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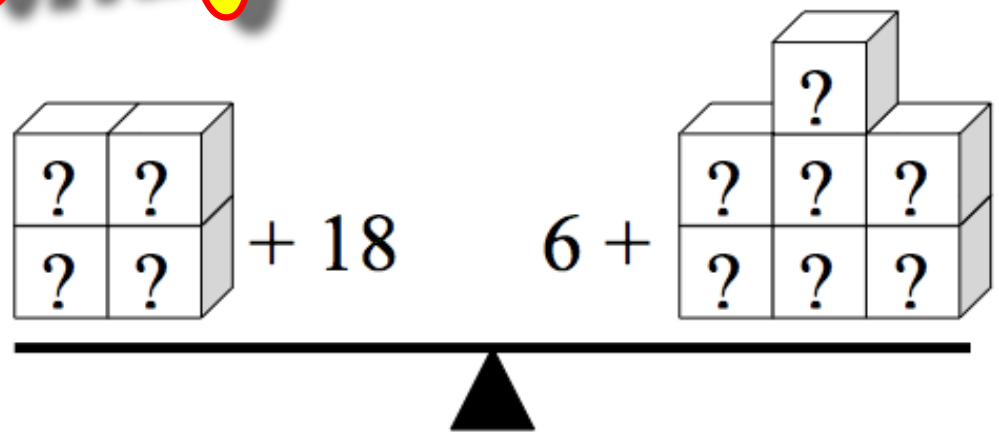
Solving Linear Equations



By Brad Fulton
Educator of the Year, 2005
brad@tttpress.com www.tttpress.com
530-547-4687
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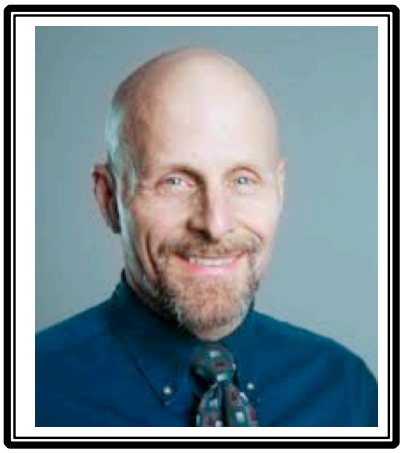

Brad Fulton

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Educator of the Year

- **Consultant**
- **Educator**
- **Author**
- **Keynote presenter**
- **Teacher trainer**
- **Conference speaker**

Known throughout the country for motivating and engaging teachers and students, Brad has co-authored over a dozen books that provide easy-to-teach yet mathematically rich activities for busy teachers while teaching full time for over 30 years. In addition, he has co-authored over 40 teacher training manuals full of activities and ideas that help teachers who believe mathematics must be both meaningful and powerful.

Seminar leader and trainer of mathematics teachers

- 2005 California League of Middle Schools Educator of the Year
- California Math Council and NCTM national featured presenter
- Lead trainer for summer teacher training institutes
- Trainer/consultant for district, county, regional, and national workshops

Author and co-author of mathematics curriculum

- Simply Great Math Activities series: six books covering all major strands
- Angle On Geometry Program: over 400 pages of research-based geometry instruction
- Math Discoveries series: bringing math alive for students in middle schools
- Teacher training seminar materials handbooks for elementary, middle, and secondary school

Available for workshops, keynote addresses, and conferences

All workshops provide participants with complete, ready-to-use activities that require minimal preparation and give clear and specific directions. Participants also receive journal prompts, homework suggestions, and ideas for extensions and assessment.

Brad's math activities are the best I've seen in 38 years of teaching!
Wayne Dequer, 7th grade math teacher, Arcadia, CA

"I can't begin to tell you how much you have inspired me!"
Sue Bonesteel, Math Dept. Chair, Phoenix, AZ

"Your entire audience was fully involved in math!! When they chatted, they chatted math. Real thinking!"
Brenda McGaffigan, principal, Santa Ana, CA

"Absolutely engaging. I can teach algebra to second graders!"
Lisa Fellers, teacher

References available upon request

Like my activities? How about giving me a favorable rating on the Teachers Pay Teachers website? Four stars would be much appreciated and would help me sleep better at night.

Like me even more? Then please don't make copies for your colleagues. I know it's tempting when they say, "Wow! Groovy activity! Can I have a copy?" But this is how I make my money, and why are they still saying "groovy" anyway?

