



Middle School Math Emergency Sub Binder

Emergency sub plans for middle school math, grades 6 to 8. The sub needs no math background: every step is on the page.

PREVIEW

What is included

- 7 front pages: binder cover, important information, note to the sub, the lesson plan filled in, schedule, class list and dismissal, how it went
- 9 activities, each with its own sub script and student pages (29 pages)
- 3 individual activities and 6 partner, team or whole-class activities
- A Say this to the class script for every activity, a star challenge on every worksheet, every answer in a key
- Color and ink-saver B&W, US Letter and A4

How it works

1. Leave the binder out. The lesson plan lists every activity with its page and minutes.
2. The sub reads the Say this to the class box word for word.
3. Students work from their own pages, with the steps on the page. The sub needs no math background: every answer is in the key.
4. No prep and no tech: print and go.

The 9 activities, 35 to 45 minutes each

1. **Quiet Reading**, 45 min **SOLO**: reading for detail with math inside: area, rates, the mean, scale factors, multiplying fractions, money
2. **Math Error Detective**, 40 min **SOLO**: finding and fixing one wrong step: order of operations, integers, fractions, percent, equations, geometry, mean, powers
3. **Practice Menu**, 45 min **SOLO**: mixed review: integers, powers and roots, percent, equal values, expressions, real-world problems
4. **Partner Check**, 40 min **PAIRS**: integers, fractions, decimals, percent, equations, area, exponents and slope, checked with a partner
5. **Design the Class Garden**, 40 min **PAIRS**: area, perimeter and volume of garden beds, unit prices, rounding up, a percent coupon, a budget
6. **Math Puzzle Tournament**, 41 min **TEAMS**: number sense, angles, area, volume, the Pythagorean theorem, equations, sequences and systems
7. **The Math Fair Mix-Up**, 40 min **TEAMS**: percent increase, sums, differences and multiples, reasoning from clues instead of guessing
8. **Which Is Greater? Stand-Off**, 40 min **WHOLE CLASS**: comparing fractions, decimals, percents, negatives, powers, roots, area, volume and probability
9. **Whiteboard Quiz Game**, 35 min **WHOLE CLASS**: a review of this binder's math: percent, integers, equations, geometry, powers and roots

What this preview shows: the note to the substitute, the lesson plan, the other front pages, one page of every activity, a sub script, four more student pages and one ink-saver page. Every product page is watermarked, and no answer key is shown. The full binder has 36 pages.



Note to the Substitute

Middle school math, grades 6 to 8 · 9 one-period activities · no prep, no math background needed

Thank you for covering my class

Everything you need is in this binder. The front pages (important information, lesson plan, schedule of the day, class list) are filled in for today. After them come 9 math activities: the first 3 are individual work, the other 6 are for partners, teams or the whole class. Each one fills most or all of a period of 40 to 50 minutes, runs from the printout alone, and carries its own problems and answer key, so you never have to teach new math or work anything out yourself. Everything reviews middle school math the class has met before.

The first page of every activity is your script. It says what the activity practices, how to set it up, and how long each step takes. The box marked **Say this to the class** is written to be read aloud word for word. Every answer is in a key on the script page (for the logic mystery, on the page right after the script). Keep those pages with you and hand out only the student pages. Every student worksheet has a **Challenge** box for early finishers (in the logic mystery, the bonus question on the slip).

The 9 activities

- **Quiet Reading** quiet single · 45 min · p. 7
- **Math Error Detective** quiet single · 40 min · p. 12
- **Practice Menu** quiet single · 45 min · p. 15
- **Partner Check** pairs · 40 min · p. 19
- **Design the Class Garden** pairs, project · 40 min · p. 22
- **Math Puzzle Tournament** teams, puzzles · 41 min · p. 25
- **The Math Fair Mix-Up** team logic · 40 min · p. 28
- **Which Is Greater? Stand-Off** whole class · 40 min · p. 32
- **Whiteboard Quiz Game** whole class, teams · 35 min · p. 34

If the class is loud

- Switch to a quiet single activity: Quiet Reading, Math Error Detective and Practice Menu. Nobody needs to move.
- In the scored games (Math Puzzle Tournament, Which Is Greater? Stand-Off and Whiteboard Quiz Game), the scoring keeps the class honest.
- If an activity is not working, stop it and switch. Every activity can start at any point in the period.
- The games are optional: a fun way to end the class or to use extra time.

Which activity when?



- A student says the class never learned this? Every activity reviews earlier work. Ask them to try the first problem with a partner, and leave me a note.
- The same activity in every period is fine: each class sees it once. The lesson plan (next page) lists all 9. Calculators: follow my rule on the Important Information page.
- First thing in the day, or a class that needs to settle: start with a quiet single activity.
- After lunch or with a restless class: a group activity uses the energy.
- Short period? These fit: Whiteboard Quiz Game (35 min) and one reading of Quiet Reading (about 25 min).

Before you leave

Please fill in the How It Went page at the back. It takes two minutes and I read every word. Thank you!





Lesson Plan

Filled in for today: 9 activities, 35 to 45 minutes each. Write the time of each period you use.

