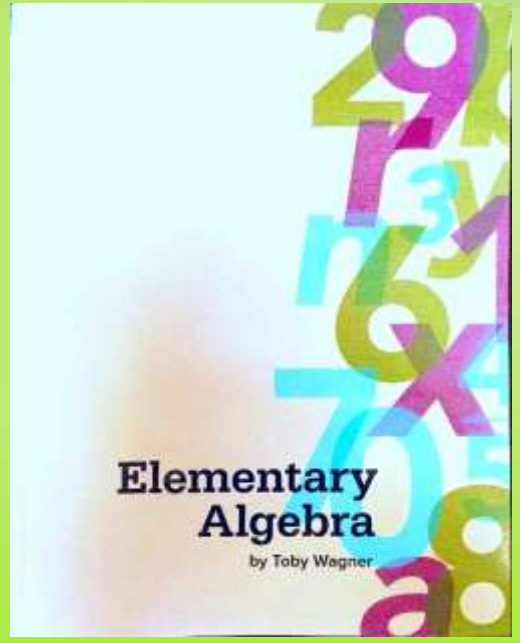
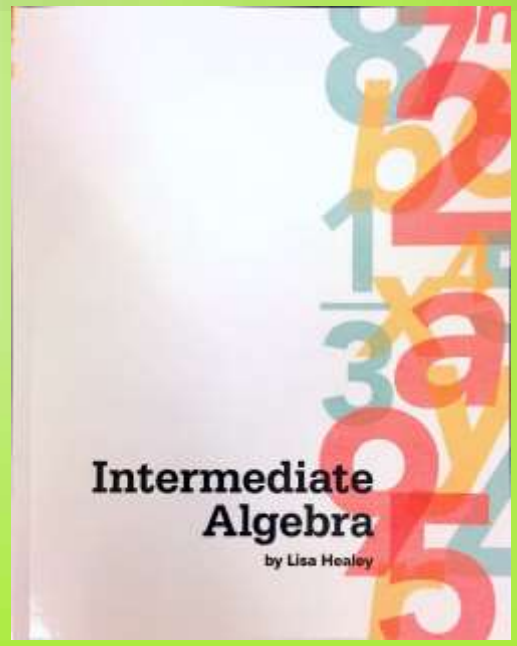
From $140 to $28

