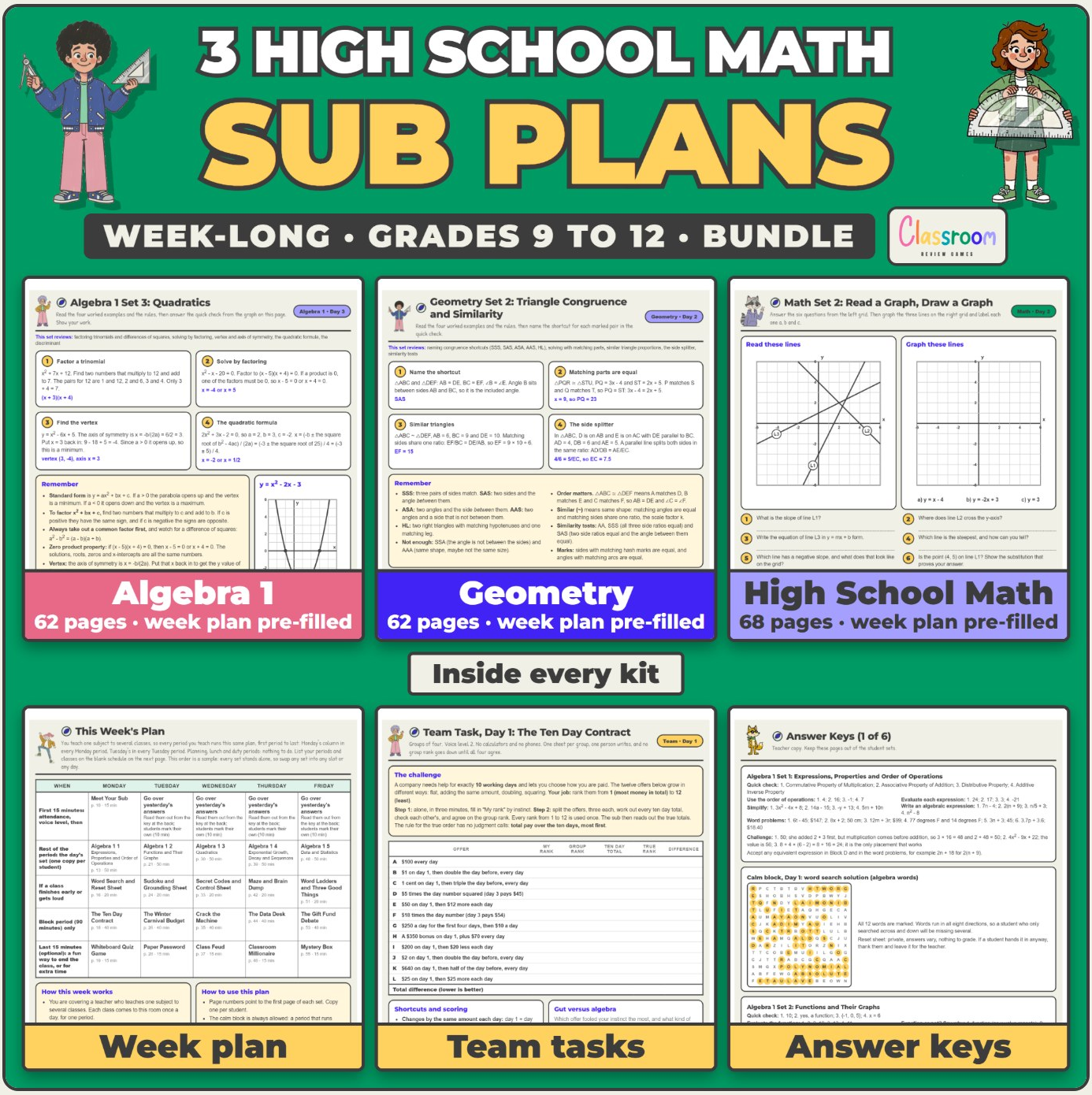
3 High School Math Sub Plans Bundle: Algebra 1, Geometry, General Math, No Prep

BUNDLE PREVIEW Everything in this bundle, on one page. Sample pages of each product follow.

WHAT'S INCLUDED: 3 PRODUCTS



KIT 1 OF 3 · 62 pages · week plan pre-filled · grades 9 to 12

Algebra 1

This Week's Plan

You teach one subject to several classes, so every period you teach runs this same plan, first period to last: Monday's column in every Monday period, Tuesday's in every Tuesday period. Planning, lunch and duty periods: nothing to do. List your periods and classes on the blank schedule on the next page. This order is a sample: every set stands alone, so swap any set into any slot or any day.

WHEN	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
First 15 minutes: attendance, voice level, then	**Meet Your Sub** p. 10 · 15 min	**Go over yesterday's answers** Read them out from the key at the back; students mark their own (10 min)	**Go over yesterday's answers** Read them out from the key at the back; students mark their own (10 min)	**Go over yesterday's answers** Read them out from the key at the back; students mark their own (10 min)	**Go over yesterday's answers** Read them out from the key at the back; students mark their own (10 min)
Rest of the period: the day's set (one copy per student)	**Algebra 1 1** Expressions, Properties and Order of Operations p. 13 · 50 min	**Algebra 1 2** Functions and Their Graphs p. 21 · 50 min	**Algebra 1 3** Quadratics p. 30 · 50 min	**Algebra 1 4** Exponential Growth, Decay and Sequences p. 39 · 50 min	**Algebra 1 5** Data and Statistics p. 48 · 50 min
If a class finishes early or gets loud	**Word Search and Reset Sheet** p. 16 · 20 min	**Sudoku and Grounding Sheet** p. 24 · 20 min	**Secret Codes and Control Sheet** p. 33 · 20 min	**Maze and Brain Dump** p. 42 · 20 min	**Word Ladders and Three Good Things** p. 51 · 20 min
Block period (90 minutes) only	**The Ten Day Contract** p. 18 · 40 min	**The Winter Carnival Budget** p. 26 · 40 min	**Crack the Machine** p. 35 · 40 min	**The Data Desk** p. 44 · 40 min	**The Gift Fund Debate** p. 53 · 40 min
Last 15 minutes (optional): a fun way to end the class, or for extra time	**Whiteboard Quiz Game** p. 19 · 15 min	**Paper Password** p. 28 · 15 min	**Class Feud** p. 37 · 15 min	**Classroom Millionaire** p. 46 · 15 min	**Mystery Box** p. 55 · 15 min

How this week works

- You are covering a teacher who teaches one subject to several classes. Each class comes to this room once a day, for one period.
- So every class gets the same set on the same day: Monday's set in every Monday period, Tuesday's set in every Tuesday period.
- One set per day covers all your classes. Copy that day's set once per student in the morning. Planning, lunch and duty periods: nothing to run.
- Each set fills one period (45 to 55 minutes); the challenge at the end stretches it to a 90-minute block.

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.

Week plan, pre-filled

Algebra 1 Set 3: Quadratics

Read the four worked examples and the rules, then answer the quick check from the graph on this page. Show your work.