ACTIVITY	PLAN	PAGE
Quiet Reading Quiet single · about 45 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> One reading and its question sheet per student; fast finishers take the other Silent reading and questions, about 20 minutes per reading Read the answers out from the key, or collect for me 	p. 7
Math Error Detective Quiet single · about 40 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> Hand out both case sheets; pencils only Students find the one wrong step in each solution, explain it and fix the answer Read the key out at the end, or collect for me 	p. 12
Practice Menu Quiet single · about 45 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> Three sheets on the desk: A Secret Message, B Match It, C Real-World Problems Students choose one, work alone in silence, swap it when done Check against the keys on the script, or collect for me 	p. 15
Partner Check Pairs · about 40 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> Pairs: one Partner A sheet and one Partner B sheet Both solve row 1, then compare: the answers must match Different answers? Find the slip together. The key is on the script 	p. 19
Design the Class Garden Pairs, project · about 40 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> Pairs or threes, one price sheet and one plan sheet each Part 1 together (keyed), then plan the garden on the grid inside the budget Check the plans with the checklist on the script; collect for me 	p. 22
Math Puzzle Tournament Teams, puzzles · about 41 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> Teams of 3 or 4, one puzzle sheet and one answer sheet per team One round at a time, 1, 2 or 3 points per puzzle Every answer is on the key. The key settles arguments 	p. 25
The Math Fair Mix-Up Team logic · about 40 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> Teams of 3 or 4, one case file and one grid per team Warm-up together on the board, then the case on their own Teams hand in their slip; check it against the key and reveal 	p. 28
Which Is Greater? Stand-Off Whole class · about 40 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> One sheet per student; everyone stays seated Read a pair, 20-second guess, count hands, then 90 seconds to work it out One speaker per side, then read the answer from the key 	p. 32
Whiteboard Quiz Game Whole class, teams · about 35 min Time ____ : ____ to ____ : ____	<ul style="list-style-type: none"> Draw the 5 by 5 board (or tape up the board sheet); 3 to 5 teams Teams take turns picking a category and value; you read the question Right answer: points on the scoreboard. Optional, for the end of class 	p. 34

Fast finishers

Any quiet single activity can follow any other activity: Quiet Reading (p. 7), Math Error Detective (p. 12) and Practice Menu (p. 15).

Collect / leave for me

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Counting a Crowd

Read the whole text before you look at the questions.

Counting a Crowd

When a big crowd gathers for a parade or a concert in a park, someone always asks the same question: how many people were there? Nobody can count every person one by one. Instead, crowd counters use a shortcut that mixes area, rates and a little sampling.

The first step is to find the area the crowd covers. Suppose a crowd fills a rectangular lawn that is 300 feet long and 120 feet wide. The area is 300 times 120, or 36,000 square feet.

The second step is to decide how tightly people are packed. Many counters use a simple rule of thumb. In a loose crowd, where people can still walk around, each person takes up about 10 square feet. In a very tightly packed crowd, like the front of a concert crowd, each person takes up only about 2.5 square feet. A loose crowd on the lawn would be about 36,000 divided by 10, or 3,600 people.

Real crowds are rarely packed the same way everywhere. People squeeze in near the stage and spread out at the edges. So counters split the area into a grid of equal squares, like a giant checkerboard. They count the people in a few sample squares and use the average for every square. A team at a street festival might count 18, 22, 25 and 15 people in four sample squares that are each 10 feet by 10 feet. The mean is 20 people per square. If the whole festival covers 150 squares, the estimate is 150 times 20, or 3,000 people.

Photos taken from above make the job easier, because every head is easy to see. Even so, a crowd count is always an estimate. Careful counters give a range, such as "between 2,500 and 3,500 people," and explain how they got it. A number with a method behind it is far more useful than a wild guess.

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1. Quiet Reading, 45 min (solo)

Math Error Detective

Each solution has exactly one wrong step. Write its number, what went wrong, and the correct answer.

How a detective works: check every step on its own. Find the step on wrong paper. The first step that does not match is the wrong one. Copying after it may look right, but it was built on the mistake.

1. **Cosimo's work:** Evaluate $18 - 6 + 3 + 2^2$
 $18 + 3 = 21$ - 4 was 18, so $18 + 3 = 4$
 $21 + 2 = 23$ - 6 was 12, so $12 + 3 = 4$
 $23 + 2 = 25$ - 4 was 4, so $4 + 4 = 8$
 $25 + 2 = 27$
 Wrong step: _____
 What went wrong? _____
 Correct answer: _____

2. **Henrietta's work:** Find $-7 - (-12) + (-3)$
 $-7 + 12 = 5$ - 12 was 12, so $-7 + 12 = 19$
 $19 + (-3) = 16$
 $16 - 3 = 13$
 Wrong step: _____
 What went wrong? _____
 Correct answer: _____

3. **Ansel's work:** Add $\frac{1}{3} + \frac{1}{4}$
 $\frac{1}{3} + \frac{1}{4} = \frac{1}{7}$ - The common denominator is 12.
 $\frac{1}{3} = \frac{4}{12}$
 $\frac{1}{4} = \frac{3}{12}$
 $\frac{4}{12} + \frac{3}{12} = \frac{7}{12}$
 Wrong step: _____
 What went wrong? _____
 Correct answer: _____

4. **Rosamund's work:** A \$64 jacket is 25% off. Find the sale price.
 $64 \times 25 = 16$
 $64 - 16 = 48$
 $48 \div 2 = 24$
 $64 - 24 = 40$
 Wrong step: _____
 What went wrong? _____
 Correct answer: _____

5. **Isabella's work:** Simplify $-3(2x - 5) + 4x$
 $-3(2x - 5) = -6x - 15$
 $-6x - 15 + 4x = -2x - 15$
 $-2x - 15 = -2x - 15$
 Wrong step: _____
 What went wrong? _____
 Correct answer: _____

Challenge
 Pick one case in this page. Write a NEW problem of the same kind where the same mistake would give a wrong answer, and solve it correctly.

