



Middle School Math Maternity Leave Sub Plans, 6 Weeks

Six complete week binders of middle school math, grades 6 to 8. Every day has individual work and a team task, and every task has a "say this" script.

PREVIEW

What is included

- Six week binders (64, 66, 65, 64, 66, 65 pages): 390 pages
- 78 front pages: binder cover, important information, note to the sub, the week plan filled in, schedule, set index, class list, how it went, Monday opener
- 60 solo blocks (30 math sets, 30 calm blocks) and 30 team tasks for groups of four
- A "say this to the class" script for all 126 tasks: 2 or 3 sentences the sub reads out
- A core task and a ★ challenge in every math set and team task
- 30 optional games, each on that day's lesson (Day 30: on all six weeks)
- Answer keys for everything; color and ink-saver B&W, US Letter and A4

How it works

1. Leave the six binders out. Each has its own filled-in plan with page numbers.
2. The sub reads the "say this" box out, then runs the day's math set in every period; students work on their own. Everyone does the core task, early finishers go on to the ★ challenge.
3. The calm block fits any gap, the team task fills a block period or extra time, the game the last 15 minutes.
4. No prep and no tech: print and go.

The 30 days, 30 topics: a math set, a team task and a game each day

- **Week 1, days 1 to 5. Math:** Ratios, Rates and Percent, Integers and Order of Operations, Fractions and Decimals, Area and Perimeter, Data and Graphs. **Team tasks:** The Number Line-Up, The Garden Plot Plan, Design the Dog Park, Time Capsule Code, The Calculator Debate.
- **Week 2, days 6 to 10. Math:** Unit Rates and Proportions, Expressions and the Distributive Property, One-Step Equations, Area of Triangles and Polygons, Mean, Median, Mode and Range. **Team tasks:** Snack Order Showdown, Expression Match-Up, Locker Combination Relay, Plaza Tile Planner, Class Survey Lab.
- **Week 3, days 11 to 15. Math:** Discount, Tax, Tip and Percent Change, Multiplying and Dividing Negative Numbers, Two-Step Equations, Circumference and Area of Circles, Probability. **Team tasks:** Sale Day Store, Temperature Trek, Number Machine Makers, Round Garden Design, Fair Game Carnival.
- **Week 4, days 16 to 20. Math:** Proportional Relationships in Tables and Graphs, Inequalities, Angle Relationships, Volume and Surface Area of Prisms, Box Plots and Spread. **Team tasks:** Map Scale Expedition, Field Day Limits, Laser Maze, Package Designer, Paper Airplane Test Flight.
- **Week 5, days 21 to 25. Math:** Exponents and Scientific Notation, Square Roots and Irrational Numbers, Slope and $y = mx + b$, The Pythagorean Theorem, Scatter Plots and Trend Lines. **Team tasks:** Size of Things Match, Number Line Builders, Ramp Rules, Treasure Map Shortcuts, Data Detectives.
- **Week 6, days 26 to 30. Math:** Functions and Input-Output Tables, Systems of Equations, Transformations, Cylinders, Cones and Spheres, Big Review of Six Weeks. **Team tasks:** Function Card Duel, Phone Plan Showdown, Tile Logo Studio, Ice Cream Shop Containers, Escape the Classroom.

Optional game every day, on that day's math lesson (Day 30, the big review day: its game reviews all six weeks): Mon

Whiteboard Quiz Game Tue **Paper Password** Wed **Class Feud** Thu **Classroom Millionaire** Fri
Mystery Box

What this preview shows: the note to the substitute, the Week 1 plan, more front pages, one page of every daily part, a full math set with its answer key, a calm block, a team task, the game types and one ink-saver page. Every product page is watermarked. The full product has 390 pages.

What the sub gets: a note that explains the routine, a "say this" script for every task (126 in all), a sub script for every Monday opener, a "Read this out" box on most games, and every answer in the key.



Note to the Substitute

Grades 6 to 8 · five days · every set runs from the printout alone

Thank you for covering my classes this week

Everything you need is in this binder. The front pages (important information, weekly schedule, class list) are filled in for this week. After them come the work sets, one per day: **Math 1** is Monday's set, **Math 2** is Tuesday's, and so on to **Math 5** on Friday. Run the day's set in every period you teach that day. Each set is one period (45 to 55 minutes), stands alone, and has its own answer key at the back of the binder, so you never have to make anything up or know the subject. Every task starts with a short **Say this to the class** box under its title: read it out, and the class knows what to do and how to start.

Every student page has a core task first, then a ★ challenge. Every student does the core task. Students who finish early go on to the ★ challenge; it fills a few extra minutes, and nobody has to finish it.