Algebra 1 · Day 3

This set reviews: factoring trinomials and differences of squares, solving by factoring, vertex and axis of symmetry, the quadratic formula, the discriminant

1 Factor a trinomial

$x^2 + 7x + 12$. Find two numbers that multiply to 12 and add to 7. The pairs for 12 are 1 and 12, 2 and 6, 3 and 4. Only 3 + 4 = 7.

(x + 3)(x + 4)

2 Solve by factoring

$x^2 - x - 20 = 0$. Factor to (x - 5)(x + 4) = 0. If a product is 0, one of the factors must be 0, so x - 5 = 0 or x + 4 = 0.

x = 4 or x = 5

3 Find the vertex

$y = x^2 - 6x + 5$. The axis of symmetry is x = -b/(2a) = 6/2 = 3. Put x = 3 back in: 9 - 18 + 5 = -4. Since a > 0 it opens up, so this is a minimum.

vertex (3, -4), axis x = 3

4 The quadratic formula

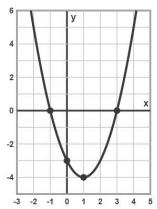
$2x^2 + 3x - 2 = 0$, so a = 2, b = 3, c = -2. x = (-b ± the square root of b^2 - 4ac) / (2a) = (-3 ± the square root of 25) / 4 = (-3 ± 5) / 4.

x = -2 or x = 1/2

Remember

- **Standard form** is $y = ax^2 + bx + c$. If a > 0 the parabola opens up and the vertex is a minimum. If a < 0 it opens down and the vertex is a maximum.
- **To factor $x^2 + bx + c$,** find two numbers that multiply to c and add to b. If c is positive they have the same sign, and if c is negative the signs are opposite.
- **Always take out a common factor first,** and watch for a difference of squares: $a^2 - b^2 = (a - b)(a + b)$.
- **Zero product property:** if (x - 5)(x + 4) = 0, then x - 5 = 0 or x + 4 = 0. The solutions, roots, zeros and x-intercepts are all the same numbers.
- **Vertex:** the axis of symmetry is x = -b/(2a). Put that x back in to get the y value of the vertex.
- **Quadratic formula:** x = (-b ± the square root of b^2 - 4ac) / (2a). If b^2 - 4ac is negative there is no real solution, if it is 0 there is one, and if it is positive there are two.

$y = x^2 - 2x - 3$



The dots mark the zeros, the vertex and the y-intercept. Use them for the quick check.

Quick check: read the graph above

A daily set

Team Task, Day 1: The Ten Day Contract

Groups of four. Voice level 2. No calculators and no phones. One sheet per group, one person writes, and no group rank goes down until all four agree.

Team · Day 1

The challenge

A company needs help for exactly **10 working days** and lets you choose how you are paid. The twelve offers below grow in different ways: flat, adding the same amount, doubling, squaring. **Your job:** rank them from **1 (most money in total)** to **12 (least)**.

Step 1: alone, in three minutes, fill in "My rank" by instinct. **Step 2:** split the offers, three each, work out every ten day total, check each other's, and agree on the group rank. Every rank from 1 to 12 is used once. The sub then reads out the true totals. The rule for the true order has no judgment calls: **total pay over the ten days, most first**.

	OFFER	MY RANK	GROUP RANK	TEN DAY TOTAL	TRUE RANK	DIFFERENCE
A	**$100 every day**					
B	**$1 on day 1, then double the day before, every day**					
C	**1 cent on day 1, then triple the day before, every day**					
D	**$5 times the day number squared (day 3 pays $45)**					
E	**$50 on day 1, then $12 more each day**					
F	**$18 times the day number (day 3 pays $54)**					
G	**$250 a day for the first four days, then $10 a day**					
H	**A $350 bonus on day 1, plus $70 every day**					
I	**$200 on day 1, then $20 less each day**					
J	**$2 on day 1, then double the day before, every day**					
K	**$640 on day 1, then half of the day before, every day**					
L	**$25 on day 1, then $25 more each day**					
	Total difference (lower is better)					

Shortcuts and scoring

- **Changes by the same amount each day:** day 1 + day 10 = day 2 + day 9, so the total is 5 × (first + last).
- **Doubles each day:** the total is 2 × last day − first day.

Difference = group rank minus true rank, sign dropped, added over the twelve rows. Score your "My rank" column the same way.

- **0 to 6:** excellent: your group adds like a payroll office
- **7 to 14:** good

Gut versus algebra

Which offer fooled your instinct the most, and what kind of growth was it?

.....

.....

Challenge: offer C comes last over ten days. Would it still lose if the job ran twenty days? Give a reason without adding.

Team task

Answer Keys (1 of 6)

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

Algebra 1 Set 1: Expressions, Properties and Order of Operations

Quick check: 1. Commutative Property of Multiplication; 2. Associative Property of Addition; 3. Distributive Property; 4. Additive Inverse Property

Use the order of operations: 1. 4; 2. 16; 3. -1; 4. 7

Simplify: 1. $3x^2 - 4x + 8$; 2. 14a - 15; 3. -y + 13; 4. 5m + 10n

Evaluate each expression: 1. 24; 2. 17; 3. 3; 4. -21

Write an algebraic expression: 1. 7n - 4; 2. 2(n + 9); 3. n/5 + 3; 4. n^2 - 8

Word problems: 1. 6t - 45; $147; 2. 8x + 2; 50 cm; 3. 12m + 3r; $99; 4. 77 degrees F and 14 degrees F; 5. 3n + 3; 45; 6. 3.7p + 3.6; $18.40

Challenge: 1. 50; she added 2 + 3 first, but multiplication comes before addition, so 3 × 16 = 48 and 2 + 48 = 50; 2. $4x^2$ - 9x + 22; the value is 56; 3. 8 + 4 × (6 - 2) = 8 + 16 = 24; it is the only placement that works

Accept any equivalent expression in Block D and in the word problems, for example 2n + 18 for 2(n + 9).

Calm block, Day 1: word search solution (algebra words)

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

All 12 words are marked. Words run in all eight directions, so a student who only searched across and down will be missing several.

Reset sheet: private, answers vary, nothing to grade. If a student hands it in anyway, thank them and leave it for the teacher.

Algebra 1 Set 2: Functions and Their Graphs

Quick check: 1. 10; 2. yes, a function; 3. {-1, 0, 5}; 4. x = 6

Evaluate the function: 1. 3; 2. 10; 3. 13; 4. 11

Function or not? Say why: 1. function (no x value repeats); 2. not a function (x = 0 has two outputs); 3. function (no x value repeats); 4. not a function (x = 5 has two outputs)

Give the domain D and range R: 1. D = {-2, 0, 3, 4}, R = {-6, 1, 5}; 2. D = {-5, -1, 6}, R = {2, 9}; 3. D = {-4, 1, 2, 7}, R = {-3, 0, 4, 8}; 4. D = {-1, 0, 1, 2}, R = {0, 1, 4}

Write the rule f(x) for each table: 1. f(x) = 5x - 2; 2. f(x) = -2x + 11; 3. f(x) = (1/2)x + 1; 4. f(x) = -3x + 4

Read the graph: 1. d(2) = 8: after 2 hours Sam is 8 miles from home; 2. domain 0 <= t <= 10, range 0 <= d <= 12; 3. t = 2 to 3 and t = 5 to 6; the graph is flat there; 4. -4 miles per hour; negative because he is riding back toward home; 5. t = 1 and t = 8; 6. 24 miles (12 out and 12 back)

Challenge: 1. f(2) = a(-2) + 5 = -10, so a = 15/-2 = -7.5; b(1) = 12, b(2) = 64, b(1) = 0; the ball is back on the ground at 4 seconds, as the

Answer keys

Algebra 1 Sub Plans Week, High School

Week-long sub plans: five days of print and go work for grades 9 to 12, planned Monday to Friday.