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2. Math Error Detective, 40 min (solo)

Practice Menu A

Solve each problem. Find your answer in the code bank and write its letter. The letters, in order, spell a secret message.

Code bank
 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1. $4 + 30 =$ Answer: _____
 2. $2^3 = 48$ Answer: _____
 3. $2^2 + 5 =$ Answer: _____
 4. $-45 + (-6) =$ Answer: _____
 5. 20% of 85 Answer: _____
 6. Solve $7x + 91 = x + 7$ Answer: _____
 7. $2^3 \cdot 3^2 =$ Answer: _____
 8. $-144 \div -69 =$ Answer: _____
 9. $-4/7 - 30 =$ Answer: _____
 10. $0.8 \div 45 =$ Answer: _____
 11. Solve $2(x - 3) = 14$. What is x ? Answer: _____
 12. The mean of 12, 15, 21 and 24 Answer: _____

The message

Challenge Solve $3(2x - 5) + 4x = 5$

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3. Practice Menu, 45 min (solo)

Partner Check

Work one row, then compare with your partner. The answers should be the same. If not, find the slip together.

INTRODUCES
 $4 + 4 = (-11)$ Answer: _____

UNDERSTANDS OPERATIONS
 $3 + 4 = 5 + 2$ Answer: _____

APPLIES AND SUBTRACTS FRACTIONS
 $\frac{1}{3} + \frac{1}{4} =$ Answer: _____

MULTIPLIES AND DIVIDES FRACTIONS
 $\frac{1}{3} \times \frac{1}{4} =$ Answer: _____

RECALLS
 $4.2 \div 1.5 =$ Answer: _____

PERCENTS
 15% of 100 Answer: _____

EQUATIONS
 Solve $4x - 7 = 21$ Answer: _____

AREA
 Area of a triangle with base 14 cm and height 6 cm Answer: _____

COORDINATES
 $7 + 2 =$ Answer: _____

SLOPE
 Slope of the line through (1, 2) and (4, 11) Answer: _____

Challenge
 The two legs of a right triangle are 9 and 12. Find the hypotenuse. Then compare with your partner. Same answer again?

My name: _____ Partner: _____

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4. Partner Check, 40 min (pairs)

Design the Class Garden

Part 1: price one bed
 Your class is designing a garden of raised beds. First, find out what one bed costs.

Sprout and Spade Garden Supply: price list

- Frame boards: \$3 per foot
- Soil: \$8 per bag. One bag fills 2 cubic feet.
- Seed packets: \$2 each. One packet plants 4 square feet.
- Round bags and packets UP to the whole numbers.

The sample bed (3 ft deep)

3 ft

2 ft

Each square is 1 foot by 1 foot.

1. What is the area of the sample bed?

2. Find the perimeter of the sample bed.

3. Frame boards go all the way around the bed. What do the boards cost?

4. The bed is 1 foot deep. How many cubic feet of soil does it hold? How many bags is that, and what do they cost?

5. How many seed packets does the bed need, and what do they cost?

6. What does the whole sample bed cost (boards, soil and seeds)?

7. A right-triangle bed, also 1 ft deep, has legs of 6 ft and 4 ft. What is its area, and how many bags of soil does it need?

8. A coupon takes 10% off soil. What would the sample bed's soil cost with the coupon?

Challenge
 The sample beds' boards get painted. One can of paint covers 15 feet of board and costs \$7. How many cans are needed, and what do they cost?

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5. Design the Class Garden, 40 min (pairs)

Math Puzzle Tournament

Solve each puzzle with your team. Write your answers on the answer sheet.

Round 1: Number Sense 1 PT EACH

- What is the smallest whole number greater than 0 that 4, 6 and 10 all divide into evenly?
- What is the greatest common factor of 56 and 84?
- A two-digit number's digits add up to 11. Its ones digit is 3 more than its tens digit. What is the number?
- How many minutes are in 3.5 hours?
- What is 7.5% of 200?
- Which number between 50 and 56 is prime?
- Write 0.35 as a fraction in simplest form.
- What is $-15 + 8 - (-6)$?

Round 2: Shapes and Measures 2 PT EACH

- Two angles of a triangle measure 47° and 68° . What is the third angle?
- Two angles are supplementary. One is 4 times the other. What is the smaller angle?
- A circle has a diameter of 20 m. Using $\pi = 3.14$ for π , what is its area?
- A rectangle is twice as long as it is wide. Its perimeter is 54 cm. What is its area?
- A square has a perimeter of 36 cm. What is its area?
- A cube has edges of 3 inches. What is its surface area?
- A right triangle has legs of 8 and 12. How long is the hypotenuse?
- A box is 10 cm long and 4 cm wide. Its volume is 120 cubic cm. How tall is it?

Round 3: Algebra and Logic 3 PT EACH

- Solve $3(x - 4) + 9 = 15$.
- Student tickets cost \$6 and adult tickets cost \$9. A group of 10 people paid \$72. How many adults are in the group?
- A line goes through (0, 3) and (2, 11). Write its equation in the form $y = mx + b$.
- $x + y = 14$ and $x - y = 4$. What are x and y ?
- What number comes next? 3, 7, 15, 31.
- Three even numbers in a row add up to 78. What is the largest of the three?
- The task tree by the school is 4 times as old as the maple tree. In 6 years, the oak will be 3 times as old as the maple. How old is the maple now?
- Which whole numbers make both $2x + 5 = 17$ and $x + 3 = 10$ true?

Challenge Telescriber Two whole numbers in a row multiply to 306. What are they?

