Transcribing Math & Science using TypeWell

Kate Ervin
Executive Director, TypeWell

Key Learning Goals

• Benefits (and challenges) of capturing accurate, well-formatted mathematical notation in a typed transcript

• Considerations for evaluating the appropriateness of TypeWell services in math/science classes
STEM Courses

- College Algebra
- Statistics
- Trigonometry
- Accounting
- Finance
- Economics
- Biology
- Organic Chemistry
- Physics/Mechanics
- Echocardiography

What happens in a STEM class?

- Lecture
- Q&A Discussion
- Discussion
- Examples
- Practice Problems
- Solutions, Proofs, etc.
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What works? What hurts?

**What works?**
- Accurate content
- Quick readability
- Correct notation
- Clear explanation of board work

**What hurts?**
- Inaccuracies
- Cluttered format
- Confusing notation
- Missing explanations of board work
Formatting

• White space

• Math Mode
  – font
  – special characters
  – expansions

• Indentation and alignment

What works? What hurts?

Solve for $c$ in this equation:

$$a(b - c) = 3d$$

Since $c$ is located inside a set of parentheses, I would first distribute the $a$ through the parentheses on the left side of the equation:

$$ab - ac = 3d$$

Next, isolate the $c$ term ($-ac$) by subtracting $ab$ from both sides of the equation:

$$-ac = 3d - ab$$

Finally, to get $c$ by itself, divide by $-a$ on both sides of the equation. Cancel the $-a$ on the left side. Then we have our answer:

$$c = \frac{3d - ab}{-a}$$

To solve for $c$ - since $c$ is in parentheses - distribute $a$ through the parentheses. So we have $a$ times $b$ ($ab$) minus $a$ times $c$ ($ac$) equals $3d$. [Missed.] [On board.] Finally to get $c$ by itself, simply divide by negative $a$ on both sides of the equation... $-ac / -a = 3d - ab / -a$

Cancel the negative $a$'s on the left. Then we have our answer. [On board.]

$$c = 3d - ab / -a$$
Example Lecture:
“How to Do Algebra”

Transcriber skills: formatting
  toggling Math Mode on/off
  fraction template ($frac$)

Transcript Evaluation

✔ Content
  - Initial equation
  - Steps explained
  - Final answer

✔ Formatting
  - White space
  - Indentation

✔ Technical Skills
  - Math mode
  - $frac$

✔ Grammar
  - Complete sentences
  - Punctuation
Solve for \( c \) in this equation:
\[
a (b - c) = 3d
\]
Since \( c \) is located inside a set of parentheses, I would first distribute the \( a \) through the parentheses on the left side of the equation:
\[
ab - ac = 3d
\]
Next, isolate the \( c \) term \((-ac)\) by subtracting \( ab \) from both sides of the equation:
\[
-ac = 3d - ab
\]
Finally, to get \( c \) by itself, divide by \(-a\) on both sides of the equation. Cancel the \(-a\) on the left side. Then we have our answer:
\[
c = \frac{3d - ab}{-a}
\]

A note about notes...
To type, or not to type

- Previews
- Summaries
- Relationships
- Cause & effect
- Questions asked of the class
- Definitions
- Formulas
- Proofs
- Reasons
- Exceptions
- Textual references

What happens in a math class?

- Lecture
- Q&A Discussion
- Examples
- Practice Problems
- Solutions, Proofs, etc.
To type, or not to type

- Verbal explanations
- [Reader orientations]
- Board work
  - Initial problem
  - Final answer
- Intermediate steps
- Diagrams, graphs
- Complex equations
- Mistake/correction
- Everything written on the board
The Pythagorean theorem deals with the lengths of the sides of a right triangle. It is often written in the form of the equation:

$$a^2 + b^2 = c^2$$

The theorem states that:

The sum of the squares of the lengths of the legs of a right triangle (‘a’ and ‘b’ in the triangle shown below) is equal to the square of the length of the hypotenuse (‘c’).
Example Lecture
“Pythagorean Theorem”

Transcript Evaluation

✔ Content
  - Pythagorean theorem
  - Define a, b, and c
  - Equation from board
  - Goal
  - Description of steps
  - Answer

✔ Formatting
  - Math mode

✔ Technical Skills
  - Abbrev for theorem
  - Square root notation

✔ Grammar
  - Complete sentences
To find the value of $x$ in this example, notice that we have a right triangle. We can use the Pythagorean theorem. This theorem states that the sum of the squares of the lengths of the legs of a right triangle is equal to the square of the length of the hypotenuse.

$$a^2 + b^2 = c^2$$  \hspace{1cm} (Where $a$ and $b$ are the legs, and $c$ is the hypotenuse)

Using the triangle on the board, we can set up this equation:

$$(6)^2 + (8)^2 = (x)^2$$

**Solve for $x$:**

$$36 + 64 = x^2$$

$$100 = x^2$$

**Take the square root of both sides of the equation:**

$$\sqrt{100} = \sqrt{x^2}$$

$$10 = x$$

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**Remember what works!**

- ✔ Accurate content
- ✔ Quick readability
- ✔ Correct notation
- ✔ Clear explanation of board work
Transcribers’ Best Practices

• Formatting
  − White space
  − Indentation

• Content
  − Initial/final equations
  − Explanation of steps

• Technical Skills
  − PAL, Math Mode
  − Practice!

• Grammar
  − Clear wording
  − Complete sentences
  − Punctuation

Graphs and Commentary

Speaker says: “This wedge highlights a worrisome trend.”

Transcript: “The blue wedge highlights a worrisome trend.”
Considerations for Students

• Verbatim vs. meaning-for-meaning
• What do you expect/need from the speech-to-text accommodation?
  – During class
  – After class (i.e., the transcript file)
• Notetaking & working problems

Considerations for the Teaching Team

• On-site vs. remote transcriber
• Providing transcriber with prep material
• Transcriber’s level of technical skill
• Transcriber’s math/science proficiency
• Managing student/parent expectations