PREVIEW

What is included

- Sub binder: notes, the filled-in week plan, a blank schedule, class list, Monday opener (11 pages)
- Algebra 1 sets for five days (15 pages)
- Calm puzzles and reset sheets (10 pages)
- Algebra 1 team tasks (9 pages)
- Algebra 1 games (10 pages)
- Answer keys (6 pages)

How it works

1. Open the week plan. Every set already has its day and page number.
2. Each day: one Algebra 1 set per period (a lesson with worked examples, practice and a challenge), a calm puzzle, a team task and an optional game for the last 15 minutes.
3. Every set stands alone: swap sets between days, or use one with another class when it fits.
4. No prep, no tech: print and go. The sub needs no subject knowledge. Every answer is in the key.
5. Print in color or ink-saver black and white, US Letter or A4.

What this preview shows: the week at a glance, the filled-in week plan, the note to the substitute, the Monday opener, and all of Day 1 (the Algebra 1 set, the calm block, the team task and the game), one answer-key page and one ink-saver page. Every product page is watermarked. The full kit has 62 pages.





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YOUR WEEK AT A GLANCE (1 OF 2)

Every Algebra 1 set of the week, with its page and what it reviews. The day's set runs in every period you teach; any set works on any day.

MONDAY (DAY 1)

Opener	**Meet Your Sub** Fifteen minutes at the top of every period on Monday: the sub sheet, three questions, the class agreement and the voice levels.	p. 10 · 15 min
Algebra 1 set 1	**Expressions, Properties and Order of Operations** Reviews: order of operations, evaluating and simplifying expressions, the distributive property, naming properties, translating phrases into expressions.	p. 13 · 50 min
Calm puzzle	**Word Search and Reset Sheet** A quiet subject word search and a two-minute reset sheet for a loud day, a long wait or anyone who finishes early.	p. 16 · 20 min
Team task	**The Ten Day Contract** Groups of four rank twelve pay offers for a ten day job by gut, then by algebra, and score the gap to the true totals.	p. 18 · 40 min
Game (optional)	**Whiteboard Quiz Game** Optional fun to end the class.	p. 19 · 15 min

TUESDAY (DAY 2)

Algebra 1 set 2	**Functions and Their Graphs** Reviews: function notation, the vertical line test, domain and range, linear rules from tables, reading a distance over time graph, rate of change.	p. 21 · 50 min
Calm puzzle	**Sudoku and Grounding Sheet** A hard sudoku with exactly one answer and a 5-4-3-2-1 grounding sheet for anyone who needs to come back into the room.	p. 24 · 20 min
Team task	**The Winter Carnival Budget** Groups of four evaluate cost and hours functions for eight carnival attractions and build the most fun plan inside two limits.	p. 26 · 40 min
Game (optional)	**Paper Password** Optional fun to end the class.	p. 28 · 15 min

WEDNESDAY (DAY 3)

Algebra 1 set 3	**Quadratics** Reviews: factoring trinomials and differences of squares, solving by factoring, vertex and axis of symmetry, the quadratic formula, the discriminant.	p. 30 · 50 min
Calm puzzle	**Secret Codes and Control Sheet** Two coded sayings to crack in silence and a sheet that sorts what you can and cannot control this week.	p. 33 · 20 min
Team task	**Crack the Machine** Groups of four build two secret function machines, then crack a neighboring group's machines in as few tests as they can.	p. 35 · 40 min
Game (optional)	**Class Feud** Optional fun to end the class.	p. 37 · 15 min

THURSDAY (DAY 4)

Algebra 1 set 4	**Exponential Growth, Decay and Sequences** Reviews: arithmetic and geometric sequences, nth term rules, exponential growth and decay models, percent to growth factor, linear versus exponential.	p. 39 · 50 min
Calm puzzle	**Maze and Brain Dump** A long maze with exactly one true path and a brain dump sheet that turns a crowded head into one next step.	p. 42 · 20 min
Team task	**The Data Desk** Four editors, each holding one data set, check eight statistical headlines and build a front page that is true and fits.	p. 44 · 40 min
Game (optional)	**Classroom Millionaire** Optional fun to end the class.	p. 46 · 15 min

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Algebra 1 Set 1: Expressions, Properties and Order of Operations

Algebra 1 · Day 1

Read the four worked examples and the rules, then do the quick check at the bottom of this page. Show every step.

This set reviews: order of operations, evaluating and simplifying expressions, the distributive property, naming properties, translating phrases into expressions

1 Order of operations

$4 + 3 \times (6 - 2)^2 \div 8$. Parentheses first: $6 - 2 = 4$. Then the exponent: $4^2 = 16$. Then multiply and divide from left to right: $3 \times 16 = 48$ and $48 \div 8 = 6$. Add last.

$4 + 6 = 10$

2 Evaluate an expression

$2x^2 - 3xy + y$ when $x = -3$ and $y = 2$. Put every value in parentheses before you do anything else: $2(-3)^2 - 3(-3)(2) + 2 = 2(9) + 18 + 2$.

$18 + 18 + 2 = 38$

3 Distribute, then combine

$4(2x - 3) - 2(x - 5)$. Multiply each number through its parentheses and carry its sign: $8x - 12 - 2x + 10$. Then combine the like terms: $8x - 2x$, and $-12 + 10$.

$6x - 2$

4 Translate a phrase

"Five less than three times a number n." Three times n is $3n$. "Less than" flips the order: five less than $3n$ means start with $3n$ and take 5 away.

$3n - 5$

Remember

- **Order of operations:** grouping symbols first, then exponents, then multiply and divide from left to right, then add and subtract from left to right. Multiplying does not always come before dividing: whichever is further left goes first.
- **Evaluate with parentheses.** Substitute every value inside parentheses, so a negative number keeps its sign: if $x = -3$, then $x^2 = (-3)^2 = 9$, but $-x^2 = -9$.
- **Like terms** have the same variable part. $5x$ and $-2x$ combine to $3x$, but $3x^2$ and $3x$ never combine.
- **Distributive property:** $a(b + c) = ab + ac$. The number outside multiplies every term inside, sign included: $-2(x - 5) = -2x + 10$.
- **Properties:** *commutative* changes the order ($a + b = b + a$), *associative* changes the grouping, *identity* adds 0 or multiplies by 1, and *inverse* gets back to 0 ($a + (-a) = 0$).