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6. Math Puzzle Tournament, 41 min (teams)

The Math Fair Mix-Up

Read the story. Every clue is true. Do the math. Fill in the grid. Then answer the case question.

The Math Fair opens tomorrow. Five students each set up one project at one of the five booths, numbered 1 to 5, and the judges already gave every project a score out of 100. Then the score sheet went through the laundry in a jacket pocket. The judges' notes survived, and every note is true, but each one is written as a math fact. Rebuild the booth for before the doors open.

The five scores: 65, 72, 80, 90, 95

The clues

- Lysander's score is 25% higher than the Paper Rockets score.
- The Bridge Model scored 5 points more than the The Patterns project.
- The scores at booth 1 and booth 2 add up to 152.
- Perpetua's booth number is 2 more than Casimir's booth number.
- Wilhelmina scored 16 points less than Augustus.
- Augustus's booth number is 3 times the booth number of the Plant Growth project.

The case question: Which project is at booth 3, and what was its score?

Scrap paper for the math

Clue 1 _____ Clue 2 _____ Clue 3 _____

Clue 4 _____ Clue 5 _____ Clue 6 _____

Warm-up the practice problems
 Simplify, Evaluate and Unfold each solved a different number of problems: 12, 15 or 20.
 1. Evaluate solved more problems than Unfold.
 2. Simplify solved exactly 3 more problems than one of the others.
 3. Unfold solved 10 problems in every one and a half hours.

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7. The Math Fair Mix-Up, 40 min (teams)

Which Is Greater?

Stand-off sheet
 Circle one greater or less first. Then work it out and circle the TRUE Greater or Lesser they are equal.