After the subject sets come the shared blocks, one of each per day. The **calm block** is always allowed: for a period that runs short, a loud class, or anyone who finishes early. The **team task** fills a period on its own. The **game** is optional: a fun way to end the class, or something for extra time. Fifteen minutes, from the script.

Each day has

- One Math set (one period, core task + ★ challenge on every page)
- A calm and quiet block: a math puzzle and a self-checking practice page
- A team task for groups of four
- A paper game from the script

If the class is loud

- Set a voice level with a number, 0 to 3, and use it all week (the Day 1 opener explains it).
- Switch to the calm block. Nobody needs to move.
- Every student page has a ★ challenge, so fast finishers always have something.
- If a set is not working, stop it and use the calm block or the team task. Every set starts cold.

At the end of each day

Please fill in that day's line on the "How it went" page. It takes two minutes and I read every word.

Did this kit work well for your class? A quick review helps other teachers find it and earns you TpT credits. Thank you!



This Week's Plan

Filled in for you: run the day's set in every period you teach. Keep it as it is, or use the blank schedule on the next page for your own order.

WHEN	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Start of class	Meet Your Sub p. 11 · 15 min, every period	Attendance, voice level	Attendance, voice level	Attendance, voice level	Attendance, voice level
Main work, every period	Math 1 Ratios, Rates and Percent p. 14	Math 2 Integers and Order of Operations p. 22	Math 3 Fractions and Decimals p. 31	Math 4 Area and Perimeter p. 40	Math 5 Data and Graphs p. 49
Early finishers or a loud moment	Word Search and Quiet Practice p. 17	Term Match and Quiet Practice p. 25	Code Breaker and Quiet Practice p. 34	Word Scramble and Quiet Practice p. 43	Cross-Number and Quiet Practice p. 52
Block period or extra time	The Number Line-Up p. 19	The Garden Plot Plan p. 27	Design the Dog Park p. 36	Time Capsule Code p. 45	The Calculator Debate p. 54
Last 15 minutes (optional): a fun way to end the class, or for extra time	Whiteboard Quiz Game p. 20	Paper Password p. 29	Class Feud p. 38	Classroom Millionaire p. 47	Mystery Box p. 56

How to use this plan

- Page numbers point to the first page of each set. Copy one per student.
- The calm block is always allowed: a period that runs short, a loud class, or anyone who finishes early.
- The game is optional: a fun way to end the class, or something for extra time.

MATH SUB PLANS WEEK 1

Middle School Math, 5 Days of Print and Go Work

Teacher _____
Room _____
Grade and classes _____
Week of _____

Everything a sub needs for five days is in this binder: a filled-in weekly plan, a blank schedule, the class list, and for every day one Math set, a calm block, a team task and a paper game. Each set is one period, stands alone, and has its own answer key. Nothing needs subject knowledge, a login or a projector.



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Math Sub Plans Week 1: Middle School Math, 5 Days of Print and Go Work

Important Information

The page the sub reads first. Fill it in once you help it current.

People to call

Office _____
Teacher next door _____
Nurse _____
Principal / admin _____
Tech help _____

Emergency procedures

Fire: exit and meeting point _____
Lockdown _____
Severe weather _____
Medical _____
Where the first aid kit is _____

Helpful students

Students who need extra support

Where things are

Attendance / how to take it _____
Paper, pencils, supplies _____
Hall passes _____
Copier, if the sub may use it _____

Class routines

Start of class _____
Bathroom _____
Phones _____
End of class _____

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Important information

Weekly Schedule (Blank)

Your sub enters, writes the set for each period (Monday: Math 1, Tuesday: Math 2, and so on) and the class next to each period. Cross out or remove periods to match the school day.

PERIOD / CLASS	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Period 1					
Class					
Period 2					
Class					
Period 3					
Class					
Period 4					
Class					
Period 5					
Class					
Period 6					
Class					
Period 7					
Class					

How to fill it in

- One set per period. Each set runs 45 to 55 minutes. If a period runs longer, the 30 challenges fit a few minutes, or add that day's team task.
- Same subject all day? Write the day's set in every period you teach. Planning, lunch and duty periods: cross them out.
- On Monday the opener (15 minutes) comes first in every period, then the set.
- The game is optional: put it in the last period as a fun way to end the class, or use it for extra time. The calm block goes in any gap.

Set naming

Sets are named by subject and day. Math 1 is Monday's set, Math 2 is Tuesday's, and so on to Math 5 on Friday. The set index lists every set with its minutes and page.

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Weekly schedule, blank

Class List and Dismissal

Name, what a sub must know, and how every student goes home. Copy one per class.