Quick check: name the property each statement shows

Commutative Property of Multiplication | Associative Property of Addition | Distributive Property | Additive Inverse Property | Multiplicative Identity Property | Commutative Property of Addition

1. $x \times 9 = 9 \times x$ _____

2. $(a + 4) + 6 = a + (4 + 6)$ _____

3. $5(x + 3) = 5x + 15$ _____

4. $12 + (-12) = 0$ _____

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Calm Block, Day 1: Word Search

Find all 12 algebra words. Any direction, including backward and diagonal. Pencils only, voices at 0.

Calm · Day 1

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

POLYNOMIAL · QUADRATIC · EVALUATE · BINOMIAL · CONSTANT · ABSOLUTE · OUTLIER · SCATTER · DOMAIN · GROWTH · RATIO · DECAY

Faster than reading every square

- Hunt the rare letters first. Only one word in the list has a Q in it, so every Q in the grid is worth a second look.
- Scan one row at a time for a word's first two letters, then check all eight directions from that square.
- Cross a word off the list the second you circle it, or you will search for it twice.

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Game, Day 1: Whiteboard Quiz Game

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

Game · Day 1

Set up (2 minutes)

1. Draw a 5 by 5 grid on the board, or tape up the board sheet. Write the five category names across the top and the values 100 to 500 down each column.
2. Teams of four to six. Team 1 picks a category and a value.
3. Read the question. The team gets 15 seconds and one answer. Right: they take the points and pick again. Wrong: the next team may steal, then play moves on.
4. Cross the square off. Highest total when time is up wins.

Read this out

"One voice per team: pick a captain who says the final answer. Shouted answers do not count and the square is dead. Team 1, choose a category and a value."

Keep the running score in a corner of the board. If a team argues a call, the script wins and the game moves on. The bold answer is the one to accept, but take a clear equivalent too (negative 1 for -1, 40% for 40 percent).

Expressions

100 What is the value of 3 + 4 times 5?
23

200 What is 2a + b when a = 6 and b = 5?
17

300 What is the coefficient of x in 3(2x + 5) + 4x?
10

400 What is (8 minus 2) squared, divided by 4?
9

500 What is 5 times the square of x when x = negative 2?
20

Sequences

100 What is the next term of 5, 9, 13, 17?
21

200 What is the common ratio of 3, 6, 12, 24?
2

300 What is the 10th term of 2, 5, 8, 11?
29

400 A value of 200 grows 10 percent a year. What is it after 2 years?
242

500 What is the 6th term of 1, 3, 9, 27?
243

Functions

100 If h(x) = 3x minus 5, what is h(4)?
7

200 If f(x) = x squared + 1, what is f(5)?
26

300 For f(x) = 4x + 2, which x makes f(x) = 30?
7

400 If f(x) = 5x on the domain 1, 2, 3, what is the largest value in the range?
15

500 What is the average rate of change of x squared from x = 1 to x = 5?
6

Statistics

100 What is the mean of 6, 9, 12 and 17?
11

200 What is the median of 10, 4, 8, 2, 6 and 12?
7

300 What is the range of 31, 18, 44, 25 and 29?
26

400 A line of best fit is y = 2x + 5. What does it predict at x = 10?
25

500 In a class, 12 of 30 students ride the bus. What percent is that?
40 percent

Quadratics

100 What is the positive solution of x squared = 49?
7

200 What are the zeros of (x minus 4)(x + 1)?
4 and negative 1

300 What is the minimum value of y = (x minus 2) squared + 3?
3

400 What is the discriminant of x squared + 4x + 1?
12

500 Factor x squared + 7x + 12. What is the larger constant in the factors?
4

Final Wager: Exponential Growth

Play this when the board is clear, or when two minutes are left. Announce the category, then every team writes a secret wager of up to the points it already has. Read the question. Teams get 60 seconds of silent writing, then hold their answers up together.

A colony of 500 bacteria doubles every hour. How many bacteria are there after 4 hours?
8000 bacteria

Right: add the wager. Wrong: subtract it. That is the final score.

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KIT 2 OF 3

62 pages · week plan pre-filled · grades 9 to 12

Geometry



This Week's Plan

You teach one subject to several classes, so every period you teach runs this same plan, first period to last: Monday's column in every Monday period, Tuesday's in every Tuesday period. Planning, lunch and duty periods: nothing to do. List your periods and classes on the blank schedule on the next page. This order is a sample: every set stands alone, so swap any set into any slot or any day.

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Rest of the period: the day's set (one copy per student)	**Geometry 1** Angles, Parallel Lines and Transversals p. 13 · 50 min	**Geometry 2** Triangle Congruence and Similarity p. 21 · 50 min	**Geometry 3** Right Triangle Trigonometry p. 30 · 50 min	**Geometry 4** Circles p. 39 · 50 min	**Geometry 5** Transformations and Coordinate Geometry p. 48 · 50 min
If a class finishes early or gets loud	**Word Search and Reset Sheet** p. 16 · 20 min	**Sudoku and Grounding Sheet** p. 24 · 20 min	**Secret Codes and Control Sheet** p. 33 · 20 min	**Maze and Brain Dump** p. 42 · 20 min	**Word Ladders and Three Good Things** p. 51 · 20 min
Block period (90 minutes) only	**The Steepness Contest** p. 18 · 40 min	**The Courtyard Plan** p. 26 · 40 min	**The Fold-Only Angle Kit** p. 35 · 40 min	**The Time Capsule Hunt** p. 44 · 40 min	**The Courtyard Garden Debate** p. 53 · 40 min
Last 15 minutes (optional): a fun way to end the class, or for extra time	**Whiteboard Quiz Game** p. 19 · 15 min	**Paper Password** p. 28 · 15 min	**Class Feud** p. 37 · 15 min	**Classroom Millionaire** p. 46 · 15 min	**Mystery Box** p. 55 · 15 min

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- So every class gets the same set on the same day: Monday's set in every Monday period, Tuesday's set in every Tuesday period.
- One set per day covers all your classes. Copy that day's set once per student in the morning. Planning, lunch and duty periods: nothing to run.
- Each set fills one period (45 to 55 minutes); the challenge at the end stretches it to a 90-minute block.

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.

Week plan, pre-filled



Geometry Set 2: Triangle Congruence and Similarity

Geometry · Day 2

Read the four worked examples and the rules, then name the shortcut for each marked pair in the quick check.

This set reviews: naming congruence shortcuts (SSS, SAS, ASA, AAS, HL), solving with matching parts, similar triangle proportions, the side splitter, similarity tests

1 Name the shortcut

△ABC and △DEF: AB = DE, BC = EF, ∠B = ∠E. Angle B sits between sides AB and BC, so it is the included angle.

SAS

2 Matching parts are equal

△PQR ≅ △STU, PQ = 3x - 4 and ST = 2x + 5. P matches S and Q matches T, so PQ = ST: 3x - 4 = 2x + 5.

x = 9, so PQ = 23

3 Similar triangles

△ABC ~ △DEF, AB = 6, BC = 9 and DE = 10. Matching sides share one ratio: EF/BC = DE/AB, so EF = 9 × 10 ÷ 6.

