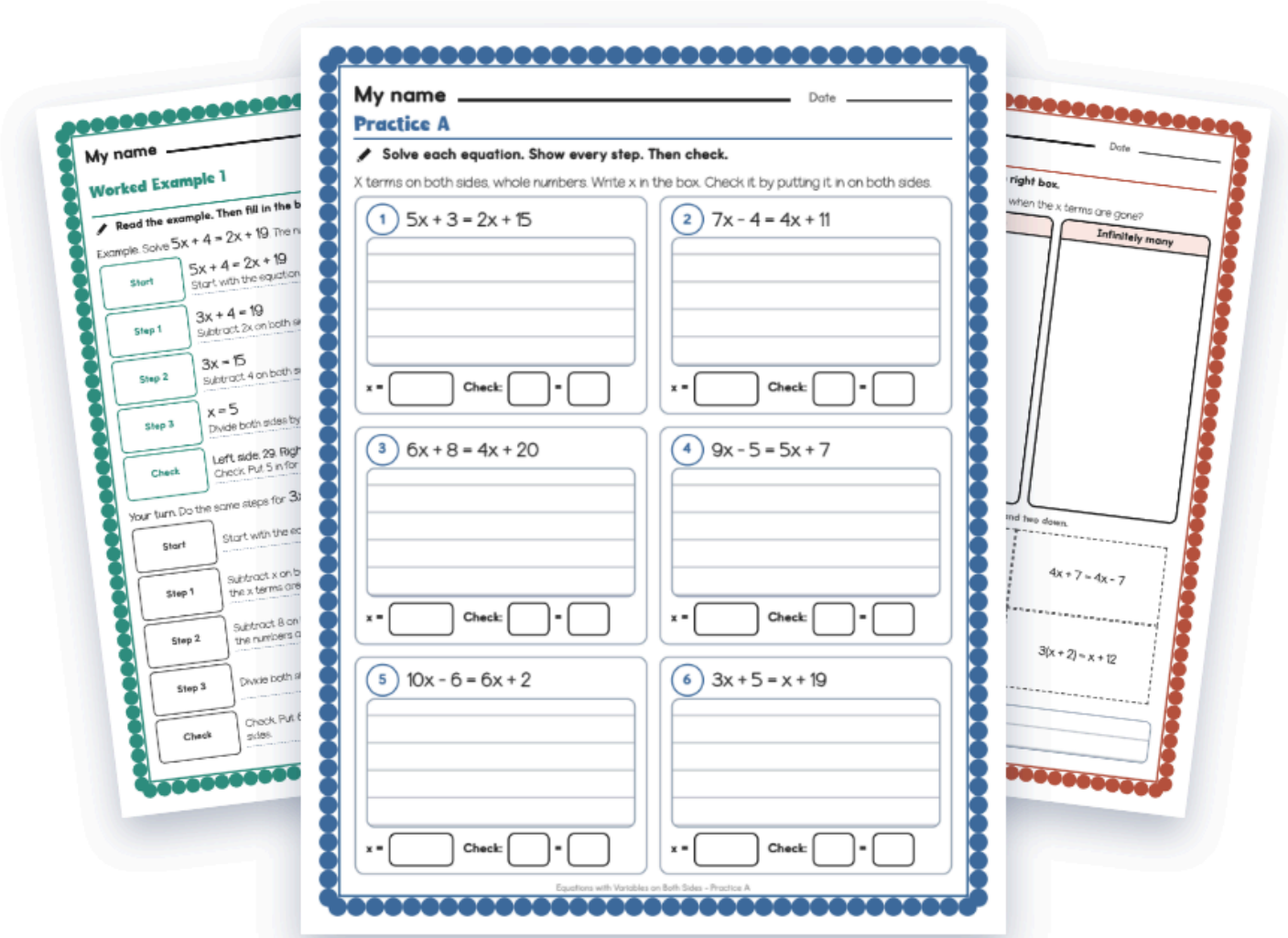
SOLVING EQUATIONS

BOTH SIDES

Notes, Practice, Keys - Grades 8-9







24 student pages - 3 sorts - answer keys

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This is a fillable PDF

- Open it in a PDF reader (Adobe Acrobat Reader, Preview, or your browser), click into a line or a box, type, and Save As.
- The name line, every answer box, every ruled work box and every check box on the student pages are type-in fields, and so are the tracker, class grid, team note and family page. You can also print any page and write by hand.
- It works offline. No account, no subscription, no internet connection needed after you download it.

