# Liberal Arts Student with Good Mathematics Background

Although liberal arts students with a strong mathematical background should find it useful to take one of the previous courses [MAT 100, 101, 102, 118], other courses, of a higher level, may be more valuable, especially if they enter fields that use higher mathematics. This is true for certain areas of economics and finance, sociology, science and psychology. In all cases, students should consult with their advisors. Possible higher level courses include MAT 103, MAT 111, MAT 122, MAT 123 and beyond. Students should carefully check prerequisites before enrolling. MAT 103 has MAT 102 as a prerequisite. Information on Calculus-sequence classes is below.

# The Calculus Sequence

Calculus I and Calculus II (MAT 122 and MAT 123) are required for some majors such as computer science, pre-med, engineering, mathematics, and the sciences. In order to take these demanding courses, students need a deep understanding of advanced algebra, as well as different types of functions. Students lacking strong high school mathematics backgrounds may need to take prerequisite courses such as MAT 109 (Algebra and Trigonometry) and MAT 111 (Elementary Functions/ Pre-calculus) before registering for Calculus courses. These courses build on each other in sequence MAT 109-MAT111-MAT122-MAT 123. **Students who had to take any remedial math courses must begin the sequence at MAT 109 if they plan to take MAT 111, 122, or 123.**

**MAT 109 Prerequisite Knowledge**

If you plan to take MAT 109, then you will be expected to have a strong foundation in basic algebra. Below is some notation/ formulas your instructor will expect you to be familiar with BEFORE you enter the course. If you do not understand some of the notation, then you are likely to struggle with MAT 109. If you do not plan to ever take calculus, then you should consider taking a course for liberal arts students. If you need to take MAT 109 for your major, or as a prerequisite for Calculus, then you should brush up your algebra skills before taking this course. The website www.mymathtest.com can give you a diagnostic algebra test and tell you what topics you need to review in an algebra text.

- $-8^0 + 3^{-1} = -\frac{2}{3}$
- $(2x-4)(3x+5) = 6x^2 - 2x - 20$
- If $2\pi r = c$, then $r = \frac{c}{2\pi}$
- The solution of $\frac{14}{6x} = \frac{3}{2}$ is $x = \frac{14}{9}$
- $25x^2 - 36y^2$ factors into $(5x+6y)(5x-6y)$
- $\frac{12x^7y^8}{4x^5y^9} = \frac{3x^2}{y}$

**MAT 111 Prerequisite Knowledge**
If you plan to take MAT 111, then you will be expected to have a strong foundation in intermediate algebra, with some knowledge of functions and graphing. Below is some notation/ formulas your instructor will expect you to be familiar with BEFORE you enter the course. If you do not understand some of the notation, then you are likely to struggle with MAT 111. If this material looks familiar, but you haven't seen it for a while, then you should review these concepts to prepare yourself for the course. If this material is unfamiliar to you, then you should take MAT 109 before registering for MAT 111.

- $\frac{5}{x}-\frac{3}{x-2}=\frac{2x-10}{x^2-2x}$
- The slope of a line from the origin to $(2,-6)$ is $-3$
- $\frac{\sqrt{x}\cdot x^2}{x^4}=x^{-3/2}$
- $\sin 60^\circ=\frac{\sqrt{3}}{2}$
- $3x^2-5x+1=0$ has a solution at $x=\frac{5\pm\sqrt{13}}{6}$
- If $5=ax+xy$ then $x=\frac{5}{a+y}$

**MAT 122 Prerequisite Knowledge**
If you plan to take MAT 122, then you will be expected to have a strong foundation in Elementary Functions. If this material looks familiar, but you haven't seen it for a while, then you should review these concepts to prepare yourself for the course. If this material is unfamiliar to you, then you should take MAT 111 and possibly MAT 109 before registering for MAT 122.

- $\tan(\arctan x)=x$
- $\ln 5+\ln 2=\ln 10$
- $\sin\left(\frac{\pi}{6}\right)=\frac{1}{2}$
- $f(x)=\frac{x-5}{x-2}$ has a vertical asymptote at $x=2$, a horizontal asymptote at $y=1$, and a zero at $x=5$
- $y=(x-1)^2+5$ is a parabola with vertex at $(1,5)$
- The average rate of change of $f(x)=x^2$ on $[1,2]$ is $3$