

# MTH 251Z Lab

## Day One

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Most all of the skills you learned in algebra and precalculus courses will be necessary for your success in calculus. This document is meant to allow you to self-diagnose any gaps in knowledge you may have. Take some time to work through all of these exercises, and note any time you feel unsure or hesitant about *any* spot or step you take. This are times you will want to ask for assistance.

1. Write  $\frac{4}{\sqrt[4]{81x^3}}$  as an algebraic expression with no radicals. Simplify where possible.
2. Explain in as much detail as possible why  $(2x - 3)^2$  is not  $4x^2 - 9$ .
3. Factor  $32z - 2z^5$  completely.
4. Find an equation for the line on the points  $(-2, 7)$  and  $(6, 1)$ . Express the equation in both point-slope and slope-intercept form.
5. Simplify  $\frac{\frac{1}{x} - \frac{x}{3+x}}{\frac{x}{3+x} + \frac{3}{x^2}}$ .
6. Rationalize the denominator of  $\frac{x-1}{\sqrt{1-x^2}-1}$ .
7. Simplify  $\left(\frac{-2xy^{-3}}{5x^{-2}y^2}\right)^3$ .
8. Your success in calculus will rely heavily on your knowledge of graphs. For each of the functions below, draw a set of coordinate axes. Label your axes with an  $x$  and a  $y$  on the positive sides of the axes. Draw tic marks and provide a scale.
  - (a)  $f(x) = x^2$ .
  - (b)  $g(x) = \ln x$ .
  - (c)  $h(x) = e^x$ .
  - (d)  $j(x) = \sqrt{x}$ .
  - (e)  $k(x) = |x|$ .
  - (f)  $\ell(x) = \frac{1}{x}$ .
  - (g)  $m(x) = \sin(x)$ .
  - (h)  $n(x) = \tan(x)$ .
9. Evaluate each of the following trigonometric functions exactly, without the aid of a calculator.
  - (a)  $\sin 210^\circ$ .
  - (b)  $\cos \frac{5\pi}{4}$ .
  - (c)  $\tan \frac{11\pi}{3}$ .
  - (d)  $\arcsin \frac{\sqrt{3}}{2}$ .
  - (e)  $\cos^{-1} \frac{\pi}{2}$ .
  - (f)  $\tan^{-1} \sqrt{3}$ .