1. $\frac{1}{3}$ of 40 _____
 2. $\frac{1}{4}$ of 120 _____
 3. $\frac{1}{5}$ of 150 _____
 4. $\frac{1}{6}$ of 180 _____
 5. $\frac{1}{7}$ of 210 _____
 6. $\frac{1}{8}$ of 240 _____
 7. $\frac{1}{9}$ of 270 _____
 8. $\frac{1}{10}$ of 300 _____
 9. $\frac{1}{11}$ of 330 _____
 10. $\frac{1}{12}$ of 360 _____
 11. $\frac{1}{13}$ of 390 _____
 12. $\frac{1}{14}$ of 420 _____
 13. $\frac{1}{15}$ of 450 _____
 14. $\frac{1}{16}$ of 480 _____
 15. $\frac{1}{17}$ of 510 _____
 16. $\frac{1}{18}$ of 540 _____
 17. $\frac{1}{19}$ of 570 _____
 18. $\frac{1}{20}$ of 600 _____
 19. $\frac{1}{21}$ of 630 _____
 20. $\frac{1}{22}$ of 660 _____
 21. $\frac{1}{23}$ of 690 _____
 22. $\frac{1}{24}$ of 720 _____
 23. $\frac{1}{25}$ of 750 _____
 24. $\frac{1}{26}$ of 780 _____
 25. $\frac{1}{27}$ of 810 _____
 26. $\frac{1}{28}$ of 840 _____
 27. $\frac{1}{29}$ of 870 _____
 28. $\frac{1}{30}$ of 900 _____
 29. $\frac{1}{31}$ of 930 _____
 30. $\frac{1}{32}$ of 960 _____
 31. $\frac{1}{33}$ of 990 _____
 32. $\frac{1}{34}$ of 1020 _____
 33. $\frac{1}{35}$ of 1050 _____
 34. $\frac{1}{36}$ of 1080 _____
 35. $\frac{1}{37}$ of 1110 _____
 36. $\frac{1}{38}$ of 1140 _____
 37. $\frac{1}{39}$ of 1170 _____
 38. $\frac{1}{40}$ of 1200 _____
 39. $\frac{1}{41}$ of 1230 _____
 40. $\frac{1}{42}$ of 1260 _____
 41. $\frac{1}{43}$ of 1290 _____
 42. $\frac{1}{44}$ of 1320 _____
 43. $\frac{1}{45}$ of 1350 _____
 44. $\frac{1}{46}$ of 1380 _____
 45. $\frac{1}{47}$ of 1410 _____
 46. $\frac{1}{48}$ of 1440 _____
 47. $\frac{1}{49}$ of 1470 _____
 48. $\frac{1}{50}$ of 1500 _____
 49. $\frac{1}{51}$ of 1530 _____
 50. $\frac{1}{52}$ of 1560 _____
 51. $\frac{1}{53}$ of 1590 _____
 52. $\frac{1}{54}$ of 1620 _____
 53. $\frac{1}{55}$ of 1650 _____
 54. $\frac{1}{56}$ of 1680 _____
 55. $\frac{1}{57}$ of 1710 _____
 56. $\frac{1}{58}$ of 1740 _____
 57. $\frac{1}{59}$ of 1770 _____
 58. $\frac{1}{60}$ of 1800 _____
 59. $\frac{1}{61}$ of 1830 _____
 60. $\frac{1}{62}$ of 1860 _____
 61. $\frac{1}{63}$ of 1890 _____
 62. $\frac{1}{64}$ of 1920 _____
 63. $\frac{1}{65}$ of 1950 _____
 64. $\frac{1}{66}$ of 1980 _____
 65. $\frac{1}{67}$ of 2010 _____
 66. $\frac{1}{68}$ of 2040 _____
 67. $\frac{1}{69}$ of 2070 _____
 68. $\frac{1}{70}$ of 2100 _____
 69. $\frac{1}{71}$ of 2130 _____
 70. $\frac{1}{72}$ of 2160 _____
 71. $\frac{1}{73}$ of 2190 _____
 72. $\frac{1}{74}$ of 2220 _____
 73. $\frac{1}{75}$ of 2250 _____
 74. $\frac{1}{76}$ of 2280 _____
 75. $\frac{1}{77}$ of 2310 _____
 76. $\frac{1}{78}$ of 2340 _____
 77. $\frac{1}{79}$ of 2370 _____
 78. $\frac{1}{80}$ of 2400 _____
 79. $\frac{1}{81}$ of 2430 _____
 80. $\frac{1}{82}$ of 2460 _____
 81. $\frac{1}{83}$ of 2490 _____
 82. $\frac{1}{84}$ of 2520 _____
 83. $\frac{1}{85}$ of 2550 _____
 84. $\frac{1}{86}$ of 2580 _____
 85. $\frac{1}{87}$ of 2610 _____
 86. $\frac{1}{88}$ of 2640 _____
 87. $\frac{1}{89}$ of 2670 _____
 88. $\frac{1}{90}$ of 2700 _____
 89. $\frac{1}{91}$ of 2730 _____
 90. $\frac{1}{92}$ of 2760 _____
 91. $\frac{1}{93}$ of 2790 _____
 92. $\frac{1}{94}$ of 2820 _____
 93. $\frac{1}{95}$ of 2850 _____
 94. $\frac{1}{96}$ of 2880 _____
 95. $\frac{1}{97}$ of 2910 _____
 96. $\frac{1}{98}$ of 2940 _____
 97. $\frac{1}{99}$ of 2970 _____
 98. $\frac{1}{100}$ of 3000 _____
 99. $\frac{1}{101}$ of 3030 _____
 100. $\frac{1}{102}$ of 3060 _____
 101. $\frac{1}{103}$ of 3090 _____
 102. $\frac{1}{104}$ of 3120 _____
 103. $\frac{1}{105}$ of 3150 _____
 104. $\frac{1}{106}$ of 3180 _____
 105. $\frac{1}{107}$ of 3210 _____
 106. $\frac{1}{108}$ of 3240 _____
 107. $\frac{1}{109}$ of 3270 _____
 108. $\frac{1}{110}$ of 3300 _____
 109. $\frac{1}{111}$ of 3330 _____
 110. $\frac{1}{112}$ of 3360 _____
 111. $\frac{1}{113}$ of 3390 _____
 112. $\frac{1}{114}$ of 3420 _____
 113. $\frac{1}{115}$ of 3450 _____
 114. $\frac{1}{116}$ of 3480 _____
 115. $\frac{1}{117}$ of 3510 _____
 116. $\frac{1}{118}$ of 3540 _____
 117. $\frac{1}{119}$ of 3570 _____
 118. $\frac{1}{120}$ of 3600 _____
 119. $\frac{1}{121}$ of 3630 _____
 120. $\frac{1}{122}$ of 3660 _____
 121. $\frac{1}{123}$ of 3690 _____
 122. $\frac{1}{124}$ of 3720 _____
 123. $\frac{1}{125}$ of 3750 _____
 124. $\frac{1}{126}$ of 3780 _____
 125. $\frac{1}{127}$ of 3810 _____
 126. $\frac{1}{128}$ of 3840 _____
