Building *Your* 21st Century Math Program

E X C E L

Chris Shore
The Math Projects Journal
Murrieta Valley USD
shore@mathprojects.com **@MathProjects**

Day 2

MPJ

Redlands USD 21st Century Math
Recap Quiz: Day 2 with Chris Shore, Feb 2020

VISION of RUSD: Circle 5

- Flunk student who don't do their work
- Prepare students for world that no longer exists
- Excellence in academics
- Competition to determine who is worthy
- Learning in safe and secure environments
- Expectations of success for only the privileged
- Enhanced learning through grade punishment
- Enhanced learning through tracking
- Enhanced learning through innovation
- Equality through equal treatment
- Equality through equity
- Grade Inflation to keep admin happy
- Learning for the motivated
- Worksheets Ad Nauseam
- Teach Students to Create in Mathematical Context
- Success for the docile few
- Collaborative community and parent involvement

Coca-Cola

Vision

People: Be a great place to work where people are inspired to be the best they can be.
Portfolio: Bring to the world a portfolio of quality beverage brands that anticipate and satisfy people's desires and needs.
Partners: Nurture a winning network of customers and suppliers; together, we create mutual, enduring value.
Planet: Be a responsible citizen that makes a difference by helping build and support sustainable communities.
Profit: Maximize long-term return to shareowners while being mindful of our overall responsibilities."
Productivity: Be a highly effective, lean, and fast-moving organization.

How does RUSD spell "vision?" ___ ___ ___ ___ ___

GROWTH MINDSETS Effecting Student Learning in the Classroom: Circle 4

- Parent's belief in their children
- Students' belief in themselves
- Social media belief in this generation
- Teacher's belief in the students
- Cable news belief in the younger generation
- Teacher's belief in themselves
- Students' belief in their teacher

The #1 most effective factor in student learning is _____ _____

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Our Principles: Correct the strikethrough portion of each statement.

1. Students don't improve until ~~parents~~ improve. _____
2. Teachers don't improve ~~paychecks~~ improve. _____
3. Our Systems are getting exactly the results that ~~we need~~ to get. _____

SBAC Claims for Math: Circle 4

- Homework Completion
- Communicating Reasoning
- Memorization of esoteric minutia
- Concepts & Procedures
- Problem Solving
- Sorting of students by ability
- Modeling and Data Analysis

The 4 C's of a College & Career Readiness: Circle 4

- Confidence
- Compliance
- Critical Thinking
- Cursive Writing
- Coloring inside the Lines
- Creativity
- Communication
- Cleanliness
- Comedic Reasoning
- Competent Parents
- Culture Norms
- Correct Clothing
- Collaboration

This can be summarized as Teaching Students to _____& _____.

The Standards of MATHEMATICAL PRACTICE:

- Structure
- Erasing Completely
- Repeated Reasoning (patterns)
- Pencil Only
- Circling Answers
- Solving Problems
- Note Taking Strategies
- Reasoning
- Critique Reasoning
- Toys
- Tools
- Finger Counting
- Incision
- Precision

Which one is not on the list? _____

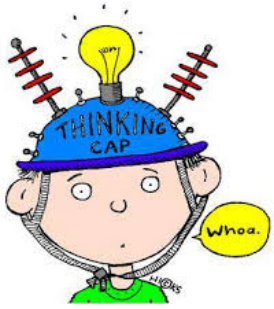
DEPTH of Knowledge (rank 1 least, 4 greatest):

_____ Skills

_____ Extension

_____ Recall

_____ Strategy



PLC Question #1: State it

What _____?

What have you implemented in your classroom or PLC meetings from our last training?: Free Response

TOPIC 1

From Proportions to Linear Relationships

Where might you see the sign shown? What can you say about the triangle on the sign? What do you think 8% represents?

ACTIVITY
1.3 Comparing Speeds

Daisa attends college in another state. During summer break, she drives home from college to visit her family and friends.

Daisa's Drive Home

Time (hours)	Distance (miles)
3	180
2	120
1.5	90
2.5	150

1. Daisa decides to keep track of the time it takes her to drive home from school. She records her distance after various numbers of hours. Her data are shown in the table.

