx + c = 0$ are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

14. There are other formulae which are a natural part of this course. You need to know those as well. For example, you should know the product rule.

15. The following formula from the course will be given on the exam if it is necessary: the price elasticity of demand $\epsilon = \frac{p}{q} \frac{dq}{dp}$. This formula will not be explained on the exam, nor may students ask questions about it of the invigilators.

16. The following comments give some guidance on expectations for the final exam concerning grading.

- In a single question, once a student makes an error, the grade consequence of that error for the remaining parts of the problem will depend on whether or not the error trivializes the problem or makes the problem far too complex. For example, if a calculation error in part (a) of a graphing problem means that a place where there is a vertical asymptote is not identified, the student would lose most or all of the marks for any affected parts that question.
- Simplification is encouraged except where stated otherwise. For example, $1 + \frac{20}{10}$ should be simplified to 3, though the mark consequences for not simplifying this answer would be minimal. Simplification may be needed when the answer, such as a derivative, is to be used in a subsequent calculation.
- Calculator-ready answers, which are formed of numbers and standard functions (e.g. e^x , $\sin(x)$, etc.) need not be simplified. For example, both $\arcsin(1/2)$ and $\pi/6$ are acceptable.
- Students should endeavour to write the mathematics correctly. Using notation incorrectly, such as $\lim_{x \rightarrow a} = f(a)$ instead of $\lim_{x \rightarrow a} f(x) = f(a)$ is frowned upon, but won't be marked down unless it affects the logical flow. Similarly, improper use of brackets or errant "=" signs are frowned upon, but won't be marked down unless they affect the logical flow.

- The grader should not have to decipher an answer. An answer in which it is unclear if there is a + or - sign, for example, will be deemed one way or the other by the best guess of the grader. An example is a - sign that has been erased, but is still visible; the assumption is a + sign in this case.
- Erased or crossed out work will not be counted against the student. **Multiple solutions where one answer is wrong will be counted as wrong even if one of the answers is correct.**
- Incorrect mathematics included in a solution, even if the overall solution reaches the correct answer, will be marked down. An example would be if a student were to correctly use the first derivative test to show that a critical point is a relative maximum, but include in the space given for the solution an incorrect calculation of the second derivative of the given function as part of another attempt at the solution.