



# **Integrating Content to Create Problem-Solving Opportunities**

**Presented by  
Tammy Hernandez  
Celia Miller**

**North Valley Academy  
NMCTM  
June 1, 2018**



## Exercise or Problem?

Exercise

Practices computation  
from a learned  
algorithm.

Problem

Incorporates critical  
thinking into the  
question.



*"Problem Solving is not a distinct topic, but a process that should permeate the study of mathematics and provide a context in which concepts and skills are learned."*

(NCTM,2000, p.182)

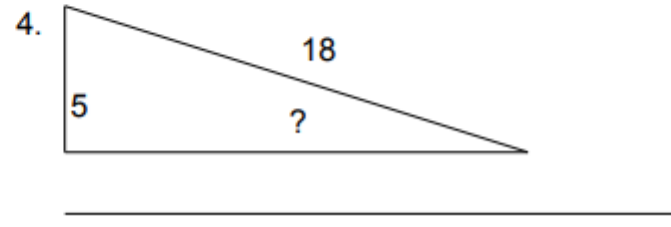
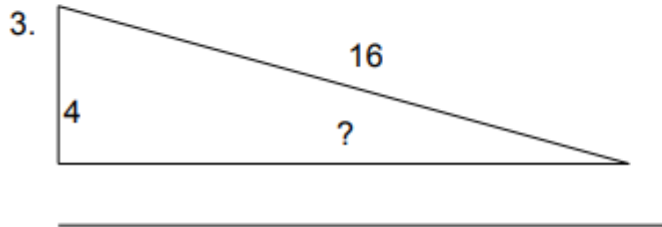
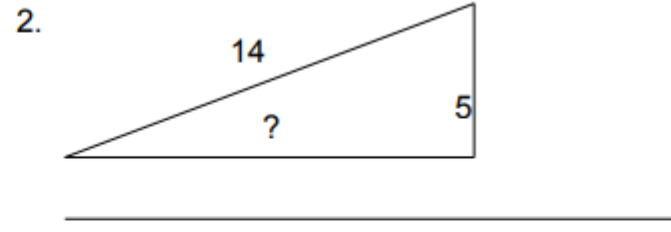
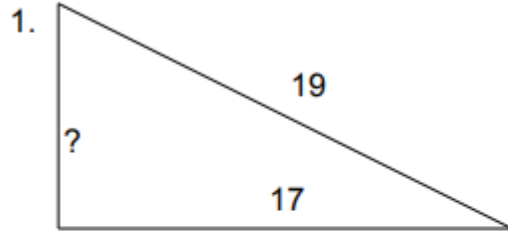


# Think-Pair-Share

- What does it mean to say problem-solving is a process?
- What challenges are presented in the context of classroom instruction?

# On your own

Find the length of the side.





# Leaning Ladder Problem

In groups, work on the problem.

A ladder leans against a vertical wall at a slope of  $\frac{9}{4}$ . The top of the ladder is 13.7 feet from the ground. What is the length of the ladder?



4:00



## Which One?

Think about the two examples presented to you.

- Which type do you use most often?
- Are there benefits to both?
- Which type would you like your students to be able to solve at the end of a lesson/unit and why?



## From NCTM on Rigor

A rigorous lesson embraces the messiness of a good **mathematics** task and the deep learning that it has the potential to achieve. Students who are successful in a rigorous learning environment take responsibility for their learning. They learn to reflect on their thinking.





Exercise or Problem?

What is the perimeter of a rectangle that is 12 yards long and 4 yards wide?



# What is wrong with the problem?

Identify shortcoming

- What is being assessed?
- Does it have enough rigor?
- Is it assessing too much at a time?
- Is there enough scaffolding?

**YOU must try the problem to know!**



# How can we change an exercise to a problem?

- Align to what I want student to learn/know
- Go beyond simple recall
- Solve in a number of ways
- Give students a chance to explain their thinking
- Communitate in several modes (words, drawings)
- Make accessible and interesting
- Encourage student to think
- Require students to decide what knowledge to apply and when
- Invite students to share their own ideas and ways of figuring things out

*Making sense of student work: A protocol for teacher collaboration*



# Your turn

1. Choose a standard for your grade level.
2. Recall an exercise for the standard you may have given your students (or look one up).
3. Look at the list of shortcomings and goals.
4. With a group of 2 or 3 people, decide how you could make one exercise into a problem.
5. Complete for each person in the group.



Some Help

<http://map.mathshell.org/>



# Reflect in groups

How will giving your students good math problems affect your students?

What is one thing you can take from today and use in your classroom in the fall?



# References

Daehler, K. R., & Folsom, J. (2014). *Making sense of student work: A protocol for teacher collaboration*. San Francisco, CA: WestEd.

Beigie, D. (2013). Integrating Content to Create Problem-Solving Opportunities. *Mathematics Teaching in the Middle School*, 13(6), 352-360. Retrieved April 25, 2018.