Print at 100 percent

Turn off fit to page and shrink to fit so the ruled lines stay 0.34 inch apart. Every student page is black and white inside a colored border, so it still reads when copied in black and white.

Student work

A filled-in tracker, class grid or team note carries a real student's name. Keep it in the data folder, and use a first name only on any page that leaves your hands.

Need help?

If a field will not behave or a page will not print the way you expect, use Ask a Question on the product page before leaving a review. Every question is read, and a fix to the file ships as a free update: re-download it any time from My Purchases.

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PREVIEW

How To Read a Page

The parts of a student page, then the page types in the order they come.

The parts of a page

- **The answer box.** A bordered box for a number, x = something, or a check value. Click it to type, or print and write in it.
- **The ruled work box.** Lines 0.34 inch apart for showing steps. One step to a line, and write what you did to both sides.
- **The check box.** One solution, no solution, infinitely many; yes or not yet: click or mark one.
- **The check line.** Put your answer in for x. Write the left side value, then the right side value. They must match.
- **The cut line.** Six pieces in a 3 by 2 grid, each 2.4 by 1.25 inches, edge to edge: two cuts across and two down.

Page type	What it looks like	What the student does
Steps, Worked Examples, Three Kinds	4 pages	A five-step chart, two examples with guided copies, one / none / infinitely many.
First Move	6 equations	Say what to add or subtract, then write the new equation.
Practice A to E	30 equations	Solve with steps, then check. Whole numbers up to fractions.
How Many Solutions?	3 pages, 12 equations	Solve, then check one, none or infinitely many.
Check My Work	7 items	Substitute a number into both sides. Is it a solution?
Find the Mistake	2 pages, 8 problems	An invented student's work has one mistake. Find it and fix it.
Write It, Make Your Own	3 word problems, 3 prompts	Write an equation from words; write your own.
Exit Tickets, Sorts, Self Check	6 tickets, 18 pieces	Quick checks, three cut-and-paste mats, a yes or not yet list.

Untimed, unscored on the page

No student page has a timer or a score on it. The keys and the tracker are for you. The answer keys are on pages 29 to 31.

Invented examples

Every equation, story and student is made up for practice. Nothing here is a real statistic. The word problems use small whole numbers so a student can check them by hand.

Printing and the type-in fields

Every page prints clean in black and white. The name line, every answer box, every ruled box and every check box are type-in fields in any PDF reader: click one, type, then save. This is a fillable PDF, not a slideshow or a word-processor file.

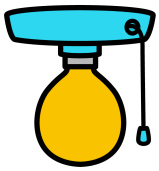
Room to work

Work boxes hold about four lines of steps. If a student needs more room, hand over one page a day, or let students work on scrap paper and copy the answer into the box.

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____



Solve It: The Steps

Read the steps. Keep this page next to you.

The example solves $3(x - 1) = x + 9$. Skip step 1 when there are no parentheses.

1 Clear the parentheses
Multiply the number outside by every term inside. Combine like terms on each side.
Example: $3x - 3 = x + 9$

2 Put the x terms together
Add or subtract an x term on both sides, so the x terms are on one side.
Example: $2x - 3 = 9$

3 Put the numbers together
Add or subtract the number on both sides, so the numbers are on the other side.
Example: $2x = 12$

4 Divide
Divide both sides by the number in front of x.
Example: $x = 6$

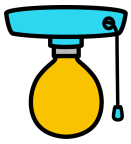
5 Check
Put your answer in for x on both sides. The two sides must match.
Example: Left side: 15. Right side: 15. They match.

If the x terms cancel, look at what is left. A false statement like 5 = 9 means no solution. A true statement like 6 = 6 means infinitely many solutions.