☐ bus (write the number) ☐ walks ☐ picked up (write who) ☐ after-school program ☐ other

★ in the notes: a student who finds the core task essay may start with the challenge.

#	STUDENT NAME	NOTES (ALLERGIES, NEEDS, HELPFUL, LEAVES EARLY)	HOME	BUS # / PICKED UP BY / PROGRAM
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

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Class list and dismissal

How It Went

For the sub/schedule. One line per day, two minutes at the end of each day. Check the boxes and go.

Monday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes
Notes / stars of the day: _____

Tuesday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes
Notes / stars of the day: _____

Wednesday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes
Notes / stars of the day: _____

Thursday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes
Notes / stars of the day: _____

Friday

Sets done: _____ Class was: ☐ Great ☐ Fine ☐ Hard, see notes
Notes / stars of the day: _____

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How it went

Meet Your Sub

Key: 15 minutes of the start of every period on Monday, before the set. Nothing to prepare.

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Sub script (same routine for every class)

- Before first period, fill in the introduction sheet (next page) once. Keep it honest and short. Students read a sub in ten seconds, give them something real to read.
- Introduce yourself from the sheet, two minutes. Then hold up the "Ask the Sub" list and take three questions from hands. Three, not ten.
- Read the class agreement out loud. Ask the class to add one line of their own and write it on the board for that period. That line is theirs, they will keep it better than yours.
- Set the voice level with a number, 0 to 3 (bottom of the sheet). Say which level the set needs. Use the numbers all week.
- Start the set. "This is today's math. Do the core task first. When you finish, try the star challenge, and the calm block is always allowed."

If the class is loud

- Skip the questions, keep the agreement and the voice level.
- Start the set sooner. Leave the voice level number on the board for the whole period.

If a period has ten minutes left

- Play Math Two Truths and a Lie (rules on the class page) in groups of six. Each group picks one to share.
- Or hand out the quiet practice page from the calm block.

Monday morning checklist (before first period)

- ☐ Read the Important Information page: office number, emergency exits, the nurse.
- ☐ Check the class list for allergies, medical needs and students who leave early.
- ☐ Find today's set on the weekly schedule and count copies for every period.
- ☐ Fill in the About Your Sub sheet and pin it where the class can see it.
- ☐ Write the voice levels 0 to 3 on the board.
- ☐ Put the answer keys somewhere students cannot reach them.

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Day 1: opener, sub script



Math Set 3: Lines in Real Life

Solve problems in each one. Use the Start-Up to help you, and then show your work in each box.

Unit 3

1 A new phone plan costs \$15 a month plus \$5 for each gigabyte. Write an equation for the monthly cost for a gigabyte. What does a month with 4 gigabytes cost?

2 A candle is 28 cm tall and burns down 1.5 cm every hour. Write an equation for its height h in centimeters after t hours? After how many hours is it gone?

3 A taxi charges \$3 to start plus \$2.50 for each mile. What is the slope, and what does it mean? What does an 8-mile ride cost?

4 Owen swims every week. Week 2: 430. Week 1: 102. Weeks 2–854. Write an equation for his savings y after x weeks. How much does he have after 10 weeks?

5 A hiker starts at 800 m up a mountain and walks down. After 2 hours she is at 500 m, going down at a steady rate. Find the slope (in miles per hour) and the equation. When does she reach 100 m?

6 A pool has 300 gallons of water in it. A hose adds 40 gallons every minute. Write an equation for the water after t minutes. How much water is in the pool after 12 minutes?

★

Challenge

Cym A costs \$20 to join plus \$4 a visit. Cym B costs \$8 to join plus \$6 a visit. Fill in the table. After how many visits do the two costs get the same?

	visits	0	5	10	15
Cym A (\$)					
Cym B (\$)					

Which cost other: _____

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Math 3.0, page 3 of 3

Word problems + challenge, Week 5 (solo)

Team Task, Day 5: Data Detectives

Students of Year 5 visit Mrs. K. Each person visits her plots, then the group sorts all eight together. AL: assist

Team 1

Task

You have 10 minutes

“Today I have been to Data Detectives, for groups of four and about five minutes. They can sort eight plots by their association and then you decide whether are they really causes the other. Remember that but they might be able to figure out whether one causes the other.”

A

 Outside temperature (°C)

B

 Hours the screen is on

C

 Letters in a first name

D

 Cakes sold at the beach

E

 Last digit of a phone number

F

 Frequent flyer at the airport

G

 Age of a card table (years)

H

 Price per packet (pence)

Sort the plots write each letter in one box

Positive association	Negative association	No association

Read the plots and sort them out, two each (4 mins). Sort the eight plots (8 mins). Check a partner's sort (4 mins). Put in the boxes (10 mins). Write down in one box another group (10 mins). Have the teacher put into the boxes (10 mins).