Taking an 80% Bite Out of Textbook Costs

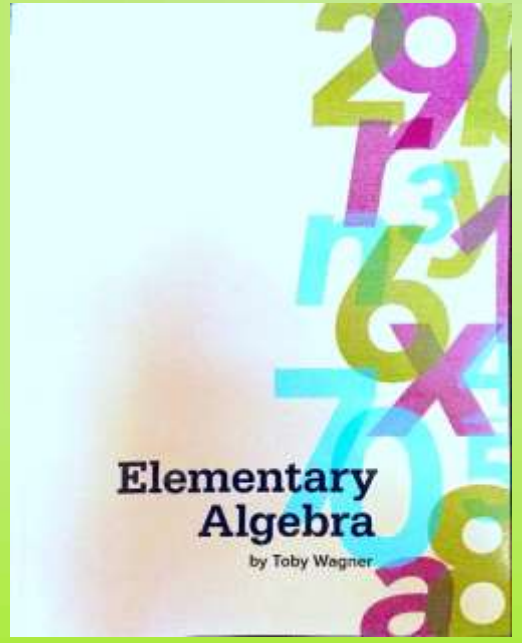


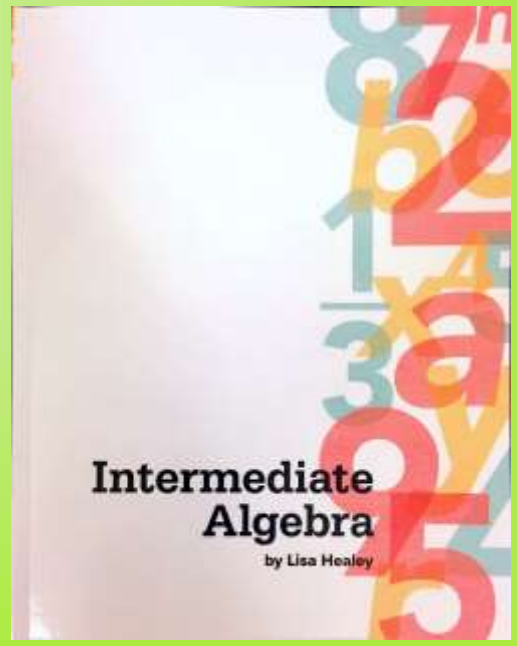


By: Toby Wagner & Lisa Healey

From ~~$140~~ $167 to $28

Taking an ~~80%~~ 83.2% Bite Out of Textbook Costs





By: Toby Wagner & Lisa Healey

How to get low-cost (or no-cost) materials

- Use books produced by others
  - Benefit: increasing quantity/quality of books
  - Downside: not customizable

- Gather OER material for your course
  - Benefit: customizable
  - Downside: hard to get high-quality books/resources, inconsistent presentation of material

Our Approach:

Gather OER source material, then create and publish our own textbooks and other resources

- **Fully customizable**
- **Consistent voice throughout book**
- **Quality, low-cost textbooks are produced**

Chemeketa Press

- Started in 2015 as a pilot project as part of Chemeketa Community College initiative to save students money on textbooks
- Goal: develop & publish effective and affordable textbooks
- Elementary Algebra book was one of four initial projects

The Process

- Identify OER source material
- Chemeketa Press converts all source material into MS Word
- Faculty author edits/enhances material
  - Editing/Authoring is done within MS Word
  - More complicated expressions created with MathType
  - Graphs are created with Geogebra

End result: We end up with a book that has everything we need, but nothing that we don't need.

The Process (continued)

- Layout/Design and textbook production is handled by Chemeketa Press
- Online homework sets are created with MyOpenMath
- “Teaching Materials” package developed with adjunct instructors in mind

Stages

1. Get approval for textbook project
2. Create a “beta” textbook w/ Chemeketa Press (1st summer)
3. Pilot the “beta” edition (typically one academic year)
   - Review and minor revisions happen during this time
   - Any major revisions happen the following summer
   - Discuss / approve adoption (or designation as an alternative textbook) by the Math Program
4. Production of “first edition” (2nd summer)
5. Online version released

Elementary Algebra Project (part 1)

Spring 2015

Chemeketa Press is given the green light

Elementary Algebra Book Project begins

- Meetings to plan book development and set deadlines
- OER material researched/gathered

Elementary Algebra Project
(part 1)

Summer 2015: Textbook Development

- OER material rearranged to fit our course
- Explanations/Examples enhanced
- Each section went through two rounds of revision
- Layout & final proofreading
- Publishing/Printing
- All of this done in… … … 2 months

Elementary Algebra Project
(part 1)

Summer 2015: Textbook Development

- OER material rearranged to fit our course
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- All of this ~~done~~ ***attempted*** in… … … 2 months

Example: Before

Solve $x + 7 = 10$ for x.

$$
\begin{aligned}
x + 7 &= 10 && \text{7 is associated with } x \text{ by addition. Undo the association} \\
x + 7 - 7 &= 10 - 7 && \text{by subtracting 7 from } \textit{both} \text{ sides.} \\
x + 0 &= 3 && 7 - 7 = 0 \text{ and } 0 \text{ is the additive identity. } x + 0 = x. \\
x &= 3 && x \text{ is isolated, and the equation } x = 3 \text{ is equivalent to the} \\
& && \text{original equation } x + 7 = 10. \text{ Therefore, these two} \\
& && \text{equation have the same solution. The solution to } x = 3 \\
& && \text{is clearly 3. Thus, the solution to } x + 7 = 10 \text{ is also 3.}
\end{aligned}
$$

Check: Substitute 3 for x in the original equation.

$$
\begin{aligned}
x + 7 &= 10 \\
3 + 7 &= 10 && \text{Is this correct?} \\
10 &= 10 && \text{Yes, this is correct.}
\end{aligned}
$$