If we make copies for our friends, can we honestly tell our students not to copy or take things that don't belong to them? (Ouch!)

Half priced site licensed copies are available on the TPT website. Please encourage them to take advantage of this affordable option. Okay?

Thanks and happy teaching,

Brad

I want...

- ☐ a) Effective staff development
- ☐ b) Affordable staff development
- ☐ c) Ongoing staff development
- ☒ d) *ALL OF THE ABOVE!*

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Great DVD presentations offer quality mathematics staff development at a fraction of the cost!

- ♦ **Effective because** they are classroom-tested and classroom-proven. These popular DVDs of Brad's trainings have been utilized by teachers throughout the country for years.
- ♦ **Affordable because** they are site-licensed. Buy only one copy for your whole school, print as many copies of the handouts as you need.
- ♦ **Ongoing because** when you hire new staff, simply hit "play" and the training begins. There's no need to bring back the consultant.

About this Manual

These activities were designed to accompany the DVD *Solving Linear Equations* by Teacher to Teacher Press. Using the instructional strategy called **Conceptual Layering**, the DVD demonstrates how to take students from the most foundational levels of solving equations through an incremental process of developing understanding and computational fluency. This technique has been tested and proven in our own classrooms before we ever began to present them to others.

Students will begin with one step equations and proceed through subsequent layers until they are solving multi-step problems with success. Each new level is introduced with a visual approach using only positive whole numbers. Then the student is led into more rigorous content involving negative whole numbers and fractions. As students progress, the visual model eventually gives way to more abstract and efficient representations.

You, the teacher, are the best judge of where your students will enter this continuum and where they will exit. You may not wish to begin with one step equations with older students, or you may wish to end the unit of instruction prior to the more advanced worksheets. Regardless of where your students start, we encourage you to begin instruction with the visual model and positive whole numbers. This ensures that all students have access to the lesson at the onset. It is also the foundation of the process of **Conceptual Layering**.

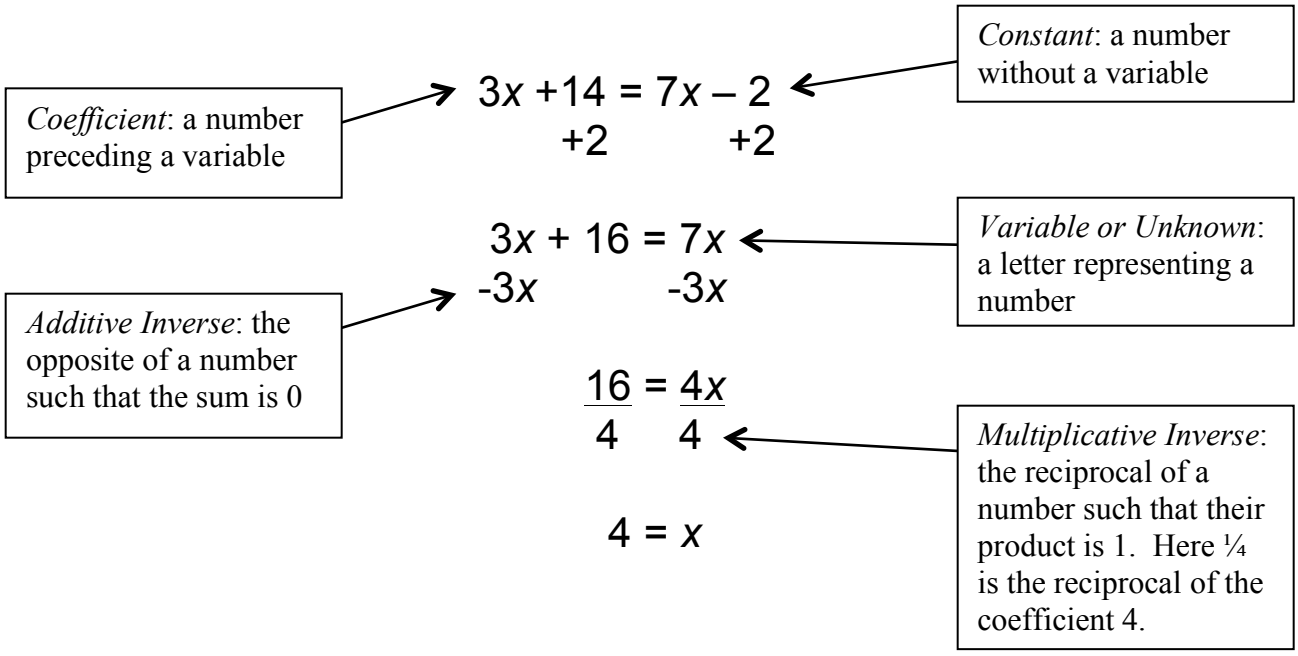
We address the development of the vocabulary of linear equations on the following page. On the subsequent page, you will find a key showing the focus of each of the worksheets in this handout. Then we provide over three-dozen worksheets. The answer key can be found at the end of the manual.