★ Challenge

Plot A and B are the only one straight line, the data is 2 hours (1mm) and 6 hours (1mm) are on A. Find its slope and say what it means. At that rate, after about how many hours would the battery run out 0%?

Slope:

Mean:

0% after:

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Team task, day 5: Data Detectives

Team task, Week 5 (groups of four)



Game, Day 3: The Boxes

Tape this up, when a team opens a box, cross it off and write the team number on it.

10

<div style="font-size: 3em; font-weight: bold;">1</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">2</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">3</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">4</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>
<div style="font-size: 3em; font-weight: bold;">5</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">6</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">7</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">8</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>
<div style="font-size: 3em; font-weight: bold;">9</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">10</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">11</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>	<div style="font-size: 3em; font-weight: bold;">12</div> <div style="border: 1px solid black; width: 60px; margin: 5px auto; height: 20px;"></div> <div style="font-weight: bold;">TEAM</div>

Scores

Team 1	
Team 2	
Team 3	
Team 4	
Team 5	
Team 6	

Game: Mystery Box (whole class)

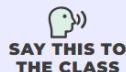


Math Set 1: Functions and Input-Output Tables

Math • Day 1

Study the four worked examples. Then decide for each warm-up: is it a function?

This set reviews: functions as one output per input, input-output tables, rules $y = mx + b$, linear and nonlinear, comparing two functions

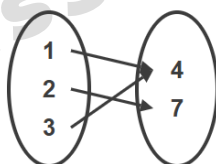


"Today you work alone on functions: rules that turn each input into exactly one output. Read the worked examples first, then try the warm-up. When a page is done, go on to its star challenge."

1 One output for each input

A function sends every input to exactly one output. Check each input on the left: does it have only one arrow?

Yes, it is a function. Two inputs may share the output 4; that is allowed.



2 Find the rule from a table

When x goes up by 1, y goes up by 3, so $y = 3x + b$. Step back from $x = 1$ to $x = 0$ to find b .

At $x = 0$, $y = 5 - 3 = 2$, so the rule is $y = 3x + 2$. Check: $3(4) + 2 = 14$.

x	1	2	3	4
y	5	8	11	14

3 Use a rule

Put each input into the rule $y = 2x - 5$. Multiply first, then subtract.

$2(-1) - 5 = -7$, $2(0) - 5 = -5$, $2(3) - 5 = 1$, $2(6) - 5 = 7$.

x	-1	0	3	6
y	-7	-5	1	7

4 Linear or nonlinear?

Find how much y changes each time x goes up by 1. The same change every time means linear.

The changes are 1, 3, 5, not equal, so it is nonlinear ($y = x$ squared): a curve.

x	0	1	2	3
y	0	1	4	9

Remember

- A **function** gives exactly **one output for each input**. Different inputs may share an output.
- A **linear** function changes by the same amount each step: $y = mx + b$, where m is the rate of change and b is the output when $x = 0$.

Warm-up: function or not?

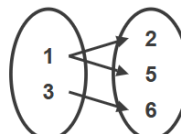
Circle yes or no. If no, write the input that has two outputs.

A

x	2	4	6	8
y	3	3	5	5

yes / no input: _____

B



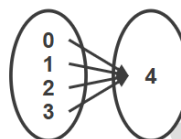
yes / no input: _____

C

(5, 1), (6, 2), (5, 3),
(7, 4)

yes / no input: _____

D



yes / no input: _____

★ Challenge

Tariq says the pairs (2, 5), (3, 7), (2, 9), (4, 11) make a function because no output repeats. Is he right? Which pair could you remove to make it a function?

Right?

Remove:



Math Set 1: Rules, Tables and Graphs

Work through blocks A to D. Show the rule you use before you fill in a table.

Math • Day 1

A. Complete each table

$$y = 4x - 1$$

1.

x	0	2	5	9
y				

$$y = 0.5x + 3$$

2.

x	2	6	10	14
y				

$$y = -3x + 10$$

3.

x	-2	0		4
y			1	

B. Find the rule: $y = mx + b$

1.

x	0	1	2	3
y	7	9	11	13

$$y = \underline{\hspace{2cm}}$$

2.

x	1	2	3	4
y	2	6	10	14

$$y = \underline{\hspace{2cm}}$$

3.