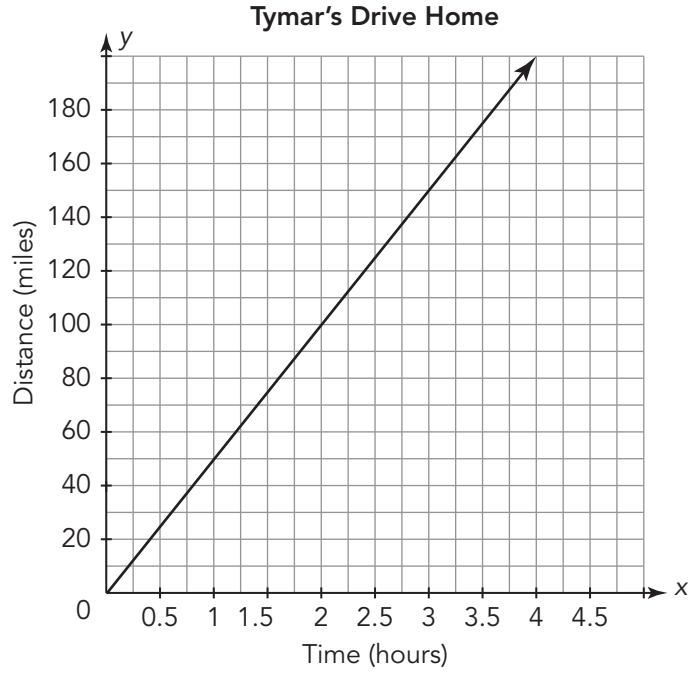
a. Does this table represent a proportional relationship? Explain your reasoning.

b. Write a ratio for distance to time.

c. Write the unit rate for distance per 1 hour.

Unit rate is a comparison of two quantities in which the denominator has a value of one unit.

One of Daisa's high school classmates, Tymar, attends college with Daisa. He also drives home during the summer break but takes a different route.



2. Analyze the graph of his trip.

a. Does the graph represent a proportional relationship? Explain your reasoning.

b. Who drives faster—Daisa or Tymar? Explain your reasoning.

A third friend, Alisha, offers to drive Daisa and Tymar home for spring break so that they can share the cost of gas money. When asked how fast she drives, Alisha reported that the distance traveled, y, for the time, x, can be expressed as $y = 57x$.

3. Does Alisha's equation represent a proportional relationship? Explain your reasoning.

4. Compare the representations of the three friends.

a. Who drives the fastest? Explain your reasoning.

b. Rank the friends in order from the slowest driver to the fastest driver.

Algebra 1 **Name**_____

7% Grade

While driving, the road you are on begins to go downhill. At the top of the hill, you see this this warning sign.

1) What do you notice about the warning sign?

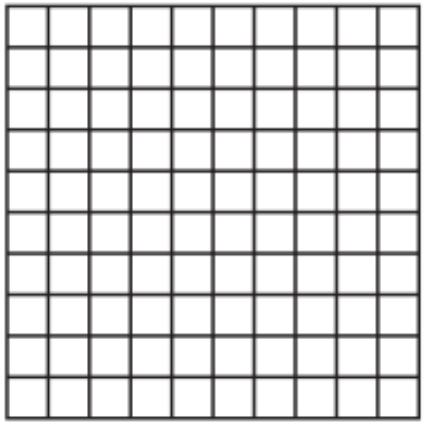
2) What do you wonder?

3) What is the mathematical slope of the triangle on the sign?

4) What is the true grade of the hill on the sign?