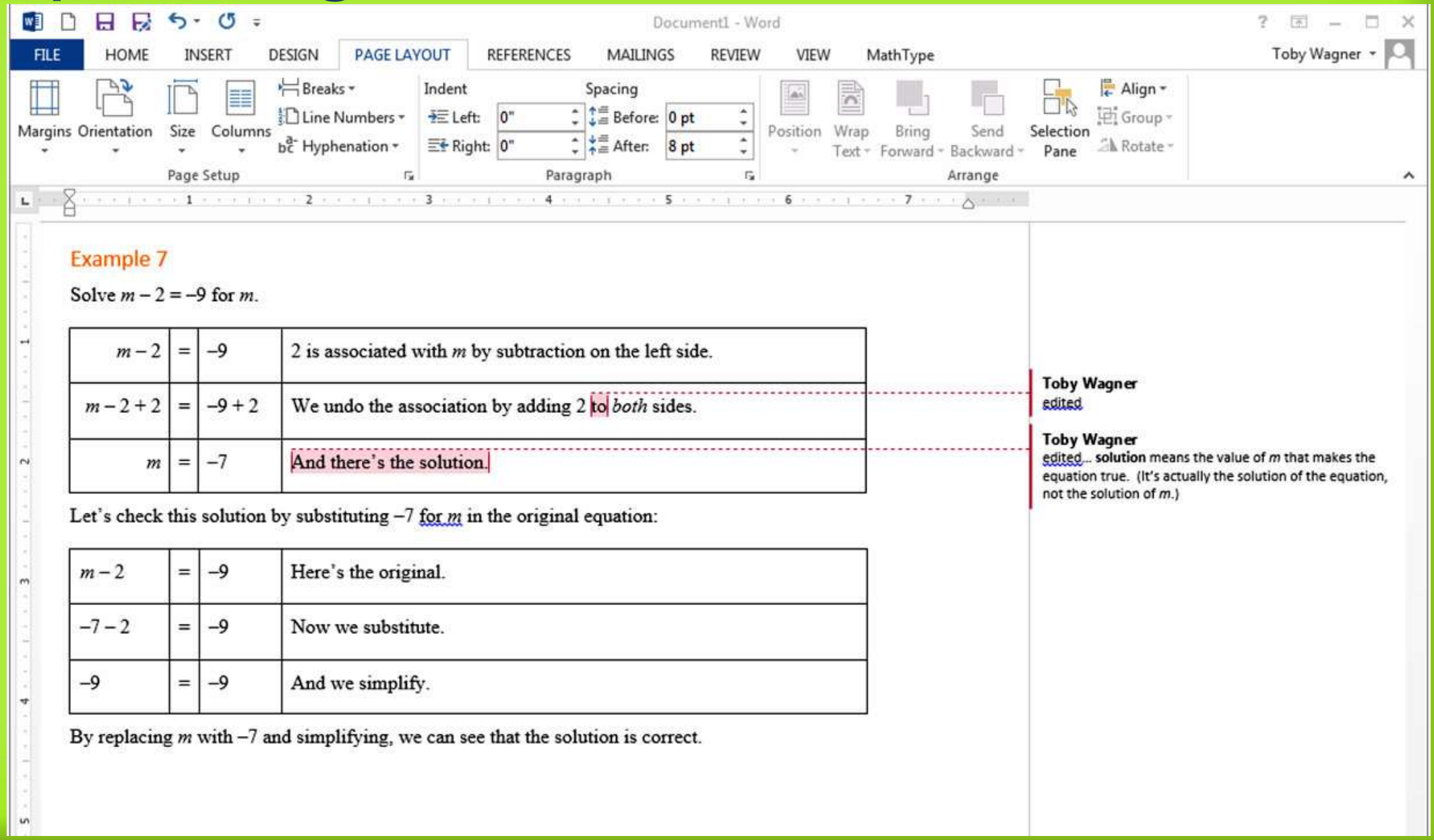
Solve $m - 2 = -9$ for m.