EF = 15

4 The side splitter

In △ABC, D is on AB and E is on AC with DE parallel to BC. AD = 4, DB = 6 and AE = 5. A parallel line splits both sides in the same ratio: AD/DB = AE/EC.

4/6 = 5/EC, so EC = 7.5

Remember

- **SSS:** three pairs of sides match. **SAS:** two sides and the angle *between* them.
- **ASA:** two angles and the side *between* them. **AAS:** two angles and a side that is not between them.
- **HL:** two right triangles with matching hypotenuses and one matching leg.
- **Not enough:** SSA (the angle is not between the sides) and AAA (same shape, maybe not the same size).
- **Order matters.** △ABC ≅ △DEF means A matches D, B matches E and C matches F, so AB = DE and ∠C = ∠F.
- **Similar (~)** means same shape: matching angles are equal and matching sides share one ratio, the scale factor k.
- **Similarity tests:** AA, SSS (all three side ratios equal) and SAS (two side ratios equal and the angle between them equal).
- **Marks:** sides with matching hash marks are equal, and angles with matching arcs are equal.

Quick check: name the shortcut that proves each pair congruent

1 _____

2 _____

A daily set



Team Task, Day 1: The Steepness Contest

Team · Day 1

Groups of four. Voice level 2. No calculators and no phones. One sheet per group, one person writes, and no group rank goes down until all four agree.

The challenge

Twelve slopes, described in many different ways: angles, pitches, percent grades, steps and slanted lengths. **Your job:** rank them from **1 (steepest)** to **12 (gentlest)**.

Step 1: alone, in three minutes, fill in "My rank" by instinct. **Step 2:** split the items, three each, work out every slope as a decimal, check each other's, and agree on the group rank. Every rank from 1 to 12 is used once. The sub then reads out the true order. The rule for the true order has no judgment calls: **the slope, rise divided by run, steepest first**.

	ITEM	MY RANK	GROUP RANK	RISE ÷ RUN	TRUE RANK	DIFFERENCE
A	A wheelchair ramp: up 1 in for every 12 in across					
B	A ski run that makes a 30° angle with level ground					
C	School stairs: each step rises 7 in and runs 11 in					
D	A mountain road with an 8 percent grade					
E	A skate ramp: sloped surface 10 ft long, top edge 8 ft high					
F	A house roof with a 6 in 12 pitch (6 in up per 12 in across)					
G	A hiking trail: climbs 150 ft over 1,000 ft of level ground					
H	A ladder that makes a 60° angle with the ground					
I	Bleachers: each row rises 12 in and steps back 20 in					
J	A playground slide 13 ft long, top 5 ft above the bottom					
K	A loading ramp that makes a 45° angle with the ground					
L	A barn roof with a 10 in 12 pitch					
	Total difference (lower is better)					

Shortcuts and scoring

- **Slope** = rise ÷ run. A percent grade is the rise for every 100 across.
- **45°** rises 1 for every 1 across. In a **30-60-90** triangle the legs are 1 and √3 ≈ 1.732, so 30° rises 1 for every 1.732 across and 60° rises 1.732 for every 1.
- **Slanted length and rise given?** Find the run with $a^2 + b^2 = c^2$ first.

Difference = group rank minus true rank, sign dropped,

Gut versus geometry

Which item fooled your instinct the most, and why?

.....

.....

Challenge: a wheelchair ramp may rise at most 1 for every 12 across. Which of the twelve would pass that rule? Show the comparison.

Team task



Answer Keys (1 of 6)

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

Geometry Set 1: Angles, Parallel Lines and Transversals

Quick check: 1. vertical angles; 64°; 2. a linear pair; 116°; 3. corresponding angles; 64°; 4. same-side exterior angles; 116°

Angle pairs: 1. x = 17 (40° and 50°); 2. x = 18 (118° and 62°); 3. x = 14 (80°); 4. 68°

Triangles and polygons: 1. x = 32; 32°, 64°, 84°; 2. x = 25 (exterior angle 102°); 3. 70°; 4. 135°

Parallel lines: 1. x = 19 (78°); 2. x = 15 (66°, 114°); 3. x = 13 (110°); 4. x = 35 (110°)

Name the pair: 1. alternate interior angles, equal; 2. same-side interior angles, supplementary; 3. alternate exterior angles, equal; 4. corresponding angles, equal

Word problems: 1. 22°; 2. 45° and 135°; 3. x = 13; 74°; 4. 80°; 5. 72° and 56°; 6. 30°

Challenge: 1. x = 95°, since the new parallel line splits x into 40° and 55° (alternate interior angles); 2. answers vary; accept: the angle corresponding to one interior angle forms a linear pair with the other, so the two add to 180°; 3. 3x + y = 75 and x + 2y = 75, so x = 15 and y = 30

Give full credit for the right x with a correct equation. Students who measured the challenge 1 figure get a wrong answer: it is not drawn to scale.

Calm block, Day 1: word search solution (geometry words)

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

All 12 words are marked. Words run in all eight directions, so a student who only searched across and down will be missing several.

Reset sheet: private, answers vary, nothing to grade. If a student hands it in anyway, thank them and leave it for the teacher.

Geometry Set 2: Triangle Congruence and Similarity

Quick check: 1. SSS; 2. ASA; 3. AAS; 4. HL

Shortcuts: 1. not enough (SSA); 2. AAS; 3. HL; 4. not enough (AAA)

Similar sides: 1. EF = 15; 2. TU = 8; 3. EC = 12; 4. MN = 15

Congruent parts: 1. x = 5, AB = 17; 2. x = 15, ∠K = 72°; 3. 60°; 4. y = 7

Similar or not: 1. similar by SSS, k = 3/2; 2. similar by AA; 3. not similar; 4. similar by SAS, k = 2

Word problems: 1. 6/4 = h/30, so 45 ft; 2. 1.5/2 = h/8, so 6 m; 3. 2/10 = h/4, so 0.8 ft; 4. 15 in; 5. 36 cm; 6. 10/5 = 12/EC, so 6 ft

Challenge: 1. 180 square cm, because area grows by the square of the scale factor, 3 × 3 = 9; 2. SAS: AM = DM and BM = CM (M is the midpoint of each), and ∠AMB = ∠DMC (vertical angles); 3. x/4 = 6/3, so x = 8

Accept any correct proportion. In block D accept k written the other way round (for example 2/3) if the student says which way it goes

Answer keys

Geometry Sub Plans Week, High School

Week-long sub plans: five days of print and go work for grades 9 to 12, planned Monday to Friday.

PREVIEW

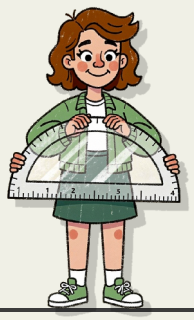
What is included

- Sub binder: notes, the filled-in week plan, a blank schedule, class list, Monday opener (11 pages)
- Geometry sets for five days (15 pages)
- Calm puzzles and reset sheets (10 pages)
- Geometry team tasks (9 pages)
- Geometry games (10 pages)
- Answer keys (6 pages)

How it works

1. Open the week plan. Every set already has its day and page number.
2. Each day: one geometry set per period (a lesson with worked examples, practice and a challenge), a calm puzzle, a team task and an optional game for the last 15 minutes.
3. Every set stands alone: swap sets between days, or use one with another class when it fits.
4. No prep, no tech: print and go. The sub needs no geometry knowledge. Every answer is in the key.
5. Print in color or ink-saver black and white, US Letter or A4.