Happy teaching,

Brad and Bill

Developing Vocabulary

Knowing and using correct vocabulary is helpful in progressing successfully through mathematics. For this reason, we encourage our students to use the correct terminology as they explain a procedure or ask a question. For example, instead of hearing, "You should divide by the four," we would prefer a student said, "You should divide by the coefficient." This moves students away from the number used in a specific problem and helps them think about the procedure itself. Bill Lombard likes to say, "Arithmetic likes numbers; algebra likes structure." Here are the terms we use in teaching students to solve equations.



Notice that constants are always added (or subtracted). Coefficients are multiplied by a variable. This determines how we cancel them in solving the equation.

To solve the equation, we used the additive inverse of -2 to "zero out" or cancel the constant on the right side of the equation.

Then we use the additive inverse of $3x$ to cancel the coefficient on the left side.

That left us $16 = 4x$. The goal in solving an equation is to isolate the variable on one side and a constant on the other. We are almost there; we simply need to cancel 4, the coefficient of x. Since coefficients are multiplied, we divide by 4 (or multiply by the reciprocal ¼). Since $^4/_4 = 1$, we have what we need: one x.

Some worksheets have two versions: with and without balances. You will not need to use both versions as they have **identical** equations on each one. For example, worksheet 19-A and 19-B have the same nine equations. The first worksheet has balances while the second is for teachers who want students to show their work without the balances.

One-Step Equations	**Solution methods**	**Answers**
Solving Equations 1	+	+ whole numbers
Solving Equations 2	–	+ whole numbers
Solving Equations 3	+, –	+ whole numbers
Solving Equations 4	+, –	decimals
Solving Equations 5	+, –	+, –
Solving Equations 6	÷	+ whole numbers
Solving Equations 7	÷	fractions
Solving Equations 8	÷	+, –
Solving Equations 9	x	+ whole numbers
Solving Equations 10	x, ÷	+, –, fractions
Solving Equations 11	+, –, x, ÷	+, –, fractions
Two-Step Equations		
Solving Equations 12	+, –, ÷	+ whole numbers
Solving Equations 13	+, –, x, ÷	+ whole numbers
Solving Equations 14	+, –, ÷	+, – whole numbers
Solving Equations 15	+, –, x, ÷	+, – whole numbers
Solving Equations 16	+, –, ÷	+, –, fractions
Solving Equations 17	+, –, x, ÷	+, –, fractions
Solving Equations 18	x, ÷ (using reciprocals)	+, –, fractions
Three-Step Equations	(variables on both sides)	
Solving Equations 19-A & B	+, –, ÷	+ whole numbers
Solving Equations 20-A & B	+, –, ÷	+, – whole numbers
Solving Equations 21-A & B	+, –, ÷	fractions
Solving Equations 22-A & B	+, –, ÷	+, –, fractions

Four-Step Equations	(combining like terms)	
Solving Equations 23	+, –, ÷	+ whole numbers
Solving Equations 24	+, –, ÷	+, – whole numbers
Solving Equations 25	+, –, ÷	+, –, fractions
Four-Step Equations	(distribution)	
Solving Equations 26	+, –, x, ÷	+ whole numbers
Solving Equations 27	+, –, x, ÷	+, – whole numbers
Solving Equations 28	+, –, x, ÷	+, –, fractions
Five-Step Equations	(distribution and combining like terms)	
Solving Equations 29	+, –, x, ÷	+ whole numbers
Solving Equations 30	+, –, x, ÷	+, – whole numbers
Solving Equations 31	+, –, x, ÷	+, –, fractions

Solving Equations 1

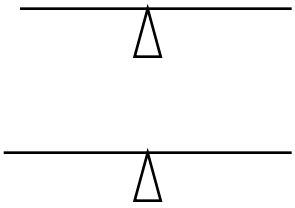
One-step equations with subtraction

Name_____

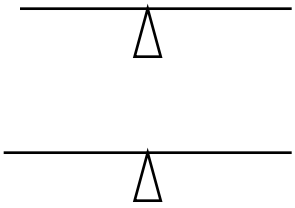
Date_____ Class_____

Solve the equations for the unknown variable.