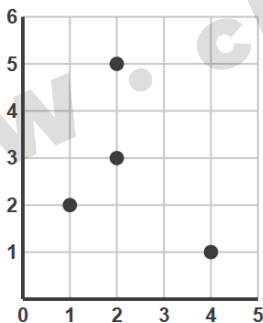
x	0	2	4	6
y	20	15	10	5

$$y = \underline{\hspace{2cm}}$$

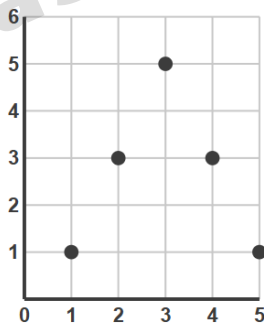
C. Function or not?

Circle yes or no for each one.

1. yes / no



2. yes / no



3. Input: a student in your class. Output: that student's height today.

yes / no

4. Input: a shoe size. Output: a student who wears that size.

yes / no

D. Compare two functions

Function A: $y = 3x + 1$

Function B:

x	0	2	4
y	5	9	13

1. What is the rate of change of Function A?

2. What is the rate of change of Function B?

3. Which has the greater output at $x = 0$?

4. At $x = 4$, which output is greater?

★ Challenge

Sanjay's rule: multiply by 3, then add 4. Umar's rule: add 4, then multiply by 3. a) Write each rule as an equation. b) Can one input give both rules the same output? Explain.

a.

b.



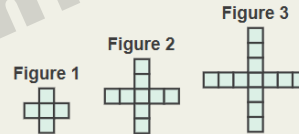
Math Set 1: Pay, Patterns and Parking

Math • Day 1

Six word problems. Write the rule first, then use it. Show your work in each box.

- 1 Selma earns \$12 an hour at a summer job, plus a \$15 bonus for each shift. Write a rule for her pay y for a shift of x hours. What does she earn for a 6-hour shift?

- 2 Figure n of this pattern is a plus sign of square tiles. Write a rule for the number of tiles t in figure n . How many tiles are in figure 10? Which figure uses 81 tiles?



- 3 A parking garage charges \$4 to enter plus \$2.50 for each hour. Wren pays \$16.50. How many hours was the car parked?

- 4 A tablet battery starts at 100% and drops 8% for each hour of video. Write a rule for the charge y after x hours. After how many hours is it at 36%?

- 5 Is the area of a square a linear function of its side length? Use the sides 1, 2, 3 and 4 to explain.

- 6 A bike rental costs \$6 plus \$3 for each hour. Write the rule. Find the cost for 1, 2 and 3 hours. Is the cost proportional to the hours? Explain.

★ Challenge

Tobias saves money by the rule $y = 15x + 40$ (dollars after x weeks). Vivian's savings are in the table. a) Whose savings grow faster each week? b) After how many weeks do they have the same amount?

- a. _____
b. _____

Vivian

x	0	1	2	3
y	70	80	90	100

 x = weeks, y = dollars



Answer Keys (1 of 7)

Teacher copy. Keep these pages out of the student sets.

Opener: Six Weeks in Six Problems

Week 1: 87.5%; Week 2: $n = 54$; Week 3: \$29.50; Week 4: $x \geq 15$; Week 5: 23; Week 6: 17.

Math Set 1: Functions and Input-Output Tables

Warm-up: A. yes; B. no (input 1); C. no (input 5); D. yes. **Challenge, page 1:** no: the input 2 has two outputs, 5 and 9. Remove (2, 5) or (2, 9); either one makes it a function.

A: 1. (0, -1), (2, 7), (5, 19), (9, 35); 2. (2, 4), (6, 6), (10, 8), (14, 10); 3. (-2, 16), (0, 10), (3, 1), (4, -2). **B:** 1. $y = 2x + 7$; 2. $y = 4x - 2$; 3. $y = -2.5x + 20$. **C:** 1. no ($x = 2$ has two points); 2. yes (outputs may repeat); 3. yes (each student has one height today); 4. no (one size can belong to many students). **D:** 1. 3; 2. 2 (y goes up 4 when x goes up 2); 3. B (5, against 1 for A); 4. neither: both are 13.

Challenge, page 2: a) Sanjay: $y = 3x + 4$; Umar: $y = 3(x + 4)$, or $y = 3x + 12$. b) No: Umar's output is always 8 more than Sanjay's for every input (same rate, different start).

Word problems: 1. $y = 12x + 15$; \$87; 2. $t = 4n + 1$; 41 tiles; figure 20; 3. 5 hours ($y = 2.5x + 4$); 4. $y = -8x + 100$; 8 hours; 5. no: the areas 1, 4, 9, 16 go up by 3, 5, 7, not by the same amount each time; 6. $y = 3x + 6$; \$9, \$12, \$15; no: cost per hour is 9, 6, 5 (not the same), and 0 hours still costs \$6.