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____



Worked Example 2

Read the example. Then fill in the blanks.

Example. Solve $3(x - 1) = x + 9$. The numbers are made up for practice.

Start	$3(x - 1) = x + 9$ Start with the equation.
Step 1	$3x - 3 = x + 9$ Clear the parentheses. Multiply the number outside by each term inside.
Step 2	$2x - 3 = 9$ Subtract x on both sides. Now the x terms are together.
Step 3	$2x = 12$ Add 3 on both sides. Now the numbers are together.
Step 4	$x = 6$ Divide both sides by 2.
Check	Left side: 15. Right side: 15. They match. Check. Put 6 in for x on both sides.

Your turn. Do the same steps for $4(x - 2) = 2x + 6$

Start	Start with the equation.	$4(x - 2) = 2x + 6$
Step 1	Clear the parentheses. Multiply the number outside by each term inside.	
Step 2	Subtract 2x on both sides. Now the x terms are together.	
Step 3	Add 8 on both sides. Now the numbers are together.	
Step 4	Divide both sides by 2.	
Check	Check. Put 7 in for x on both sides.	

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

First Move

Move the x term. Write what you do.

Move the x term from the right side to the left side. You do not need to finish solving.

$6x + 4 = 2x + 12$

1. **I will** ☐ **add** ☐ **subtract** ☐ **on both sides.**

   New equation: ☐

$3x - 5 = 7x + 3$

2. **I will** ☐ **add** ☐ **subtract** ☐ **on both sides.**

   New equation: ☐

$8x - 1 = x + 13$

3. **I will** ☐ **add** ☐ **subtract** ☐ **on both sides.**

   New equation: ☐

$4x + 6 = -3x + 20$

4. **I will** ☐ **add** ☐ **subtract** ☐ **on both sides.**

   New equation: ☐

$-5x + 2 = -2x - 7$

5. **I will** ☐ **add** ☐ **subtract** ☐ **on both sides.**

   New equation: ☐

$9x + 10 = 4x - 5$

6. **I will** ☐ **add** ☐ **subtract** ☐ **on both sides.**

   New equation: ☐

PREVIEW

Preview - Bright Path Shed

My name _____ Date _____

Practice B

Solve each equation. Show every step. Then check.

Negatives and a bigger x term on the right. Write x in the box. Check it by putting it in on both sides.

1 $2x + 9 = 5x - 6$

x = ☐ Check: ☐ = ☐

2 $3x - 8 = 7x + 4$

x = ☐ Check: ☐ = ☐

3 $-2x + 7 = 3x - 8$

x = ☐ Check: ☐ = ☐

4 $4x + 3 = -2x - 27$

x = ☐ Check: ☐ = ☐

5 $6 - 4x = x + 26$

x = ☐ Check: ☐ = ☐

6 $-x + 13 = 2x - 8$

x = ☐ Check: ☐ = ☐

PREVIEW

Preview - Bright Path Shed

My name _____ Date _____

Practice D

Solve each equation. Show every step. Then check.

Fractions. Write x in the box. Check it by putting it in on both sides.

1. $\frac{1}{2}x + 3 = \frac{1}{4}x + 5$

x = ☐ Check: ☐ = ☐

2. $\frac{2}{3}x - 1 = \frac{1}{3}x + 4$

x = ☐ Check: ☐ = ☐

3. $\frac{3}{4}x + 2 = \frac{1}{4}x + 8$

x = ☐ Check: ☐ = ☐

4. $x + \frac{1}{2} = \frac{3}{2}x - 4$

x = ☐ Check: ☐ = ☐

5. $\frac{1}{3}(x + 6) = \frac{1}{6}x + 5$

x = ☐ Check: ☐ = ☐

6. $\frac{2}{5}x - 3 = \frac{1}{5}x + 1$

x = ☐ Check: ☐ = ☐

PREVIEW

Preview - Bright Path Shop

My name _____ Date _____

How Many Solutions? A

Solve it. Then check one box.

Write x in the box only if there is one solution.