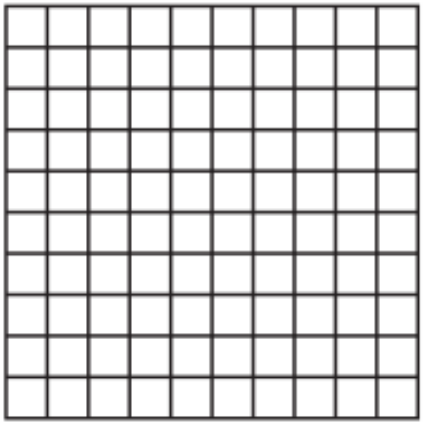
5) Draw a triangle like the one shown in the warning sign that represents the given grade. Then determine the slope (vertical change divided by horizontal change, or "rise over run"). Write it as a fraction and a decimal.

a) 0% Grade



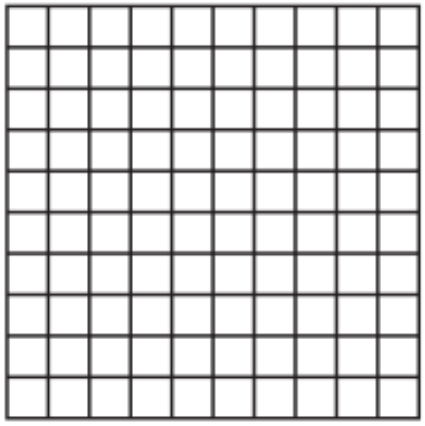
Slope = ------ = _____

b) 100% Grade



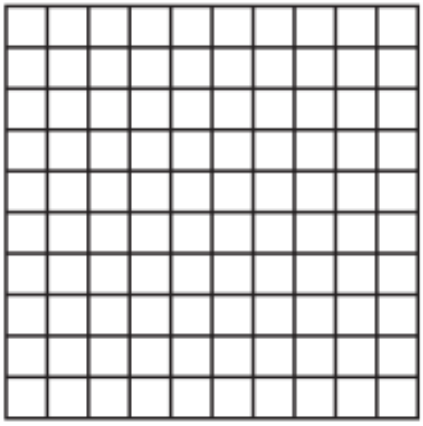
Slope = ------ = _____

c) 50% Grade



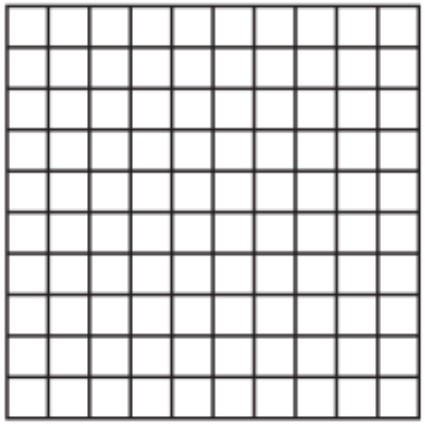
Slope = ------ = _____

d) 7% Grade



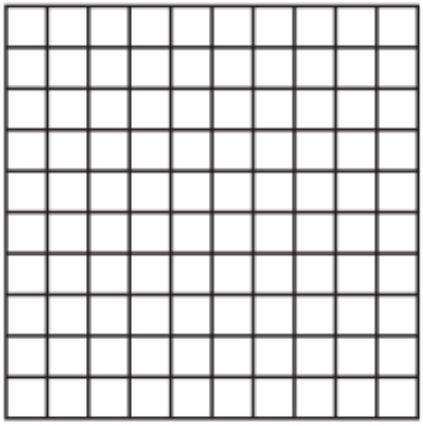
Slope = ------ = _____

e) The True Grade in the sign



Slope = ------ = _____

f) 250% Grade



Slope = ------ = _____

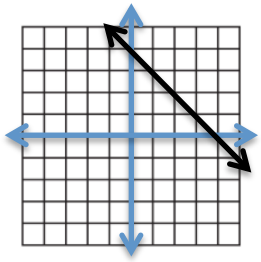
Algebra 1 **Name**_____

7% Grade
Slope Practice

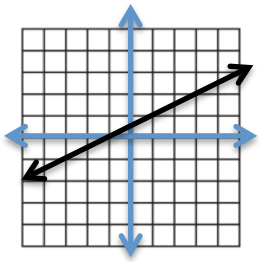
6) Determine the slope represented in each case below.

a)