Challenge, page 3: a) Tobias (\$15 a week against \$10 for Vivian, whose rule is $y = 10x + 70$); b) after 6 weeks, when both have \$130.



Calm Block, Day 1: Word Search

Find all 12 exponent and big number words. Every direction, including backward. Pencils only, voices at 0.

Calm • Day 1



SAY THIS TO
THE CLASS

"Calm block time: pencils only, voices at zero, and everyone works alone. Page 1 hides twelve words about powers and big numbers, and page 2 has eight short exponent problems. Every page 2 answer is in the answer bank, so you can check yourself."

K	G	I	A	N	T	U	C	T	M	M	S	X	P
T	R	I	L	L	I	O	N	W	T	V	B	V	J
N	O	I	L	L	I	M	I	P	B	D	L	D	A
X	J	N	Q	E	S	R	U	I	U	N	S	I	N
Y	F	R	R	Z	A	G	L	W	P	T	M	N	O
N	I	G	E	A	Y	L	C	O	I	Y	P	J	I
I	D	R	Z	E	I	U	W	G	S	B	X	Q	T
T	O	P	W	O	B	E	I	N	Q	V	D	J	A
S	F	W	N	E	R	D	J	D	U	U	U	I	T
E	O	I	D	H	I	G	C	Y	A	R	N	P	O
K	I	Q	C	T	B	M	N	H	R	D	P	Z	N
N	R	H	R	S	F	R	K	G	E	T	C	R	X
T	N	E	G	R	A	L	Y	E	D	V	N	O	R
Z	F	N	R	M	G	Y	H	Z	S	F	Q	R	X

POWER

GIANT

SQUARED

CUBED

NOTATION

MILLION

BILLION

TINY

TRILLION

ZEROS

LARGE

DIGITS

Done early?

Pick three of the words. Write a tiny example of each one, like $5^2 = 25$ for squared.

.....

.....



Team Task, Day 2: The 16 Number Cards

Cut out the cards. Place each one above its spot on your long number line, then answer the questions.

Team • Day 2

$\textcircled{K}$ $\sqrt{10}$	$\textcircled{C}$ $9/5$	$\textcircled{P}$ $\sqrt{2}$	$\textcircled{F}$ $9/2$
$\textcircled{A}$ $\sqrt[3]{20}$	$\textcircled{M}$ $5/8$	$\textcircled{H}$ $\sqrt{30}$	$\textcircled{B}$ π
$\textcircled{N}$ $\sqrt{5}$	$\textcircled{E}$ $2.\overline{6}$	$\textcircled{J}$ $\sqrt{20}$	$\textcircled{D}$ $\sqrt[3]{27}$
$\textcircled{L}$ $\sqrt{3}$	$\textcircled{G}$ 3.5	$\textcircled{O}$ $\sqrt{15}$	$\textcircled{I}$ $\sqrt{8}$

Questions

1. Write all 16 letters in order, from least to greatest.

.....

2. Which cards are irrational? How many are there?

.....

3. Which two cards are closest together on your line? How do you know?

.....

4. Show that $\sqrt{20}$ is less than $9/2$ without a calculator.

.....

.....



Challenge

Find a fraction that fits between π and $\sqrt{10}$ on your line. Check it by changing it to a decimal.

Fraction:

As a decimal:



Game, Day 1: The Board

Tape this to the whiteboard or copy it. Cross squares off as they are played.

Game • Day 1

USE RULE	FIND X	TABLES	RATE	PATTERNS
100	100	100	100	100
200	200	200	200	200
300	300	300	300	300
400	400	400	400	400
500	500	500	500	500

Scores

Team 1

.....

.....

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Team 2

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Team 3

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Team 4

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Team 5

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Team 6

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Game, Day 2: Paper Password

Sub script and math word list. 15 minutes at the end of the period, or for extra time. Optional.

Game • Day 2



SAY THIS TO THE CLASS

"Paper Password is our optional pair game for the last few minutes, played just for fun. Every secret word comes from today's lesson on square roots and irrational numbers, and fewer clues score more points."

Set up (2 minutes)

1. Pairs sit face to face. Give each pair one card page, cut into the four round cards (or folded so one card shows).
2. Partner A is the clue giver in rounds 1 and 3, Partner B in rounds 2 and 4. The guesser never sees the card.
3. Each round lasts 2 minutes. The clue giver says ONE word. The guesser gets ONE guess. Wrong: give another one-word clue.
4. After five clues without a right guess, the word scores 0 and the pair moves on. Say "Go" and "Stop" for each round.