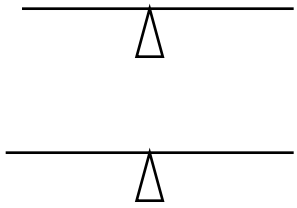
1. $b - 4 = 22$



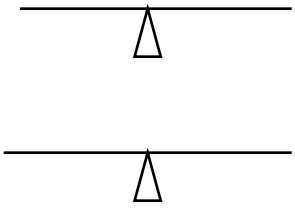
2. $b - 12 = 21$



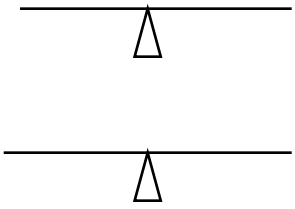
3. $b - 18 = 14$



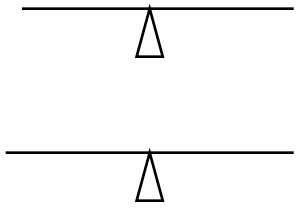
4. $56 = b - 3$



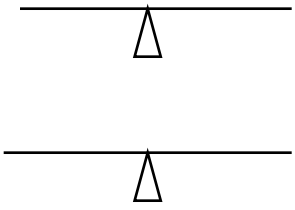
5. $2 = b - 44$



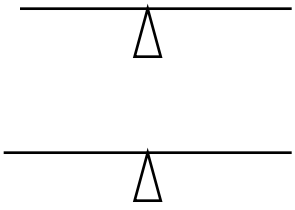
6. $b - 27 = 20$



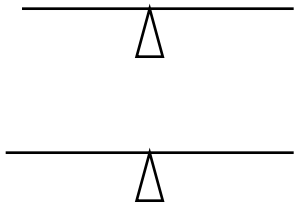
7. $11 = b - 55$



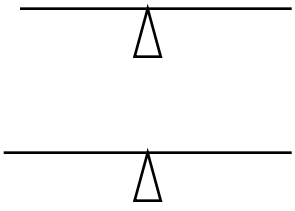
8. $b - 92 = 31$



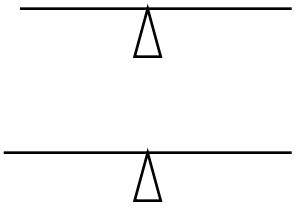
9. $3 = b - 68$



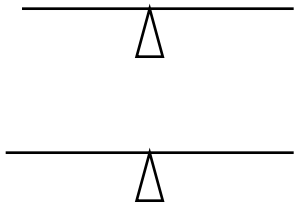
10. $39 = b - 9$



11. $9 = b - 39$



12. $b - 44 = 29$



Solving Equations 2

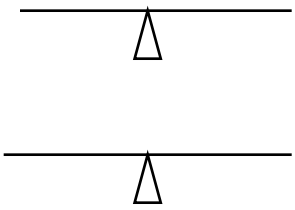
One-step equations with addition

Name_____

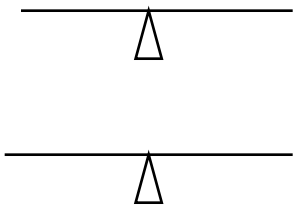
Date_____ Class_____

Solve the equations for the unknown variable.