$$
\begin{aligned}
m - 2 &= -9 && 2 \text{ is associated with } m \text{ by subtraction. Undo the association} \\
m - 2 + 2 &= -9 + 2 && \text{by adding 2 from } \textit{both} \text{ sides.} \\
m + 0 &= -7 && -2 + 2 = 0 \text{ and } 0 \text{ is the additive identity. } m + 0 = m. \\
m &= -7
\end{aligned}
$$

Check: Substitute -7 for m in the original equation.

$$
\begin{aligned}
m - 2 &= -9 \\
-7 - 2 &= -9 && \text{Is this correct?} \\
-9 &= -9 && \text{Yes, this is correct.}
\end{aligned}
$$

Example: During



Example 7

Solve $m - 2 = -9$ for m.

$m - 2$	=	-9	2 is associated with m by subtraction on the left side.
$m - 2 + 2$	=	$-9 + 2$	We undo the association by adding 2 to *both* sides.
m	=	-7	And there's the solution.

Let's check this solution by substituting -7 for m in the original equation:

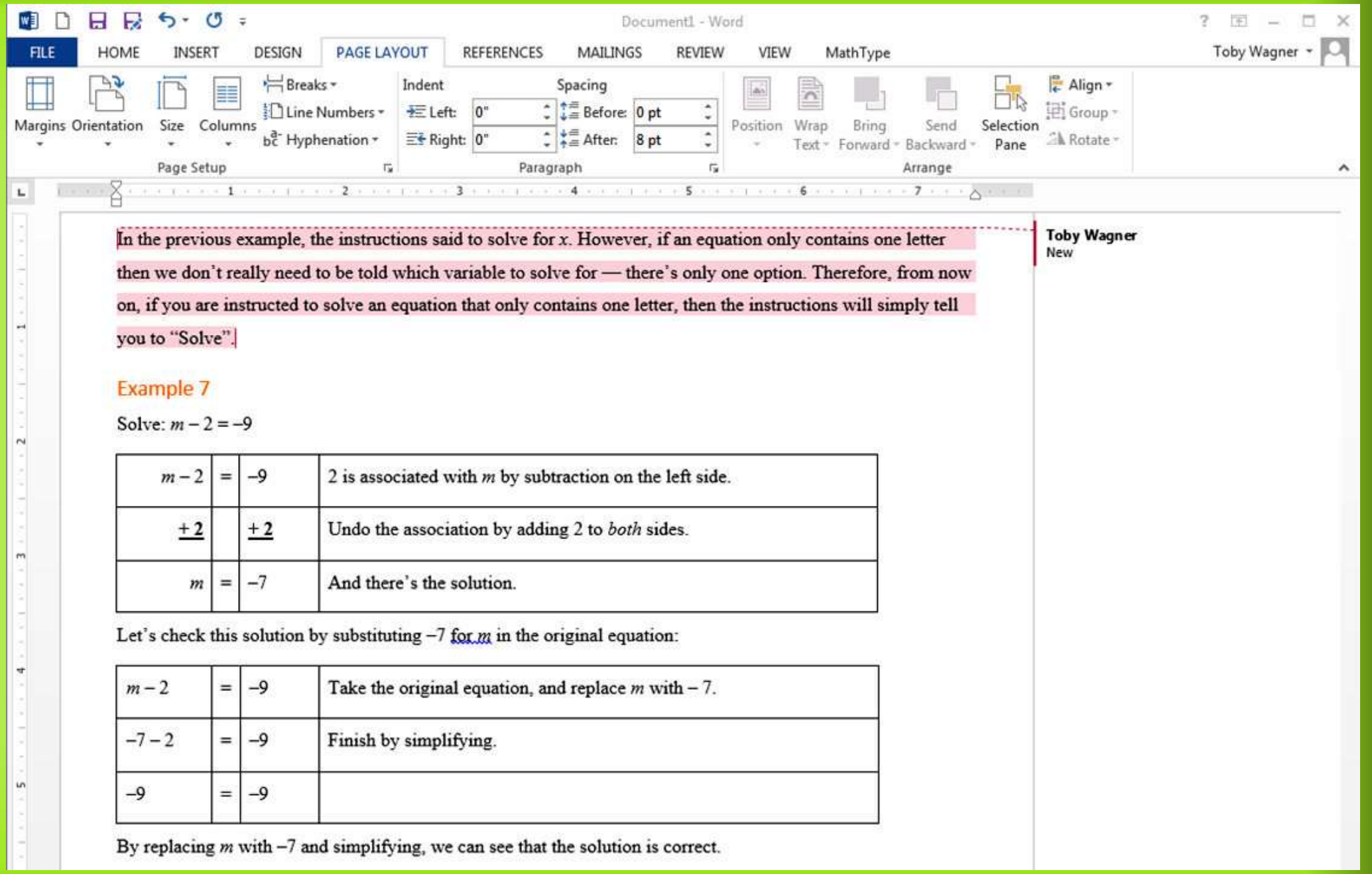
$m - 2$	=	-9	Here's the original.
$-7 - 2$	=	-9	Now we substitute.
-9	=	-9	And we simplify.