 127. $\frac{1}{129}$ of 3870 _____
 128. $\frac{1}{130}$ of 3900 _____
 129. $\frac{1}{131}$ of 3930 _____
 130. $\frac{1}{132}$ of 3960 _____
 131. $\frac{1}{133}$ of 3990 _____
 132. $\frac{1}{134}$ of 4020 _____
 133. $\frac{1}{135}$ of 4050 _____
 134. $\frac{1}{136}$ of 4080 _____
 135. $\frac{1}{137}$ of 4110 _____
 136. $\frac{1}{138}$ of 4140 _____
 137. $\frac{1}{139}$ of 4170 _____
 138. $\frac{1}{140}$ of 4200 _____
 139. $\frac{1}{141}$ of 4230 _____
 140. $\frac{1}{142}$ of 4260 _____
 141. $\frac{1}{143}$ of 4290 _____
 142. $\frac{1}{144}$ of 4320 _____
 143. $\frac{1}{145}$ of 4350 _____
 144. $\frac{1}{146}$ of 4380 _____
 145. $\frac{1}{147}$ of 4410 _____
 146. $\frac{1}{148}$ of 4440 _____
 147. $\frac{1}{149}$ of 4470 _____
 148. $\frac{1}{150}$ of 4500 _____
 149. $\frac{1}{151}$ of 4530 _____
 150. $\frac{1}{152}$ of 4560 _____
 151. $\frac{1}{153}$ of 4590 _____
 152. $\frac{1}{154}$ of 4620 _____
 153. $\frac{1}{155}$ of 4650 _____
 154. $\frac{1}{156}$ of 4680 _____
 155. $\frac{1}{157}$ of 4710 _____
 156. $\frac{1}{158}$ of 4740 _____
 157. $\frac{1}{159}$ of 4770 _____
 158. $\frac{1}{160}$ of 4800 _____
 159. $\frac{1}{161}$ of 4830 _____
 160. $\frac{1}{162}$ of 4860 _____
 161. $\frac{1}{163}$ of 4890 _____
 162. $\frac{1}{164}$ of 4920 _____
 163. $\frac{1}{165}$ of 4950 _____
 164. $\frac{1}{166}$ of 4980 _____
 165. $\frac{1}{167}$ of 5010 _____
 166. $\frac{1}{168}$ of 5040 _____
 167. $\frac{1}{169}$ of 5070 _____
 168. $\frac{1}{170}$ of 5100 _____
 169. $\frac{1}{171}$ of 5130 _____
 170. $\frac{1}{172}$ of 5160 _____
 171. $\frac{1}{173}$ of 5190 _____
 172. $\frac{1}{174}$ of 5220 _____
 173. $\frac{1}{175}$ of 5250 _____
 174. $\frac{1}{176}$ of 5280 _____
 175. $\frac{1}{177}$ of 5310 _____
 176. $\frac{1}{178}$ of 5340 _____
 177. $\frac{1}{179}$ of 5370 _____
 178. $\frac{1}{180}$ of 5400 _____
 179. $\frac{1}{181}$ of 5430 _____
 180. $\frac{1}{182}$ of 5460 _____
 181. $\frac{1}{183}$ of 5490 _____
 182. $\frac{1}{184}$ of 5520 _____
 183. $\frac{1}{185}$ of 5550 _____
 184. $\frac{1}{186}$ of 5580 _____
 185. $\frac{1}{187}$ of 5610 _____
 186. $\frac{1}{188}$ of 5640 _____
 187. $\frac{1}{189}$ of 5670 _____
 188. $\frac{1}{190}$ of 5700 _____
 189. $\frac{1}{191}$ of 5730 _____
 190. $\frac{1}{192}$ of 5760 _____
 191. $\frac{1}{193}$ of 5790 _____
 192. $\frac{1}{194}$ of 5820 _____
 193. $\frac{1}{195}$ of 5850 _____
 194. $\frac{1}{196}$ of 5880 _____
 195. $\frac{1}{197}$ of 5910 _____
 196. $\frac{1}{198}$ of 5940 _____
 197. $\frac{1}{199}$ of 5970 _____
 198. $\frac{1}{200}$ of 6000 _____
 199. $\frac{1}{201}$ of 6030 _____
 200. $\frac{1}{202}$ of 6060 _____
 201. $\frac{1}{203}$ of 6090 _____
 202. $\frac{1}{204}$ of 6120 _____
 203. $\frac{1}{205}$ of 6150 _____
 204. $\frac{1}{206}$ of 6180 _____
 205. $\frac{1}{207}$ of 6210 _____
 206. $\frac{1}{208}$ of 6240 _____
 207. $\frac{1}{209}$ of 6270 _____
 208. $\frac{1}{210}$ of 6300 _____
 209. $\frac{1}{211}$ of 6330 _____
 210. $\frac{1}{212}$ of 6360 _____
 211. $\frac{1}{213}$ of 6390 _____
 212. $\frac{1}{214}$ of 6420 _____
 213. $\frac{1}{215}$ of 6450 _____
 214. $\frac{1}{216}$ of 6480 _____
 215. $\frac{1}{217}$ of 6510 _____
 216. $\frac{1}{218}$ of 6540 _____
 217. $\frac{1}{219}$ of 6570 _____
 218. $\frac{1}{220}$ of 6600 _____
 219. $\frac{1}{221}$ of 6630 _____
 220. $\frac{1}{222}$ of 6660 _____
 221. $\frac{1}{223}$ of 6690 _____
 222. $\frac{1}{224}$ of 6720 _____
 223. $\frac{1}{225}$ of 6750 _____
 224. $\frac{1}{226}$ of 6780 _____
 225. $\frac{1}{227}$ of 6810 _____
 226. $\frac{1}{228}$ of 6840 _____
 227. $\frac{1}{229}$ of 6870 _____
 228. $\frac{1}{230}$ of 6900 _____
 229. $\frac{1}{231}$ of 6930 _____
 230. $\frac{1}{232}$ of 6960 _____
 231. $\frac{1}{233}$ of 6990 _____
 232. $\frac{1}{234}$ of 7020 _____
 233. $\frac{1}{235}$ of 7050 _____
 234. $\frac{1}{236}$ of 7080 _____
 235. $\frac{1}{237}$ of 7110 _____
 236. $\frac{1}{238}$ of 7140 _____
 237. $\frac{1}{239}$ of 7170 _____
 238. $\frac{1}{240}$ of 7200 _____
 239. $\frac{1}{241}$ of 7230 _____
 240. $\frac{1}{242}$ of 7260 _____
 241. $\frac{1}{243}$ of 7290 _____
 242. $\frac{1}{244}$ of 7320 _____
 243. $\frac{1}{245}$ of 7350 _____
 244. $\frac{1}{246}$ of 7380 _____
 245. $\frac{1}{247}$ of 7410 _____
 246