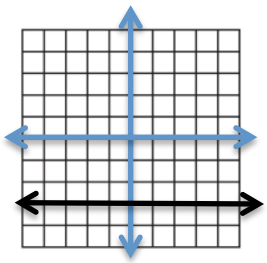
b)



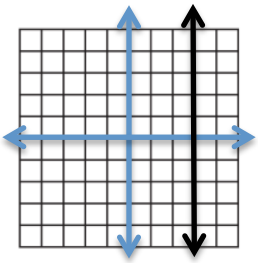
c)



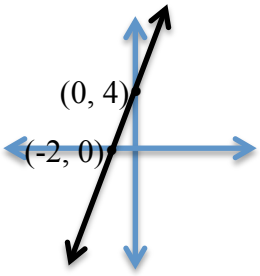
d)



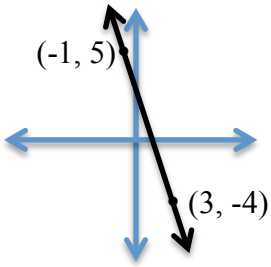
e)



f)



g)



h)

x	y
-1	-2
0	1
1	4

i)

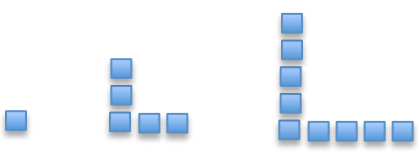
x	y
-2	8
0	4
2	0

j) (5, 2), (8, 14)

k) $y = \frac{-3}{2}x + 7$

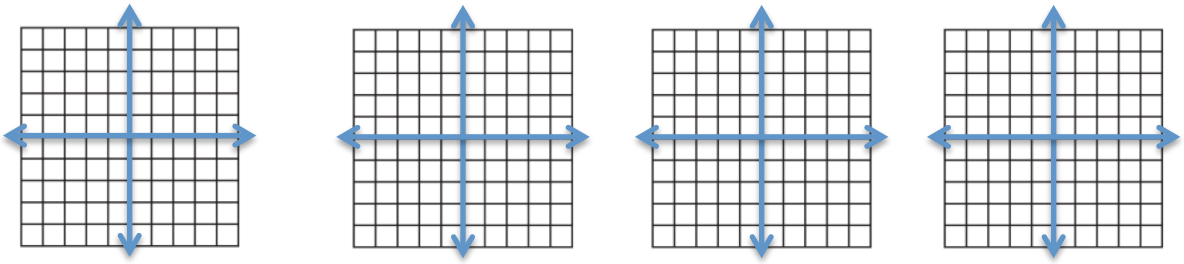
l) James has $10 and earns $30 every 2 hours.

m)



7) Draw a line on the graph that has a slope that is …

a) positive b) negative c) zero d) undefined



8) Algebraically calculate the slope for each line that you drew above:

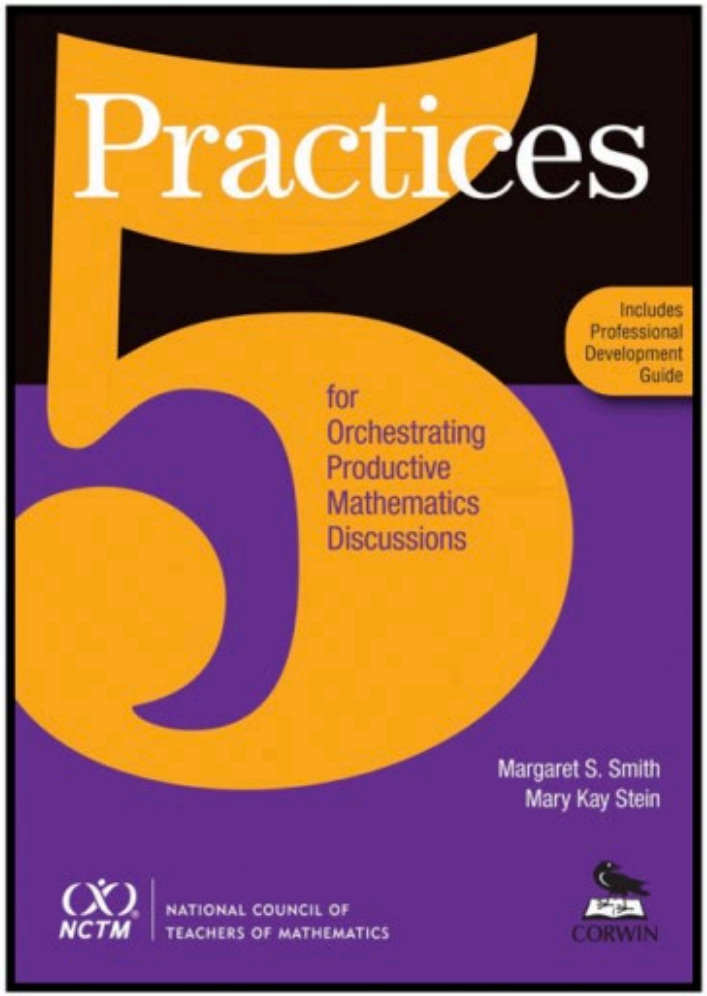
for $(x_1, y_1), (x_2, y_2)$, m = ----------