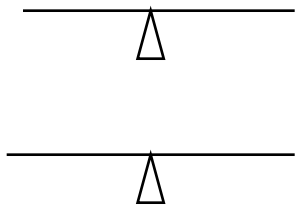
1. $b + 8 = 39$



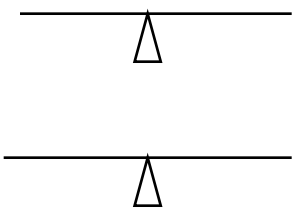
2. $b + 15 = 51$



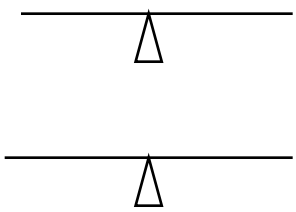
3. $6 + b = 44$



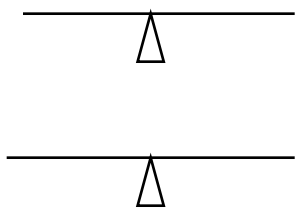
4. $b + 28 = 36$



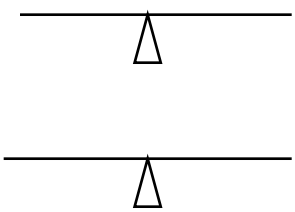
5. $14 + b = 23$



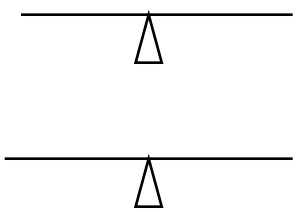
6. $46 + b = 60$



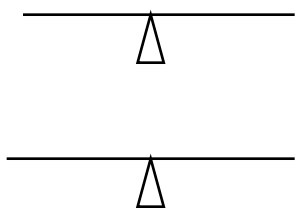
7. $18 = b + 7$



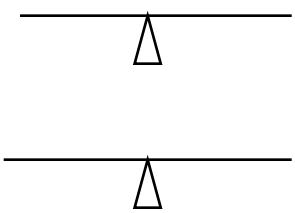
8. $b + 7 = 21$



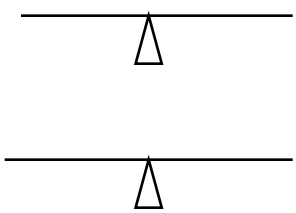
9. $77 = b + 59$



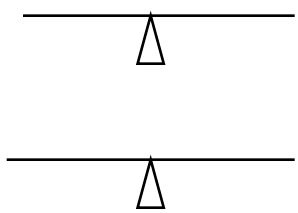
10. $38 = 27 + b$



11. $41 = 26 + b$



12. $b + 1 = 89$



Solving Equations 3

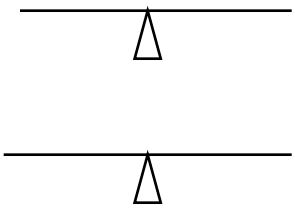
One-step equations, addition & subtraction

Name_____

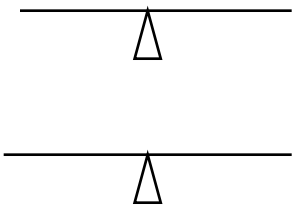
Date_____ Class_____

Solve the equations for the unknown variable.