The Math Fair Mix-Up

Sub script: a team logic mystery with math clues

One period • teams of 3 or 4

This activity practices: percent increase, sums, differences and multiples, reasoning from clues instead of guessing



SAY THIS TO THE CLASS

"The score sheet for the Math Fair got washed, and your team rebuilds it from the judges' notes. Every note is a true math fact: do the math on scrap paper first, then mark the grid with an X for no and a circle for yes. We start with a short warm-up together."

Materials

- Teams of 3 or 4. Each team gets one case file and one grid sheet (the grid sheet has the answer slip).
- Pencils (erasers help), scrap paper for the math, and the board for the warm-up.
- Jobs: **reader** (reads the clues out), **calculator** (does the math of a clue on scrap paper), **marker** (the only one who writes in the grid) and **recorder** (fills in the slip).
- Keep this page and the next one: together they are your key.

Run it (40 minutes)

- Set up.** Make the teams, hand out the sheets. 3 min
- Read the story.** A volunteer reads the story on the case file out loud. 3 min
- Warm-up together** on the board, as shown below. 6 min
- Teams solve the case.** Walk around. After about 10 minutes, give a hint from the next page to any team that is stuck. Fast teams answer the bonus question. 23 min
- Reveal.** Collect the slips, then read the answer and the full solution from the key. 5 min

The warm-up: teach the grid (6 minutes)

Draw this grid on the board. Students have the same one on their case file. Benedikt, Evadne and Ulrich each solved a different number of problems: 12, 15 or 20. Read the two clues:

- Evadne solved more problems than Ulrich.
- Benedikt solved exactly 3 more problems than one of the others.

Then show it step by step:

- Clue 2 first, because it has the math: which two of the numbers 12, 15 and 20 are exactly 3 apart? Only 12 and 15. Benedikt has the bigger one, so circle Benedikt under 15. A circle means the rest of that row and that column get an X.
- Clue 1: Evadne solved more than Ulrich. Only 12 and 20 are left, so Evadne has 20 and Ulrich has 12. Circle both.
- Check it against both clues out loud: 20 is more than 12, and 15 is 3 more than 12.

The two rules to say out loud: one circle in every row and every column of each small grid; and in this case, do the math of a clue on scrap paper first, then mark the grid. An X means no, a circle means yes.

	12	15	20
Benedikt			
Evadne			
Ulrich			

Answer: Benedikt, 15; Evadne, 20; Ulrich, 12.



Math Error Detective Cases 1 to 5

Each solution has exactly one wrong step. Write its number, what went wrong, and the correct answer.

Math Error Detective



How a detective works: check every step on its own. Redo the step on scrap paper. The first step that does not match is the wrong one. Everything after it may look right, but it was built on the mistake.

1 Cosimo's work: Evaluate $18 - 6 \div 3 + 2^2$

- STEP 1 $2^2 = 4$, so $18 - 6 \div 3 + 4$
- STEP 2 $18 - 6 = 12$, so $12 \div 3 + 4$
- STEP 3 $12 \div 3 = 4$, so $4 + 4$
- STEP 4 $= 8$

Wrong step ☐

What went wrong?

Correct answer

2 Henrietta's work: Find $-7 - (-12) + (-3)$

- STEP 1 $-7 - (-12) = -19$
- STEP 2 $-19 + (-3) = -22$
- STEP 3 Answer: -22

Wrong step ☐

What went wrong?

Correct answer

3 Anselm's work: Add $\frac{2}{3} + \frac{3}{4}$

- STEP 1 The common denominator is 12.
- STEP 2 $\frac{2}{3} = \frac{8}{12}$
- STEP 3 $\frac{3}{4} = \frac{6}{12}$
- STEP 4 $\frac{8}{12} + \frac{6}{12} = \frac{14}{12} = 1 \frac{1}{6}$

Wrong step ☐

What went wrong?

Correct answer

4 Rosamund's work: A \$64 jacket is 25% off. Find the sale price.

- STEP 1 $25\% = 0.25$
- STEP 2 $0.25 \times 64 = 16$
- STEP 3 Sale price: $64 + 16 = \$80$

Wrong step ☐

What went wrong?

Correct answer

5 Isadora's work: Simplify $-3(2x - 5) + 4x$

- STEP 1 $-3 \cdot 2x = -6x$
- STEP 2 $-3 \cdot (-5) = -15$
- STEP 3 $-6x - 15 + 4x$
- STEP 4 $= -2x - 15$

Wrong step ☐

What went wrong?

Correct answer

★ Challenge

Pick one case on this page. Write a NEW problem of the same kind where the same mistake would give a wrong answer, and solve it correctly.

Name Score / 15



Practice Menu A Secret Message

Solve each problem. Find your answer in the code bank and write its letter. The letters, in order, spell a message.

Practice Menu

Code bank

-46	O	-14	I	-2	L	4	A	5	D	8	M	10	N	13	H	16	E	17	T	18	S
19	S	21	R	27	G	36	I	40	N												

Four numbers in the bank belong to no problem. Your answer is not in the bank? Check your work again.

①

$$-6 \times 7 + 50$$

 Answer Letter ☐

②

$$\frac{3}{4} \text{ of } 48$$

 Answer Letter ☐

③

$$2^3 \times 5$$

 Answer Letter ☐

④

$$-45 \div (-9)$$

 Answer Letter ☐

⑤

$$20\% \text{ of } 85$$

 Answer Letter ☐

⑥

$$\text{Solve } 7x = 91. \text{ What is } x?$$

 Answer Letter ☐

⑦

$$5^2 - 3^2$$

 Answer Letter ☐

⑧

$$\sqrt{144} + \sqrt{49}$$

 Answer Letter ☐

⑨

$$(-4)^2 - 30$$

 Answer Letter ☐

⑩

$$0.6 \times 45$$

 Answer Letter ☐

⑪

$$\text{Solve } 2(x - 3) = 14. \text{ What is } x?$$

 Answer Letter ☐

⑫

$$\text{The mean of } 12, 15, 21 \text{ and } 24$$

 Answer Letter ☐

The message

1	2	3	4	5	6	7	8	9	10	11	12
---	---	---	---	---	---	---	---	---	----	----	----


Challenge Solve $3(2x - 5) = 4x + 9$.

Name Score / 12



Partner Check Partner A

Solve one row, then compare with your partner. The answers should be the same. If not, find the slip together.