a) (,) , (,) b) (,) , (,) c) (,) , (,) d) (,) , (,)

Example: for (3, 4), (7, 16), $m = \frac{16-4}{7-3} = \frac{12}{4} = 3$

9) Find the slope for the line through the given pairs of points.

a) (2, 3) , (6, 15) b) (5, 10) , (2 , 4) c) (-2, 3) , (7 ,- 6)



1. Anticipate

- Do the problem yourself
- What are students likely to produce?
- Which problems will most likely be the most useful in addressing the mathematics?

2. Monitor

- Listen, observe, identify key strategies
- Keep track of approaches
- Ask questions of students to get them back on track or to think more deeply

3. Select

- CRUCIAL STEP – what do you want to highlight?
- Purposefully select those that will advance mathematical ideas

4. Sequence

- In what order do you want to present the student work samples?
- Do you want the most common? Present misconceptions first?
- How will students share their work? Draw on board? Put under doc cam?

5. Connect

- Craft questions to make the mathematics visible.
- Compare and contrast 2 or 3 students' work – what are the mathematical relationships?
- What do parts of student's work represent in the original problem? The solution? Work done in the past?

Reaching & Teaching "Those Kids"

Chris Shore

Paradigm Shift

- Shift from "students are solely responsible" to a Coach's or Parent's Mindset.
- Emotional Investment.
- Singles Digits failure rates are possible.
- We are to teach ALL kids.

No-Options Engagement

- No-Options: Make failure more painful than success.
- Engagement: No Quiet Deals, No Gravity Storms.
- It's not an issue of knowledge; it's a matter of will.

Boot Camp Numeracy

- Numeracy is the #1 indicator of math success.
- Students don't flunk current content; they flunk prior content.
- Refresh, Refine & Accelerate.
- Before a lesson, week, or unit.
- Use your textbook pre-assessments.

HOTS

- Explicit Teaching of Thinking.
- Problems are different than exercises.
- Be Task Oriented.
- Tasks = Problems that teach both Content & Critical Thinking.
- Teach tasks; don't skip, treat as a worksheet, or use as notes.

Making Group Work
Work with Less Work

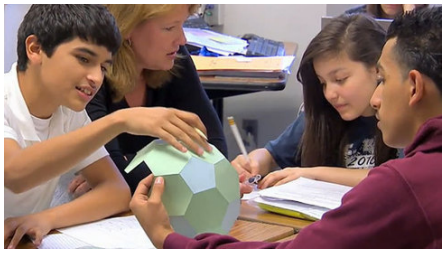
Chris Shore, Feb 2020

Why Group? = _____ & _____

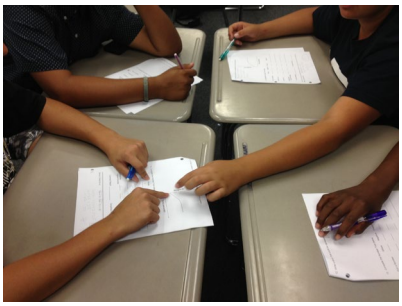
WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD

Which Groups? = _____, _____, _____



Managing Groups? = _____, _____, _____



When to Group? = _____,

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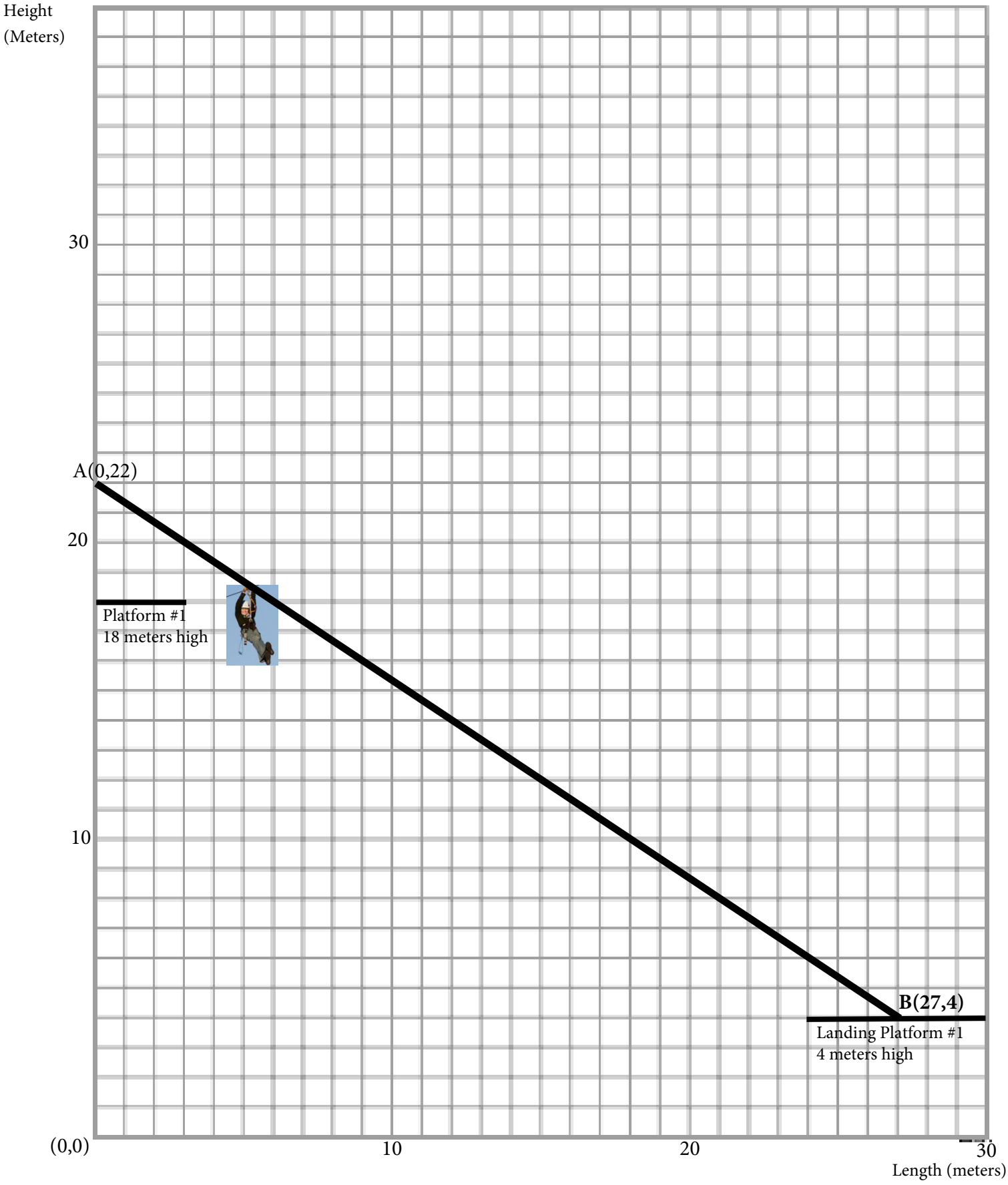
Zip Line Activity