1 $3x + 1 = x + 9$

Show your steps

- ☐ one solution — x = ☐
- ☐ no solution
- ☐ infinitely many

2 $2(x + 4) = 2x + 8$

Show your steps

- ☐ one solution — x = ☐
- ☐ no solution
- ☐ infinitely many

3 $4x + 6 = 4x + 10$

Show your steps

- ☐ one solution — x = ☐
- ☐ no solution
- ☐ infinitely many

4 $6x - 4 = 2x + 8$

Show your steps

- ☐ one solution — x = ☐
- ☐ no solution
- ☐ infinitely many

PREVIEW

Preview - Bright Path Shop

My name _____ Date _____

How Many Solutions? C

Solve it. Then check one box.

Write x in the box only if there is one solution.

1 $5x - 2(x + 3) = 3x + 1$

Show your steps

- ☐ one solution — x = ☐
- ☐ no solution
- ☐ infinitely many

2 $6(x - 1) = 4x + 10$

Show your steps

- ☐ one solution — x = ☐
- ☐ no solution
- ☐ infinitely many

3 $\frac{1}{3}(6x - 9) = 2x - 3$

Show your steps

- ☐ one solution — x = ☐
- ☐ no solution
- ☐ infinitely many

4 $2(5x + 1) = 4(2x + 1)$

Show your steps

- ☐ one solution — x = ☐
- ☐ no solution
- ☐ infinitely many

PREVIEW

My name _____ Date _____

Find the Mistake 1

Find the mistake. Then fix it.

Sam is made up for practice. Each problem has one mistake.

1 **Sam solved it like this:**

1 $4x + 3 = x + 15$
2 $3x + 3 = 15$
3 $3x = 18$
4 $x = 6$

The mistake is on line

☐ 1 ☐ 2 ☐ 3 ☐ 4

Fix it. Write the right answer.

2 **Sam solved it like this:**

1 $3(x + 4) = x + 20$
2 $3x + 4 = x + 20$
3 $2x + 4 = 20$
4 $2x = 16$
5 $x = 8$

The mistake is on line

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Fix it. Write the right answer.

3 **Sam solved it like this:**

1 $6x + 5 = 2x + 21$
2 $8x + 5 = 21$
3 $8x = 16$
4 $x = 2$

The mistake is on line

☐ 1 ☐ 2 ☐ 3 ☐ 4

Fix it. Write the right answer.

4 **Sam solved it like this:**

1 $5x + 4 = 3x + 14$
2 $2x + 4 = 14$
3 $x + 4 = 7$
4 $x = 3$

The mistake is on line

☐ 1 ☐ 2 ☐ 3 ☐ 4

Fix it. Write the right answer.

PREVIEW

My name _____ Date _____

Make Your Own

Make up your own equations.

Tip: start with different x terms on the two sides, then choose the numbers.

1. Write an equation with the solution x = 6. The x terms must be different on the two sides.

My equation

Check it. Put 6 in for x. Left side ☐ **Right side** ☐

2. Write an equation with no solution.

My equation

How do I know there is no solution?

3. Write an equation with infinitely many solutions.

My equation

How do I know every number works?

PREVIEW

Preview · Bright Path Sped

My name _____ Date _____

Exit Tickets 2

Solve each one. Tell how sure you are.

Exit ticket 4 $3(2x - 1) = 6x - 3$

My answer: _____ How sure am I?

☐ sure ☐ kind of sure ☐ not sure

Exit ticket 5 $\frac{1}{2}x + 4 = \frac{1}{6}x + 10$

My answer: _____ How sure am I?

☐ sure ☐ kind of sure ☐ not sure

Exit ticket 6 $3(3x + 1) = 9x - 1$

My answer: _____ How sure am I?

☐ sure ☐ kind of sure ☐ not sure

PREVIEW

Preview - Bright Path Sped

My name _____ Date _____

Cut and Paste 2

Cut out the six pieces. Paste each one in the right box.

Solve each equation. Paste it in the box with its answer.

x = -4	x = 3	x = 1

x = 8	x = -2	x = 5

PREVIEW

Cut on the dashed lines: six pieces, two straight cuts across and two down.