Partner Check

1 INTEGERS $-9 + 4 - (-11)$	Answer ☐ Same as my partner
2 ORDER OF OPERATIONS $3 + 4 \times 5 - 2$	Answer ☐ Same as my partner
3 ADDING AND SUBTRACTING FRACTIONS $\frac{1}{2} + \frac{3}{8}$	Answer ☐ Same as my partner
4 MULTIPLYING AND DIVIDING FRACTIONS $\frac{2}{3} \times \frac{9}{10}$	Answer ☐ Same as my partner
5 DECIMALS 4.2×1.5	Answer ☐ Same as my partner
6 PERCENT OF A NUMBER 15% of 120	Answer ☐ Same as my partner
7 EQUATIONS Solve $4x - 7 = 21$	Answer ☐ Same as my partner
8 AREA Area of a triangle with base 14 cm and height 6 cm	Answer ☐ Same as my partner
9 EXPONENTS $2^5 + 2^5$	Answer ☐ Same as my partner
10 SLOPE Slope of the line through (1, 2) and (4, 11)	Answer ☐ Same as my partner



Challenge

The two legs of a right triangle are 9 and 12. Find the hypotenuse.

Then compare with your partner. Same answer again?

My name _____

Partner _____



Math Puzzle Tournament

Puzzle sheet

Solve each puzzle with your team. Write your answers on the answer sheet.

Math Puzzle Tournament



Round 1: Number Sense

1 PT EACH

1. What is the smallest whole number greater than 0 that 4, 6 and 10 all divide into evenly?
2. Which number between 50 and 56 is prime?
3. What is the greatest common factor of 36 and 84?
4. Write 0.35 as a fraction in simplest form.
5. A two-digit number's digits add up to 11. Its ones digit is 3 more than its tens digit. What is the number?
6. What is $-15 + 8 - (-6)$?
7. How many minutes are in 3.5 hours?
8. What is 7.5% of 200?



Round 2: Shapes and Measures

2 PT EACH

9. Two angles of a triangle measure 47° and 68° . What is the third angle?
10. A square has a perimeter of 36 cm. What is its area?
11. Two angles are supplementary. One is 4 times the other. What is the smaller angle?
12. A cube has edges of 3 inches. What is its surface area?
13. A circle has a diameter of 20 m. Using 3.14 for pi, what is its area?
14. A right triangle has legs of 5 and 12. How long is the hypotenuse?
15. A rectangle is twice as long as it is wide. Its perimeter is 54 ft. What is its area?
16. A box is 10 cm long and 4 cm wide. Its volume is 120 cubic cm. How tall is it?



Round 3: Algebra and Logic

3 PT EACH

17. Solve $3(x - 4) = x + 10$.
18. What number comes next? 3, 7, 15, 31, ...
19. Student tickets cost \$6 and adult tickets cost \$9. A group of 10 people paid \$72. How many adults are in the group?
20. Three even numbers in a row add up to 78. What is the largest of the three?
21. A line goes through (0, 3) and (2, 11). Write its equation in the form $y = mx + b$.
22. The oak tree by the school is 4 times as old as the maple tree. In 6 years, the oak will be 3 times as old as the maple. How old is the maple now?
23. $x + y = 14$ and $x - y = 4$. What are x and y ?
24. Which whole numbers make both $2x + 5 < 17$ and $x > 3$ true?


Challenge Tiebreaker Two whole numbers in a row multiply to 306. What are they?

Name or team _____



Counting a Crowd Article

Read the whole text before you look at the questions.

Quiet Reading

Counting a Crowd

When a big crowd gathers for a parade or a concert in a park, someone always asks the same question: how many people were there? Nobody can count every person one by one. Instead, crowd counters use a shortcut that mixes area, rates and a little sampling.



The first step is to find the area the crowd covers. Suppose a crowd fills a rectangular lawn that is 300 feet long and 120 feet wide. The area is 300 times 120, or 36,000 square feet.

The second step is to decide how tightly people are packed. Many counters use a simple rule of thumb. In a loose crowd, where people can still walk around, each person takes up about 10 square feet. In a very tightly packed crowd, like the front of a concert crowd, each person takes up only about 2.5 square feet. A loose crowd on the lawn would be about 36,000 divided by 10, or 3,600 people.

Real crowds are rarely packed the same way everywhere. People squeeze in near the stage and spread out at the edges. So counters split the area into a grid of equal squares, like a giant checkerboard. They count the people in a few sample squares and use the average for every square. A team at a street festival might count 18, 22, 25 and 15 people in four sample squares that are each 10 feet by 10 feet. The mean is 20 people per square. If the whole festival covers 150 squares, the estimate is 150 times 20, or 3,000 people.

Photos taken from above make the job easier, because every head is easy to see. Even so, a crowd count is always an estimate. Careful counters give a range, such as "between 2,500 and 3,500 people," and explain how they got it. A number with a method behind it is far more useful than a wild guess.

In the full binder

A whole math sub day, planned and ready to print.

36 pages in color and ink-saver
B&W, US Letter and A4

9 activities of 35 to 45 minutes, one
per class period

7 front pages: note to the sub,
lesson plan, schedule, class list

3 + 6 individual activities +
partner, team and
whole-class activities

Use it your way

- A sudden sick day: emergency sub plans that are ready before you need them.
- Any middle school math class, grades 6 to 8: every activity fits a 40 to 50 minute period and reviews math the class has met before.
- Your sub tub: print it once and keep it all year.
- Your own no prep day: teach it yourself when you need a break from planning.

Thank you! If this works for your class, a quick review helps other teachers find it, and earns you TpT credits.



Classroom
REVIEW GAMES