By replacing m with -7 and simplifying, we can see that the solution is correct.

Toby Wagner
edited

Toby Wagner
edited... **solution** means the value of m that makes the equation true. (It's actually the solution of the equation, not the solution of m.)

Example: During



Example: After

In the previous example, the instructions said to "solve for x." However, if an equation only contains one letter, we don't really need to be told which variable to solve for — there's only one option. So from now on, if you're instructed to solve an equation that only contains one letter, the instructions will simply tell you to "solve."

Example 7

Solve: $m - 2 = -9$

$$\begin{aligned} m - 2 &= -9 \quad && \text{2 is associated with } m \text{ by subtraction on the left side.} \\ \underline{+\,2} &\quad \underline{+\,2} && \text{Undo the association by adding 2 to } \textit{both} \text{ sides.} \\ m &= -7 \end{aligned}$$

Let's check this solution by substituting -7 for m in the original equation:

$$\begin{aligned} m - 2 &= -9 \quad && \text{Take the original equation and replace } m \text{ with } -7. \\ -7 - 2 &= -9 \quad && \text{Finish by simplifying.} \\ -9 &= -9 \ \checkmark \end{aligned}$$

Challenges:

- Complete underestimation of time/effort needed
- The editing/revision tug-o-war: Conversational vs. Technical

Highlights

- Insight/Experience gained with regard to textbook production
- Producing a book matching our course concepts/objectives
- Providing students with a book they can afford

Intermediate Algebra Project

Winter 2016

Chemeketa Press makes a proposal:

Create low-cost textbooks for our developmental math sequence

We volunteer:

- Chris: Math 60, *Elementary Algebra*
- Toby: Math 70, *Elementary Algebra*
- Lisa: Math 95, *Intermediate Algebra*

Spring 2016

"Team Algebra" holds several meetings:

- Realign curriculum: Math 60, 70, 95
- Discuss instructional style
- Discuss use of technology
- Debate the use of color
- Produce detailed outlines for the textbooks

Spring 2016

- Select: *Open Stax College Algebra*, by OpenStax College
- Align: *OpenStax* material with our textbook outline
- Create: formatted templates in Microsoft Word
  - Overview for each chapter
  - One template for each section of the textbook
  - Glossary
  - Solutions to odd-numbered problems

Summer 2016

- Writing and editing begin in earnest
- Lots of *re*writing!
- Lots of deleting!
- Adding practice sets, buffing up exercise sets
- Responding to feedback from reviewers
- Proof reading
- Colleague (Rick) creates online homework in MyOpenMath
- Chemeketa Press staff prepare the text for publishing

Fall 2016

- First printing: Beta 1.0
- Textbook piloted in 4 classes
- First adopters meet regularly to discuss errors, typos, content
- Simple corrections (no page changes) sent to Chemeketa Press

Winter 2017

- Second printing: Beta 1.1
- Textbook piloted in 7 classes
- Textbook committee recommends full adoption of the book, approval given by program

Spring and Summer 2017

Work to improve and complete the book

- Section 5.4: Dimensional Analysis
- Rewrite/reword several topics
- Beef up exercise sets
- Compile supplementary materials

Fall 2017

- Third printing: 1st Edition
- Full adoption!