What this preview shows: the week at a glance, the filled-in week plan, the note to the substitute, the Monday opener, and all of Day 1 (the geometry set, the calm block, the team task and the game), one answer-key page and one ink-saver page. Every product page is watermarked. The full kit has 62 pages.





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YOUR WEEK AT A GLANCE (1 OF 2)

Every geometry set of the week, with its page and what it reviews. The day's set runs in every period you teach; any set works on any day.

MONDAY (DAY 1)

Opener	**Meet Your Sub** Fifteen minutes at the top of every period on Monday: the sub sheet, three questions, the class agreement and the voice levels.	p. 10 · 15 min
Geometry set 1	**Angles, Parallel Lines and Transversals** Reviews: naming angle pairs, solving for x with vertical angles, linear pairs and parallel lines cut by a transversal, triangle angle sums and exterior angles.	p. 13 · 50 min
Calm puzzle	**Word Search and Reset Sheet** A quiet subject word search and a two-minute reset sheet for a loud day, a long wait or anyone who finishes early.	p. 16 · 20 min
Team task	**The Steepness Contest** Groups of four rank twelve ramps, roofs, trails and ladders from steepest to gentlest by gut, then by slope, and score the gap.	p. 18 · 40 min
Game (optional)	**Whiteboard Quiz Game** Optional fun to end the class.	p. 19 · 15 min

TUESDAY (DAY 2)

Geometry set 2	**Triangle Congruence and Similarity** Reviews: naming congruence shortcuts (SSS, SAS, ASA, AAS, HL), solving with matching parts, similar triangle proportions, the side splitter, similarity tests.	p. 21 · 50 min
Calm puzzle	**Sudoku and Grounding Sheet** A hard sudoku with exactly one answer and a 5-4-3-2-1 grounding sheet for anyone who needs to come back into the room.	p. 24 · 20 min
Team task	**The Courtyard Plan** Groups of four find the area of eight courtyard features, from circles to trapezoids, and build the most fun plan inside two limits.	p. 26 · 40 min
Game (optional)	**Paper Password** Optional fun to end the class.	p. 28 · 15 min

WEDNESDAY (DAY 3)

Geometry set 3	**Right Triangle Trigonometry** Reviews: sine, cosine and tangent ratios (SOH CAH TOA), finding sides and angles with a trig table, 45-45-90 and 30-60-90 triangles, angles of elevation.	p. 30 · 50 min
Calm puzzle	**Secret Codes and Control Sheet** Two coded sayings to crack in silence and a sheet that sorts what you can and cannot control this week.	p. 33 · 20 min
Team task	**The Fold-Only Angle Kit** Groups of four fold and tear five angle templates from two sheets of paper, then measure eight printed angles with no protractor.	p. 35 · 40 min
Game (optional)	**Class Feud** Optional fun to end the class.	p. 37 · 15 min

THURSDAY (DAY 4)

Geometry set 4	**Circles** Reviews: central and inscribed angles, arc length and sector area in terms of pi and rounded, tangent and radius facts, chords, inscribed quadrilaterals.	p. 39 · 50 min
Calm puzzle	**Maze and Brain Dump** A long maze with exactly one true path and a brain dump sheet that turns a crowded head into one next step.	p. 42 · 20 min
Team task	**The Time Capsule Hunt** Four role cards each hold one location clue: a circle, a perpendicular bisector and two boundaries.	p. 44 · 40 min
Game (optional)	**Classroom Millionaire** Optional fun to end the class.	p. 46 · 15 min

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Geometry Set 1: Angles, Parallel Lines and Transversals

Geometry · Day 1

Read the four worked examples and the rules, then do the quick check from the figure. Show the equation you solve every time.

This set reviews: naming angle pairs, solving for x with vertical angles, linear pairs and parallel lines cut by a transversal, triangle angle sums and exterior angles

1 Vertical angles

Two vertical angles measure (3x + 10)° and (5x - 30)°. Vertical angles are equal, so 3x + 10 = 5x - 30. Then 40 = 2x.

x = 20; 70°

2 A linear pair

(2x + 15)° and (4x + 45)° form a linear pair, so they add to 180: 6x + 60 = 180, and 6x = 120.

x = 20; 55° and 125°

3 Alternate interior angles

Parallel lines, and (3x + 14)° and (5x - 22)° are alternate interior angles, so they are equal: 3x + 14 = 5x - 22, and 36 = 2x.

x = 18; 68°

4 Same-side interior angles

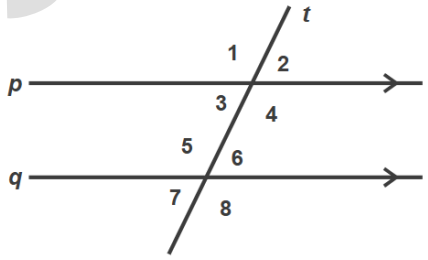
Parallel lines, and (3x + 20)° and (2x + 10)° are same-side interior angles, so they add to 180: 5x + 30 = 180.

x = 30; 110° and 70°

Remember

- **Vertical angles** are equal. A **linear pair** adds to 180°. **Complementary** angles add to 90°, **supplementary** angles add to 180°.
- **When two parallel lines are cut by a transversal:** corresponding angles, alternate interior angles and alternate exterior angles are **equal**. Same-side interior angles and same-side exterior angles are **supplementary**.
- **Interior** means between the two parallel lines, **exterior** means outside them. **Alternate** means on opposite sides of the transversal.
- **Triangles:** the three angles add to 180°. An exterior angle equals the sum of the two remote interior angles.
- **Polygons:** the interior angles of an n-sided polygon add to (n - 2) × 180°.
- **Solve, do not measure.** Write the equation the angle fact gives you, solve for x, then put x back in to get each angle.

Lines p and q are parallel



In this figure ∠2 = 64°.

Quick check: use the figure above

1. ∠2 and ∠3. Name the pair, then find ∠3. _____

2. ∠2 and ∠4. Name the pair, then find ∠4. _____

3. ∠3 and ∠7. Name the pair, then find ∠7. _____

4. ∠2 and ∠8. Name the pair, then find ∠8. _____

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Calm Block, Day 1: Word Search

Find all 12 geometry words. Any direction, including backward and diagonal. Pencils only, voices at 0.

Calm · Day 1

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

HYPOTENUSE · CONGRUENT · PARALLEL · TRIANGLE · BISECTOR · TANGENT · POLYGON · RHOMBUS · TRAPEZOID · DEGREE · RADIUS · CHORD

Faster than reading every square

- Hunt the rare letters first. Only one word in the list has a Z in it, so every Z in the grid is worth a second look.
- Scan one row at a time for a word's first two letters, then check all eight directions from that square.
- Cross a word off the list the second you circle it, or you will search for it twice.