$7x - 6 = 4x + 3$	$3x + 5 = 5x + 9$	$\frac{1}{2}x + 1 = \frac{1}{4}x + 3$
$2(x + 1) = x + 7$	$6 - x = 3x + 22$	$5x - 2 = 8x - 5$

My name _____ Date _____

Check My Own Work

Check your own work. Mark yes or not yet.

1	I wrote each step on its own line.	☐ yes	☐ not yet
2	I did the same thing to both sides every time.	☐ yes	☐ not yet
3	I cleared the parentheses before I moved anything.	☐ yes	☐ not yet
4	I put the x terms together on one side.	☐ yes	☐ not yet
5	I checked my answer by putting it back in.	☐ yes	☐ not yet
6	When the x terms canceled, I looked at what was left.	☐ yes	☐ not yet
7	I can tell no solution from infinitely many solutions.	☐ yes	☐ not yet
8	I can explain my steps to a partner.	☐ yes	☐ not yet

The kind of problem I can do now is...

The kind I still need help with is...

PREVIEW

Answer Key: Moves, Counts and Sorts

First Move page 9

#	Equation	Do	New equation
1	6x + 4 = 2x + 12	Subtract 2x	4x + 4 = 12
2	3x - 5 = 7x + 3	Subtract 7x	-4x - 5 = 3
3	8x - 1 = x + 13	Subtract x	7x - 1 = 13
4	4x + 6 = -3x + 20	Add 3x	7x + 6 = 20
5	-5x + 2 = -2x - 7	Add 2x	-3x + 2 = -7
6	9x + 10 = 4x - 5	Subtract 4x	5x + 10 = -5

How Many Solutions? pages 15, 16, 17

Item	Equation	Answer
A1	3x + 1 = x + 9	One solution, x = 4
A2	2(x + 4) = 2x + 8	Infinitely many solutions
A3	4x + 6 = 4x + 10	No solution
A4	6x - 4 = 2x + 8	One solution, x = 3
B1	5x - 3 = 5x + 2	No solution
B2	7x - 7 = 7(x - 1)	Infinitely many solutions
B3	3(x + 5) = 2x + 9	One solution, x = -6
B4	2(3x + 4) = 6x + 5	No solution
C1	5x - 2(x + 3) = 3x + 1	No solution
C2	6(x - 1) = 4x + 10	One solution, x = 8
C3	$\frac{1}{3}(6x - 9) = 2x - 3$	Infinitely many solutions
C4	2(5x + 1) = 4(2x + 1)	One solution, x = 1

Cut and Paste 1 page 25

Piece (row, column)	Box
r1 c1: **6x - 3 = 3(2x - 1)**	Infinitely many
r1 c2: **9x - 4 = 5x + 12**	One solution
r1 c3: **4x + 7 = 4x - 7**	No solution
r2 c1: **2(x + 5) = 2x + 3**	No solution
r2 c2: **$\frac{1}{2}(6x + 4) = 3x + 2$**	Infinitely many
r2 c3: **3(x + 2) = x + 12**	One solution

Cut and Paste 2 page 26

Piece (row, column)	Box
r1 c1: **7x - 6 = 4x + 3**	x = 3
r1 c2: **3x + 5 = 5x + 9**	x = -2
r1 c3: **$\frac{1}{2}x + 1 = \frac{1}{4}x + 3$**	x = 8
r2 c1: **2(x + 1) = x + 7**	x = 5
r2 c2: **6 - x = 3x + 22**	x = -4
r2 c3: **5x - 2 = 8x - 5**	x = 1

Cut and Paste 3 page 27

Piece (row, column)	Box
r1 c1: **2x = 6**	Step 4
r1 c2: **4(x + 1) = 2x + 10**	Step 1
r1 c3: **Left side: 16. Right side: 16. They match.**	Step 6
r2 c1: **4x + 4 = 2x + 10**	Step 2
r2 c2: **2x + 4 = 10**	Step 3
r2 c3: **x = 3**	Step 5

PREVIEW

Equations Tracker

One student, every scored page. Filled example: page 36.