Challenges:

- Mathematics requires accuracy, with both words and numbers
- Meeting deadlines!
- Graphs and fonts
- Differences in teaching style, expectations amongst math faculty
- A much bigger project than anticipated!

Highlights

- Students are happy with the textbook and with the price
- It has honed my skills as a math “explainer”
- Communication and collaboration within the program
- It takes a village to create a textbook!

Data

…Why this should be taken with a grain of

Data – Print vs. Digital

For students who have used print textbooks *and* digital textbooks*

94.9% prefer print

96.0% feel that they learn better with print

* 2.3% of students surveyed can't decide whether or not they've ever used a digital book

Data – Print vs. Digital

On the other hand…

43.4% of students surveyed answered "No Way" or "Unlikely" when asked if they would purchase a print textbook if a free digital version was available.

Data – When students bought the textbook

68.5% had their textbook on/before 1st day of class

94.6% had their textbook within 1 week

Data – Readability/Professionalism

… … … More

Data – Readability/Professionalism

Writing is easy to read/understand

73.4% good/excellent

24.2% fair

2.3% poor/very poor

Data – Readability/Professionalism

Quality/Professionalism

82.8% good/excellent

14.8% fair

2.3% poor/very poor

Student Feedback:

“ The very affordable price”

“The textbook had all the information I need to pass the class but it wasn’t a HUGE overwhelming book!”

“When I missed the first day of class, read the sections needed, and when I came back to class I felt caught up.”

More student feedback:

"This smaller version of a math book is way less scary. It's informative and to the point. Very helpful."

"This book has been the most helpful book I've had since going back to school. I usually have a hard time understanding, especially math, but this book is super awesome! I wish all classes did this."

And some more comments:

"I love that step-by-step it shows you how to solve the problems and it has an explanation along with it. I also love that the answers can be found for the practice problems (not for cheating of course)."

"It is nicely displayed and easy to find what you're working on. It has helped me several times when I was working on homework!"

MyOpenMath Integration

57. Eleven fifteenths of the sum of a number and two is eight.

58. One tenth of a number is one less than that number.

63. An unknown quantity is decreased by eleven. This result is then divided by fifteen. Now, one is subtracted from this result and five is obtained.

For the following exercises, use the five-step process to help you solve each problem.

