If I draw a vertical line through $F_2(c, 0)$, the line will intersect the ellipse in two points.

It would be beneficial if I could find the coordinates of the endpoints of the latus rectum.

PS - This is another reason why MAT 1033 is a prerequisite!

How does one find these coordinates?

We have a "system" \[
\begin{align*}
\frac{x^2}{a^2} + \frac{y^2}{b^2} &= 1 \\
&\quad \text{ellipse} \\
x &= c \\
&\quad \text{vert. line}
\end{align*}
\]

\[\therefore \frac{c^2}{a^2} + \frac{y^2}{b^2} = 1\]

Solve for $y$

\[\frac{y^2}{b^2} = 1 - \frac{c^2}{a^2} = \frac{a^2-c^2}{a^2} = \frac{b^2}{a^2}\]

\[\therefore b^2 \frac{y^2}{b^2} = \frac{b^2}{a^2} \cdot \frac{b^2}{a^2}\]

\[y^2 = \frac{b^4}{a^2}\]

\[\therefore y = \pm \frac{b^2}{a}\]

\[\therefore \text{The length of the L.R. is } 2\frac{b^2}{a}\]
Start Ch 11: Sequences & Series (p. 820)  
(Read intro p 821).

§ 11.1: Sequences & Summation Notation (p. 822)

1. Sequence. — A sequence is an ordered list.
   a. Two concepts:
      i. The entry.
      ii. The address of the entry.

   Example
   \[2, 4, 6, 8, 10\]  
   \[1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th}\]  
   Cardinal numbers (the list)  
   Ordinal numbers (the addresses of the entries).

2. Generic sequence. \(a_1, a_2, a_3, \ldots\) (The \(a_i\)'s stand for the elements of the list; while the subscripts are the "addresses" — which number is in 1st position, 2nd position, etc...)

   In the case above: \(a_1 = 2, a_2 = 4, a_3 = 6\) etc...

2. In most of our problems, we'll be dealing with patterns.

   Example: 5, 9, 13, 17, 21, 25
   There is a pattern (formula).
   i. What is \(a_4\)? \(\text{Ans: } a_4 = 17\) \(\leftarrow\) (add 4) each time.
   ii. Write down a formula.
      \[
      a_n = a_{n-1} + 4
      \]
      \[
      a_1 = 5
      \]
      \[
      5, 9, 13, 17, 21, 25
      \]
      \[
      a_2 = 9, a_3 = 13, a_4 = 17, a_5 = 21, a_6 = 25
      \]
   iii. \(a_n = 4n + 1\) Here is the formula I was looking for.