EVIEW · classroomr



Game, Day 1: Whiteboard Quiz Game

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

Game · Day 1

Set up (2 minutes)

1. Draw a 5 by 5 grid on the board, or tape up the board sheet. Write the five category names across the top and the values 100 to 500 down each column.
2. Teams of four to six. Team 1 picks a category and a value.
3. Read the question. The team gets 15 seconds and one answer. Right: they take the points and pick again. Wrong: the next team may steal, then play moves on.
4. Cross the square off. Highest total when time is up wins.

Read this out

"One voice per team: pick a captain who says the final answer. Shouted answers do not count and the square is dead. Team 1, choose a category and a value."

Keep the running score in a corner of the board. If a team argues a call, the script wins and the game moves on. The bold answer is the one to accept, but take a clear equivalent too (negative 0.5 for -1/2, 25 pi for 25 times pi).

Angles

100 What is the complement of 35 degrees?
55 degrees

200 What is the supplement of 112 degrees?
68 degrees

300 Vertical angles are 3x plus 10 and 5x minus 20 degrees. What is x?
15

400 What do a hexagon's interior angles add up to?
720 degrees

500 A regular polygon's exterior angles are 24 degrees. How many sides?
15 sides

Circles

100 What is the diameter of a circle with radius 9?
18

200 An inscribed angle cuts off a 140 degree arc. How big is it?
70 degrees

300 What is the area of a radius 5 circle, in terms of pi?
25 pi

400 Tangent from P: 12. Radius: 5. How far is P from the center?
13

500 What is the area of a 90 degree sector of radius 4, in pi?
4 pi

Triangles

100 A triangle has angles of 50 and 60 degrees. What is the third?
70 degrees

200 An isosceles vertex angle is 100 degrees. What is each base angle?
40 degrees

300 Scale factor 3, small to large. A small side is 7. The large side?
21

400 An exterior angle is 130. One remote interior angle is 55. The other?
75 degrees

500 Scale factor 2: how many times the area is the larger triangle?
4 times

Coordinates

100 How far apart are (1, 1) and (4, 5)?
5

200 What slope is perpendicular to a slope of 2?
-1/2

300 Reflect (3, 5) over the x-axis. What is the new y?
-5

400 What is the x of the midpoint of (2, 4) and (8, 10)?
5

500 Dilate (4, -2) by 3 about the origin to (12, y). What is y?
-6

Trigonometry

100 What is sin 30 degrees, as a decimal?
0.5

200 A 30-60-90 triangle's hypotenuse is 16. What is its short leg?
8

300 What is the tangent of 45 degrees?
1

400 A right triangle has legs 9 and 12. What is the hypotenuse?
15

500 In a right triangle, sin A = 3/5. What is cos A, as a decimal?
0.8

Final Wager: Arc Length

Play this when the board is clear, or when two minutes are left. Announce the category, then every team writes a secret wager of up to the points it already has. Read the question. Teams get 60 seconds of silent writing, then hold their answers up together.

A circle has a radius of 6. How long is the arc of a 60 degree central angle, in terms of pi?
2 pi

Right: add the wager. Wrong: subtract it. That is the final score.

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KIT 3 OF 3 · 68 pages · week plan pre-filled · grades 9 to 12

High School Math (general)



This Week's Plan

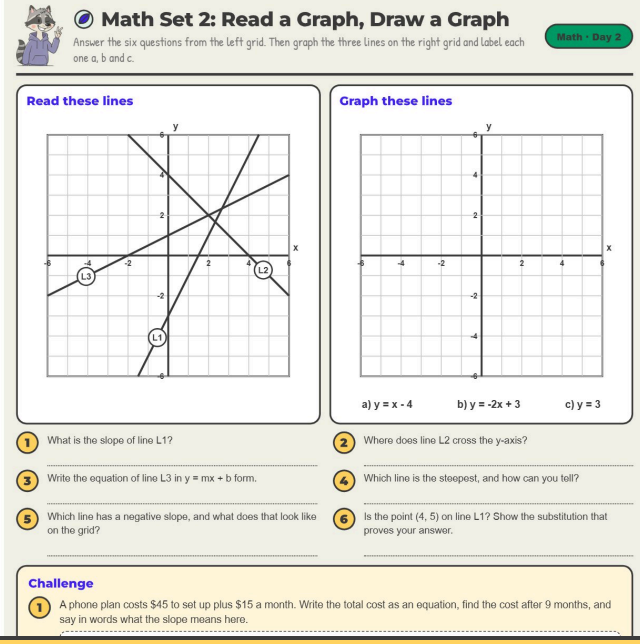
Filled in for you: run the day's set in every period you teach. Keep it as it is, or use the blank schedule on the next page for your own order.

WHEN	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
Start of class	Meet Your Sub p. 10 · 15 min, every period	Attendance, voice level	Attendance, voice level	Attendance, voice level	Attendance, voice level
Main work, every period	Math 1 Linear Equations and Inequalities p. 13	Math 2 Slope and Graphing Lines p. 21	Math 3 Systems of Equations p. 30	Math 4 Exponents and Polynomials p. 39	Math 5 Area, Volume and Right Triangles p. 48
Early finishers or a loud moment	Word Search and Reset Sheet p. 16	Sudoku and Grounding Sheet p. 24	Secret Codes and Control Sheet p. 33	Maze and Brain Dump p. 42	Word Ladders and Three Good Things p. 51
Block period or extra time	Largest to Smallest p. 18	The Pocket Park Plan p. 26	Twenty Four Squares p. 35	The Fountain Arc p. 44	Calculator Debate p. 53
Last 15 minutes, if earned	Whiteboard Jeopardy p. 19	Paper Password p. 28	Class Feud p. 37	Classroom Millionaire p. 46	Mystery Box p. 55

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 the reward. Skip it on a day the class has not earned it.

Week plan, pre-filled



Math Set 2: Read a Graph, Draw a Graph

Answer the six questions from the left grid. Then graph the three lines on the right grid and label each one a, b and c.

Math · Day 2

Read these lines

Graph these lines

a) y = x - 4 b) y = -2x + 3 c) y = 3

1. What is the slope of line L1?
2. Where does line L2 cross the y-axis?
3. Write the equation of line L3 in y = mx + b form.
4. Which line is the steepest, and how can you tell?
5. Which line has a negative slope, and what does that look like on the grid?
6. Is the point (4, 5) on line L1? Show the substitution that proves your answer.

Challenge

1. A phone plan costs $45 to set up plus $15 a month. Write the total cost as an equation, find the cost after 9 months, and say in words what the slope means here.

A daily set



Team Task, Day 1: Largest to Smallest

Groups of four. Voice level 2. No calculators and no phones. One sheet per group, one person writes, and no rank goes down until all four agree.

Team · Day 1

The challenge

The twelve numbers below are all between 1,000 and 2,200, but they are dressed up as powers, roots, products and scientific notation. Some pairs are only a few apart. **Your job:** rank them from **1 (largest)** to **12 (smallest)** using reasoning, not a calculator. Work alone for five minutes and fill in "My rank". Then argue it out and agree on one set of group ranks. Every rank from 1 to 12 is used exactly once.