The Indoor Zip Line Company uses a room that is 30 meters long and 38 meters high to set up their zip line. The zip line industry has many safety regulations. Regulation #1 is that the platform from which you launch must be a minimum of 3 meters long. Regulation #2 is that the platform that you land on must be a minimum of 6 meters long. Regulation #3 is that the zip line must be 2 meters above the edge of both the launching and landing platforms. There are other regulations that deal with the steepness, distance, and the sag (slack) of the zip line as well. The Indoor Zip Line Company starts by building one zip line with the maximum steepness allowed. Here is a graph of their first zip line.



Zip Line Activity

1. The Indoor Zip Line Company built their zip line to be the steepest allowed by regulations. Complete the following safety regulation about steepness.

Regulation #4 is ...

2. a) What is the distance from point A to point B?

b) Regulation #5 deals with the distance of the zip line ride and how much sag there must be in the cable. According to the regulation, the sag in the cable must have at least 5% of the distance from point A to point B. What does the minimum length of the cable have to be to meet this regulation?

3. a) Assuming there is no sag in the cable, write the equation of the zip line in slope intercept form.

b) Assuming there is no sag in the cable, write the equation of the zip line in standard form.

4. a) The Indoor Zip Line Company has been getting request to build a second zip line that is more exciting, but safety regulations won't allow them to build one that is steeper. So instead of going steeper they decide to build one that is higher off the ground. Their second 3 meter launching platform will be 29 meters off the ground. If the distance and the steepness stay the same as the first zip line, and they follow all of the regulations, how high must the second 6 meter landing platform be off the ground?

b) Assuming there is no sag in the cable, write the equation of the second zip line in slope-intercept form.

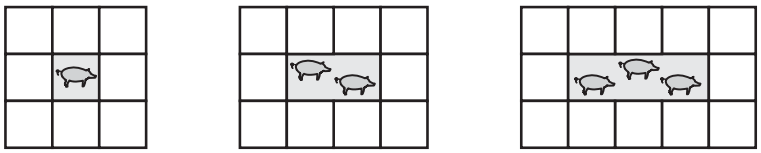
5. a) To maximize their space the Indoor Zip Line Company decides to build a third zip line using the second landing platform as their third launching platform. This is still within regulation since the minimum launching platform is 3 meters long and this platform is 6 meters long. The third zip line will have the same steepness and distance as the first two zip lines. Knowing that the zip line must be 2 meters above the edge of the platforms and the third landing platform must be 6 meters long, what is the equation of the third zip line in slope-intercept form assuming no sag?

b) What the domain and range of the 3rd zip line?

6. At what height do the first and third zip lines intercept?

Pig Pen Algebra

Farmer John is making a pig pen. He is short on materials so he is making the pen out of bales of hay. These bales are shaped as cubes. Farmer John likes to keep things simple, so whenever he gets another pig, he just extends the pen as shown below. Your job is to help Farmer John write a formula to tell him how many bales of hay he will need for a given number of pigs.



1. How would you move the existing bales to make room for another pig?

2. In the space above, draw pens that would hold 4 and 5 pigs respectively.

3. How many bales of hay must be added to an existing pen, to make room for the next pig?

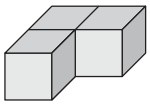
4. Without anymore drawings, complete the chart below for P number of pigs and B number of bales.

P (pigs)	1	2	3	4	5	6	7	8	9	10	20	50
B (bales)	8	10	12									

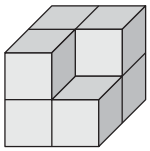
5. How did you figure out your answers for 20 and 50 pigs?

6. According to the pattern in the chart, how many bales would you predict are needed for no pigs?

7. Write an equation that represents the number of bales B needed to pen P number of pigs.



8. Show how to use your new equation to find how many bales are needed for 100 pigs.



9. How many pigs could be penned by 96 bales of hay?

ASSIGNMENT

A tower is built up as shown on the right. Write an equation that represents the number of blocks T needed to build a tower S stories tall.