Read this out

"Your clue is one word only. You may not say the secret word or any part of it. If the word is snowman, you cannot say snow or man. No gestures, no spelling, no rhymes. Break a rule and that word scores zero."

Scoring: guessed on clue 1 = 5 points, clue 2 = 4, clue 3 = 3, clue 4 = 2, clue 5 = 1. The clue giver circles the number on the card. After round 4, pairs add their four round totals. Highest total wins; ask pairs to call out totals over 60.

Referee calls

Two words glued together ("hotdog") count as one clue only if they make a real single word. Plurals and "-ing" forms of the secret word are not allowed. If two pairs argue about a clue, the word scores zero and they move on. The example clues below are allowed and show students what a good first clue sounds like.

Timing (15 minutes)

0:00

Set up, rules

2:00

Round 1, Partner A

4:30

Round 2, Partner B

7:00

Round 3, Partner A

9:30

Round 4, Partner B

12:00

Add totals, winners

Round 1: Partner A gives clues

ROOT	example clue: tree
RADICAL	example clue: symbol
PERFECT	example clue: flawless
ESTIMATE	example clue: guess
SQUARED	example clue: itself

Round 3: Partner A gives clues

EXACT	example clue: precise
HUNDREDTH	example clue: cents
PRINCIPAL	example clue: main
CUBED	example clue: three
DIGITS	example clue: numerals

Round 2: Partner B gives clues

ROUNDING	example clue: nearby
REPEATING	example clue: again
TERMINATE	example clue: stop
PI	example clue: circle
BETWEEN	example clue: middle

Round 4: Partner B gives clues

ENDLESS	example clue: forever
TENTH	example clue: place
COMPARE	example clue: versus
SIDE	example clue: edge
NEAREST	example clue: closest



Game, Day 4: Classroom Millionaire

Sub script and the 12 questions. 15 minutes at the end of the period, or for extra time. Optional.

Game • Day 4



"If we finish early, the whole class can play Classroom Millionaire together, an optional game just for fun. Every question is about today's volumes of cylinders, cones and spheres, and a new student sits in the hot seat each time."

How it works

1. Tape up the ladder sheet. The whole class is one player. Pick a student for the hot seat (a new student for every question).
2. Read the question and the four options, then read the options again. The hot seat may listen to quiet advice, then says "final answer" and a letter.
3. Right: the class climbs one rung. Before hearing the next question, the class may vote to walk away and keep what it has.
4. Wrong: the climb ends. Rungs 4 and 8 are safe: the class keeps the last safe amount it passed.
5. Time left over? Play the questions again as a team quiz.

Three lifelines (one use each)

Ask the class: everyone shows 1, 2, 3 or 4 fingers at once for A, B, C or D. The hot seat looks, then decides.

50/50: read out the two wrong options listed under the question. Cross them off.

Phone a friend: the hot seat picks one classmate, who has 30 seconds to say what they think out loud.

"Only the hot seat's final answer counts. Shout an answer and the class loses a lifeline."

Rungs 1 to 4, rung 4 is safe

1. **\$100** Which solid has a circle base and a point?
A. Cylinder B. Cone C. Sphere D. Cube
Answer: B. Cone (50/50 removes C and D)
2. **\$250** A circle has diameter 10. What is its radius?
A. 20 B. 10 C. 5 D. 2.5
Answer: C. 5 (50/50 removes A and D)
3. **\$500** Which one gives the volume of a cylinder?
A. $3.14 \times r \times r \times h$ B. $2 \times 3.14 \times r \times h$ C. $3.14 \times r \times h$ D. $r \times r \times h$
Answer: A. $3.14 \times r \times r \times h$ (50/50 removes C and D)
4. **\$1,000** A cone holds what part of its cylinder?
A. $1/2$ B. $1/3$ C. $2/3$ D. 3 times
Answer: B. $1/3$ (50/50 removes A and D)

Rungs 9 to 12

9. **\$50,000** Sphere, $r = 3$: volume ($\pi = 3.14$)?
A. 37.68 B. 113.04 C. 84.78 D. 452.16
Answer: B. 113.04 (50/50 removes A and D)
10. **\$100,000** Cylinder holds 150. Cone, same base and h ?
A. 450 B. 75 C. 50 D. 100
Answer: C. 50 (50/50 removes A and D)
11. **\$500,000** Cylinder: $V = 50.24$, $r = 2$, $\pi = 3.14$. h ?
A. 4 B. 8 C. 2 D. 16
Answer: A. 4 (50/50 removes C and D)
12. **\$1 MILLION** Hemisphere, $r = 3$: volume ($\pi = 3.14$)?
A. 113.04 B. 28.26 C. 56.52 D. 84.78
Answer: C. 56.52 (50/50 removes B and D)