When every group is done, the sub reads out the exact values. The rule for the true order is simple and has no judgment calls: **exact value, largest first**. Write each value in, then score the difference.

	NUMBER	MY RANK	GROUP RANK	EXACT VALUE	TRUE RANK	DIFFERENCE
A	$\sqrt{3{,}000{,}000}$					
B	43×47					
C	$\pi \times 20^2$					
D	2^{11}					
E	1.3×10^3					
F	3^7					
G	$1 \div 0.0005$					
H	11^3					
I	45^2					
J	2.1×10^3					
K	$1{,}000 \times \sqrt{2}$					
L	12^3					
	Total (lower is better)					

Scoring

For each row: group rank minus true rank, and drop the minus sign. Add the twelve numbers.

Defend one call

Pick the closest pair your group ranked correctly. Show, without a calculator, how you knew which one is bigger.

Team task



Answer Keys (1 of 12)

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

Math Set 1: Linear Equations and Inequalities

Quick check: 1. x = 6; 2. x = 4; 3. x = 11; 4. x < -4

Solve the two-step equations: 1. x = 5; 2. x = 9; 3. x = -6; 4. x = 24

Variables on both sides: 1. x = 5; 2. x = -3; 3. x = -5; 4. x = 6

Distribute, then solve: 1. x = 5; 2. x = 6; 3. x = 4; 4. x = 7

Solve the inequalities: 1. x > 6; 2. x <= 6; 3. x < -6; 4. x <= -3

Word problems: 1. 31 (the integers are 31, 32 and 33); 2. 10 months; 3. 8 cm wide (the length is 20 cm); 4. 8 miles (both cost $26); 5. 5 tickets (12t + 9 is at most 75, so t is at most 5.5); 6. 89 or higher

Challenge: 1. x = 6 (6x - 17 = 2x + 7, so 4x = 24); 2. h = 2A/b, so h = 8; 3. x <= -5; dividing both sides by -3 flips the inequality sign

Answer keys

Math Sub Plans Week, High School

Week-long sub plans: five days of print and go work for grades 9 to 12, planned Monday to Friday.

PREVIEW

What is included

- Sub binder: notes, the filled-in week plan, a blank schedule, class list, Monday opener (11 pages)
- Math sets for five days (15 pages)
- Calm puzzles and reset sheets (10 pages)
- Math team tasks (9 pages)
- Math games (10 pages)
- Answer keys (12 pages)

How it works

1. Open the week plan. Every set already has its day and page number.
2. Each day: one math set per period (a lesson with worked examples, practice and a challenge), a calm puzzle, a team task and a game for the last 15 minutes.
3. The sub needs no subject knowledge. Every answer is in the key.
4. Print in color or ink-saver black and white, US Letter or A4.

What this preview shows: the filled-in week plan, the note to the substitute, the Monday opener, and all of Day 1 (the math set, the calm block, the team task and the game), one answer-key page and one ink-saver page. Every product page is watermarked. The full kit has 68 pages.







Math Set 1: Linear Equations and Inequalities

Math · Day 1

Read the four worked examples and the rules, then do the quick check at the bottom of this page. Show your working.

1 Two-step equation

4x + 7 = 31. Undo the addition first: subtract 7 from both sides to get 4x = 24. Then undo the multiplication: divide both sides by 4.

x = 6

2 Variables on both sides

5x - 3 = 2x + 12. Move the variable to one side: subtract 2x from both sides to get 3x - 3 = 12. Add 3, then divide by 3.

x = 5

3 Distribute first

3(2x - 5) + 4 = 25. Multiply the 3 through the parentheses: 6x - 15 + 4 = 25. Combine the constants: 6x - 11 = 25. Add 11, divide by 6.

x = 6

4 Inequality, negative coefficient

-4x + 2 <= 18. Subtract 2 to get -4x <= 16, then divide both sides by -4. Dividing by a negative number flips the inequality sign.

x >= -4

Remember

- **Whatever you do to one side, do to the other.** That is the whole method: keep the equation balanced while you strip away everything around the x.
- **Undo in reverse order:** addition and subtraction first, then multiplication and division.
- **Distribute before you combine.** 3(2x - 5) means 6x - 15, not 6x - 5.
- **Inequalities work the same way, with one rule added:** multiplying or dividing both sides by a negative number flips the sign. 2 < 5, but -2 > -5.
- **Check your answer** by putting it back into the original equation. Both sides must give the same number.

Quick check: one of each before you start the practice

1. 6x - 5 = 31 _____

2. 8x - 1 = 3x + 19 _____

3. 3(x - 4) = 21 _____

4. -2x + 1 > 9 _____

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Calm Block, Day 1: Word Search

Find all 12 math words. Any direction, including backward and diagonal. Pencils only, voices at 0.

Calm · Day 1

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

EQUATION · FUNCTION · EXPONENT · PARABOLA · VARIABLE · INTEGER · RADICAL · TANGENT · VERTEX · MATRIX · FACTOR · SLOPE

Faster than reading every square

- Hunt the rare letters first. Only one word in the list has a Q in it, so every Q in the grid is worth a second look.
- Scan one row at a time for a word's first two letters, then check all eight directions from that square.
- Cross a word off the list the second you circle it, or you will search for it twice.

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Team Task, Day 1: Largest to Smallest

Groups of four. Voice level 2. No calculators and no phones. One sheet per group, one person writes, and no rank goes down until all four agree.

Team · Day 1

The challenge

The twelve numbers below are all between 1,000 and 2,200, but they are dressed up as powers, roots, products and scientific notation. Some pairs are only a few apart. **Your job:** rank them from **1 (largest)** to **12 (smallest)** using reasoning, not a calculator. Work alone for five minutes and fill in "My rank". Then argue it out and agree on one set of group ranks. Every rank from 1 to 12 is used exactly once.

When every group is done, the sub reads out the exact values. The rule for the true order is simple and has no judgment calls: **exact value, largest first**. Write each value in, then score the difference.

	NUMBER	MY RANK	GROUP RANK	EXACT VALUE	TRUE RANK	DIFFERENCE
A	$\sqrt{3{,}000{,}000}$					
B	43×47					
C	$\pi \times 20^2$					
D	2^{11}					
E	1.3×10^3					
F	3^7					
G	$1 \div 0.0005$					
H	11^3					
I	45^2					
J	2.1×10^3					
K	$1{,}000 \times \sqrt{2}$					
L	12^3					
Total (lower is better)						

Scoring

For each row: group rank minus true rank, and drop the minus sign. Add the twelve numbers.

- **0 to 8:** excellent: your group reasons like a calculator
- **9 to 18:** good
- **19 to 30:** fair
- **Over 30:** look again at the powers of 2 and the square roots.

Tools that help: $2^{10} = 1{,}024$, $\sqrt{2}$ is about 1.414, $\sqrt{3}$ is about 1.732, π is about 3.14.

Defend one call

Pick the closest pair your group ranked correctly. Show, without a calculator, how you knew which one is bigger.

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