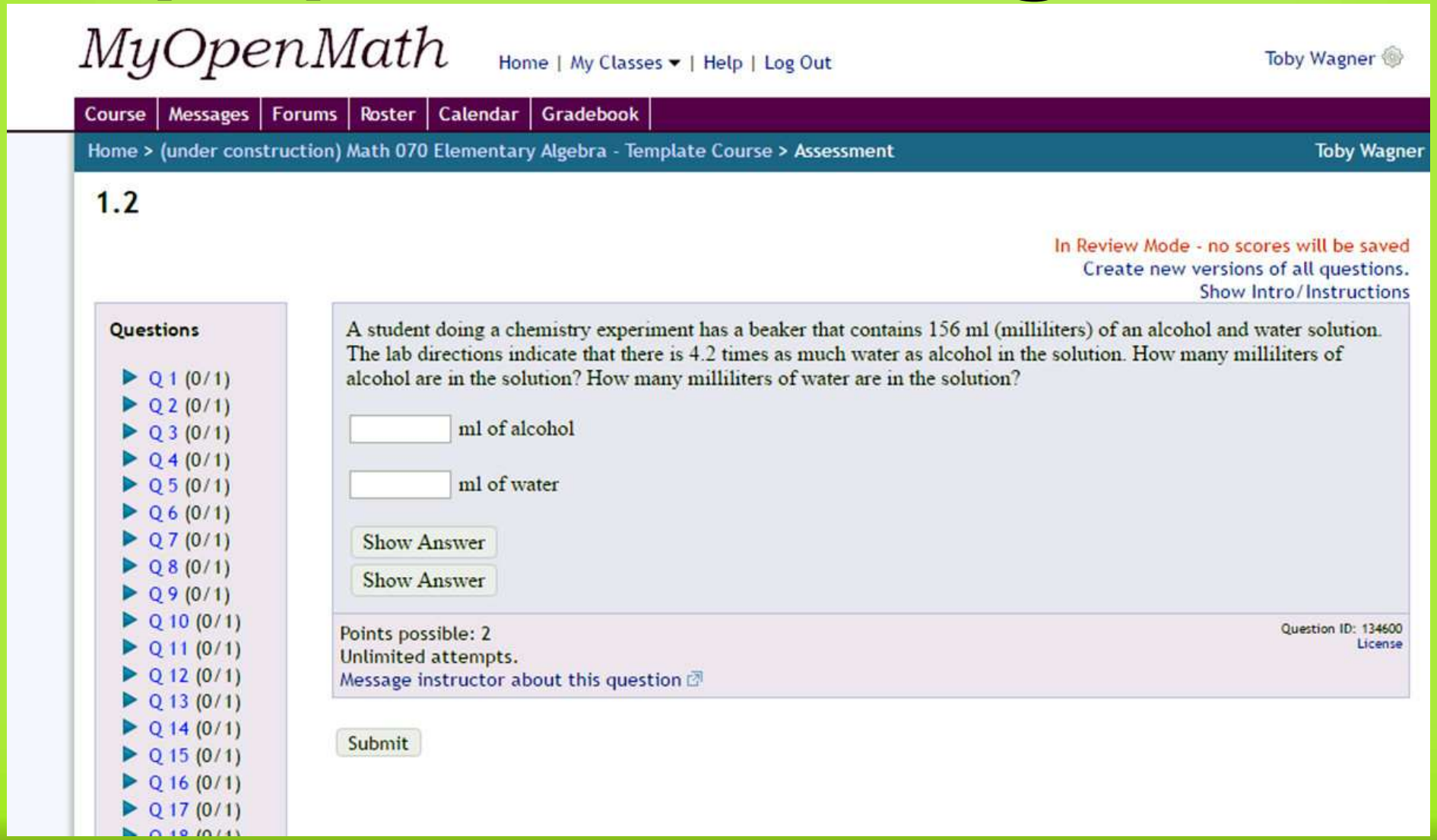
64. If a quantity plus 85% more of the quantity is 62.9, what is the original quantity? Hint — this might help:
    Step 1: Let x = original quantity.
    Step 2: x (original quantity) + $0.85x$ (85% more) = 62.9

65. A company must increase production by 12% over last year's production. The new output will be 56 items. What was last year's output?

66. A company has determined that it must increase production of a certain line of goods by $1\frac{1}{2}$ times last year's production. The new output will be 2885 items. What was last year's output?

67. A student doing a chemistry experiment has a beaker that contains 84 ml (milliliters) of an alcohol and water solution. Her lab directions tell her that there is 4.6 times as much water as alcohol in the solution. How many milliliters of alcohol are in the solution? How many milliliters of water are in the solution?

MyOpenMath Integration



MyOpenMath Integration

Highlights

- FREE, customizable online assessment
- Minimal student issues with registering/using
- Re-discovering my inner computer programmer
  - Added bonus: more familiarity with student difficulties associated with online HW/assessments

MyOpenMath Integration

Challenges

- Wading through the (ever-expanding) volume of problems available… too much of a good thing
- Time needed to learn a new system
- Initial inexperience with tweaking problems to better match my textbook
- Mis-placed belief in my own programming awesomeness
  - (When they say "test new problems well", they're not joking)

Can you use our stuff…?

Absolutely!

While the whole purpose of our projects is to develop material for use at Chemeketa, we are not selfish people…

Questions?

Contact Information

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Additional information about Chemeketa Press is available at: chemeketapress.org