Rungs 5 to 8, rung 8 is safe

5. **\$2,500** Cylinder, $r = 1$, $h = 5$: volume ($\pi = 3.14$)?
A. 15.7 B. 31.4 C. 3.14 D. 7.85
Answer: A. 15.7 (50/50 removes C and D)
6. **\$5,000** A sphere has $r = 3$. What is $r \times r \times r$?
A. 9 B. 27 C. 18 D. 81
Answer: B. 27 (50/50 removes A and D)
7. **\$10,000** Cone, $r = 3$, $h = 1$: volume ($\pi = 3.14$)?
A. 28.26 B. 9.42 C. 3.14 D. 18.84
Answer: B. 9.42 (50/50 removes A and C)
8. **\$25,000** Cylinder, $r = 2$, $h = 3$: volume ($\pi = 3.14$)?
A. 18.84 B. 12.56 C. 37.68 D. 113.04
Answer: C. 37.68 (50/50 removes B and D)

If the class misses

- | | |
|------------------------|----------------------|
| Wrong on rung 1 to 4 | class keeps \$0 |
| Wrong on rung 5 to 8 | class keeps \$1,000 |
| Wrong on rung 9 to 12 | class keeps \$25,000 |
| Walk away after rung n | class keeps rung n |



Math Set 2: Systems of Equations

Study the four worked examples, then test each warm-up point in BOTH equations.

Math • Day 2

This set reviews: systems of two linear equations: checking a point, solving by graphing, tables and substitution, no solution and infinitely many



SAY THIS TO THE CLASS

"Today you work alone on systems of equations, which are two equations about the same x and y . The solution is the x and y that make both equations true, where the two lines cross. Start with the worked examples on page 1, and test every answer in both equations."

1 What a solution means

A solution of a system is **ONE** point that makes **BOTH**

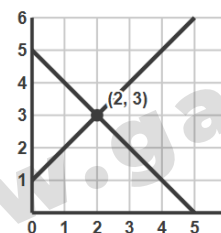
equations true. Test $(2, 5)$ in $\begin{cases} y = x + 3 \\ y = 2x + 1 \end{cases}$

First: $5 = 2 + 3$, true. **Second:** $5 = 2(2) + 1$, true. **Both true**, so $(2, 5)$ is the solution.

2 Solve by graphing

Graph both lines: $y = x + 1$ and $y = -x + 5$. The solution is where they cross.

They cross at $(2, 3)$. Check: $3 = 2 + 1$ and $3 = -2 + 5$.



3 Solve with a table

Make a table for both equations and look for the x where the two y values match.

At $x = 2$ both give $y = 8$, so the solution is $(2, 8)$.

x	0	1	2	3
$y = 2x + 4$	4	6	8	10
$y = 4x$	0	4	8	12

4 Solve by substitution

$\begin{cases} y = 3x \\ x + y = 12 \end{cases}$ The first says y is $3x$. Put $3x$ in place of y in the second equation.

$x + 3x = 12$, so $4x = 12$ and $x = 3$. Then $y = 3(3) = 9$.
Solution: $(3, 9)$.

Remember

- Two lines that cross once: **one solution**. Parallel lines (same slope, different start): **no solution**. The same line twice: **infinitely many**.
- Always **check**: put the x and y into both equations. Both must be true.

Warm-up: does the point solve both equations?

Test the point in each equation. Circle yes only if it makes both true.

A $(1, 4)$	$\begin{cases} y = 3x + 1 \\ y = x + 3 \end{cases}$	yes / no	B $(2, 5)$	$\begin{cases} y = 2x + 1 \\ y = 3x - 2 \end{cases}$	yes / no
C $(3, 1)$	$\begin{cases} x - y = 2 \\ 2x + y = 8 \end{cases}$	yes / no	D $(0, -3)$	$\begin{cases} y = 4x - 3 \\ x + y = -3 \end{cases}$	yes / no



Challenge

Soren graphs $y = 2x + 1$ and $y = 2x - 3$. a) What do you notice about the two lines? b) How many solutions does this system have? Why?

a.
b.

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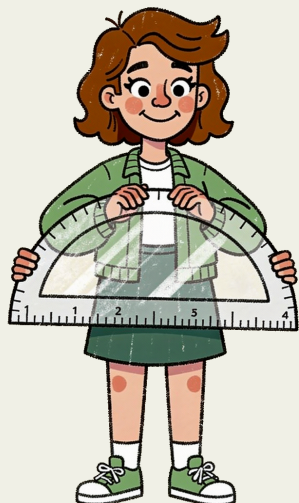
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