Student _____ Teacher _____ Month _____

Page	Page type and set	Items	Right	Date	Notes
9	First Move	6			
10	Practice A	6			
11	Practice B	6			
12	Practice C	6			
13	Practice D	6			
14	Practice E	6			
15	How Many Solutions? A	4			
16	How Many Solutions? B	4			
17	How Many Solutions? C	4			
18	Check My Work	7			
19	Find the Mistake 1	4			
20	Find the Mistake 2	4			
21	Write It, Solve It	3			
23	Exit Tickets 1	3			
24	Exit Tickets 2	3			
25	Cut and Paste 1	6			
26	Cut and Paste 2	6			
27	Cut and Paste 3	6			

How to fill this in

Write how many items the student got right with no prompt, and the date. A blank means not tried yet, never wrong. There are 90 items on the 18 scored pages. Answer keys: pages 29 to 31. Filled example: page 36.

This month we are working on (your own standard or wording)

PREVIEW

Team Note

Use this page between team meetings or when a student moves classes, to hand off what changed without writing a note from scratch. Everything below is observable, with a blank for the number or the wording your team already uses.

Student _____ Team member _____ Date _____

Page type	Covered since last note (Y/N)	Items right	Still blank
Practice A to E			
First move			
How many solutions			
Check my work			
Find the mistake			
Word problems			
Exit tickets			
Sorts			

What I saw (observable, not a conclusion)

- Solved ___ of ___ equations with x on both sides without a prompt.
- Cleared parentheses correctly on ___ of ___ (Practice C, page 12).
- Named one solution, no solution or infinitely many correctly on ___ of ___ (pages 15, 16, 17).
- Checked the answer by putting it back in: yes / no / with a reminder.

Next step

- Next page or set: ___, because ___ (what you saw).
- What to try in another class or at home: ___.
- What to keep doing because it is working: ___.
- Anything for the team meeting to decide: ___ (this page records what happened, never a label or a plan).

Summary, in one or two sentences, for whoever reads this next

A filled-in line, for reference

"Solved 4 of 6 equations on Practice B with no prompt on 10/8. Next step: say what the sign will be before subtracting a negative term." That is the level of detail this page is built for. It matches the filled example on page 36.

PREVIEW

Jordan's Tracker (Invented Student)

Jordan P. is invented; nothing on this page describes a real student. The blank tracker is on page 32.

Student: Jordan P. (an invented student)

Teacher: Ms. Reyes (invented)

Month: October

Page	Page type and set	Items	Right	Date	Notes
9	First Move	6	6	10/9	-
10	Practice A	6	6	10/6	-
11	Practice B	6	4	10/8	Two sign slips on negatives
12	Practice C	6	3	10/13	Missed the second term inside the parentheses
13	Practice D	6	-	-	-
14	Practice E	6	-	-	-
15	How Many Solutions? A	4	4	10/15	-
16	How Many Solutions? B	4	2	10/16	Read 0 = 0 as x = 0 once
17	How Many Solutions? C	4	-	-	-
18	Check My Work	7	6	10/17	Item 7 check not finished
19	Find the Mistake 1	4	3	10/20	Found the line, one fix not finished
20	Find the Mistake 2	4	-	-	-
21	Write It, Solve It	3	-	-	-
23	Exit Tickets 1	3	-	-	-
24	Exit Tickets 2	3	-	-	-
25	Cut and Paste 1	6	-	-	-
26	Cut and Paste 2	6	-	-	-
27	Cut and Paste 3	6	-	-	-

How to read it

Jordan P. has done **8 of 18** scored pages and got **34 of 43** items right with no prompt. **3** pages were all right and **5** carry a note. Every number comes from the table.

What the table points to

The lowest pages are Practice C (3 of 6) and How Many Solutions? B (2 of 4). Those are where the next practice goes. The 10 pages left blank are not tried yet, never wrong.

PREVIEW

Binder Cover

Slide this into the front of a binder. The divider tabs and a spine label to cut out are on the next page (page 39).

Math - Algebra 1

SOLVING EQUATIONS

Variables on Both Sides

Steps	Practice	Check

Teacher _____

Class or student _____

PREVIEW