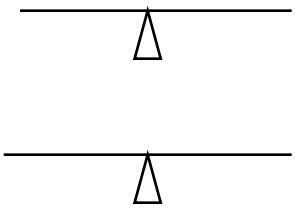
1. $b - 13 = 8$



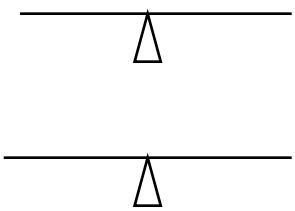
2. $b + 26 = 39$



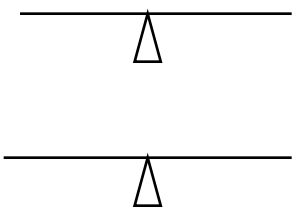
3. $17 + b = 51$



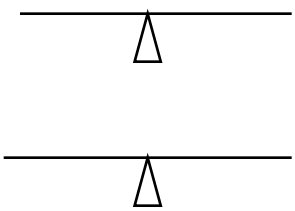
4. $b - 11 = 42$



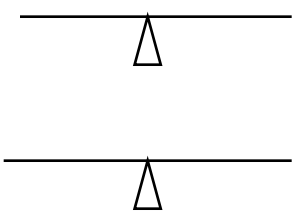
5. $b - 13 = 20$



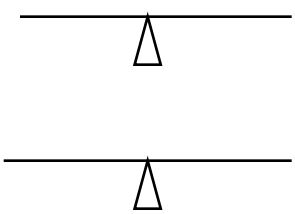
6. $b + 13 = 20$



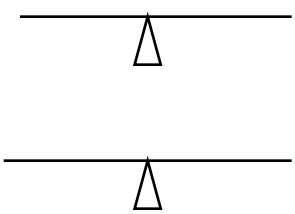
7. $35 = b - 12$



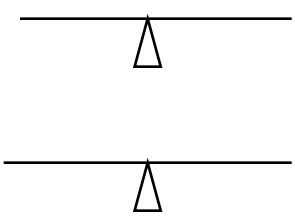
8. $b + 24 = 24$



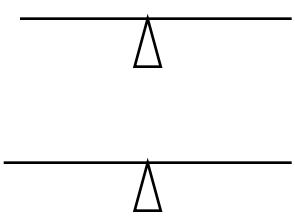
9. $8 = b - 63$



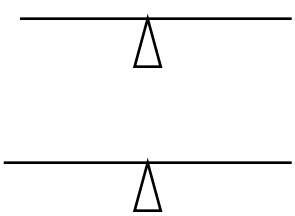
10. $47 = b - 9$



11. $54 = 27 + b$



12. $b - 13 = 1$



Solving Equations 4

One-step equations with decimals

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $b - .7 = 2.2$
2. $b + 1.8 = 3.7$
3. $.8 + n = 2.3$
4. $n + .6 = 1.8$
5. $x + .6 = 1$
6. $x - .6 = 1$
7. $6.91 + a = 10.3$
8. $n - 8.2 = .8$
9. $x - .89 = 2.64$
10. $v - .072 = 3.4$
11. $x + .38 = .395$
12. $2.01 + r = 5.2$

Solving Equations 5

One-step equations with integers

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $b - 7 = 2$

2. $x + 7 = 2$

3. $7 + n = 2$

4. $c + 16 = 15$

5. $w - 8 = {}^{-}4$

6. $a - 8 = {}^{-}9$

7. $12 + x = {}^{-}6$

8. $d - 8 = {}^{-}2$

9. $x - 8 = {}^{-}22$

10. $k + 21 = {}^{-}4$

11. ${}^{-}12 + x = 13$

12. $x - {}^{-}4 = 6$

Solving Equations 6

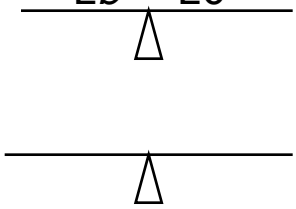
One-step equations with multiplication

Name_____

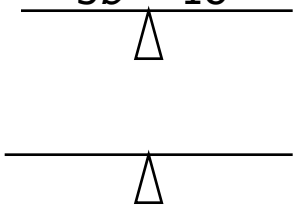
Date_____ Class_____

Solve the equations for the unknown variable.

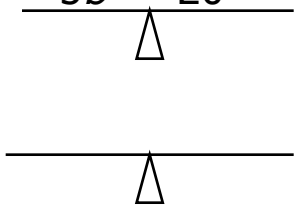
1. $2b = 26$



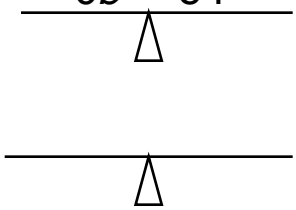
2. $3b = 18$



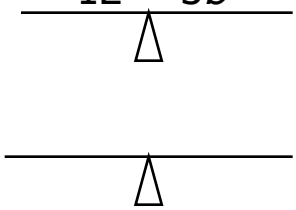
3. $5b = 20$



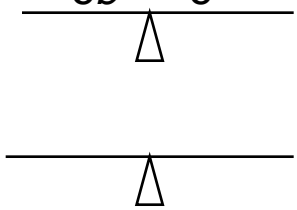
4. $6b = 84$



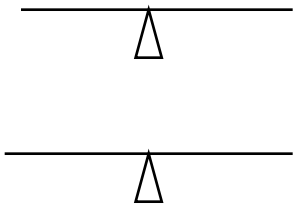
5. $12 = 3b$



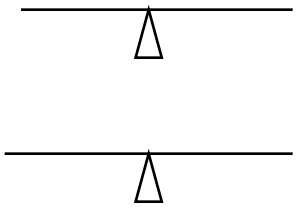
6. $8b = 8$



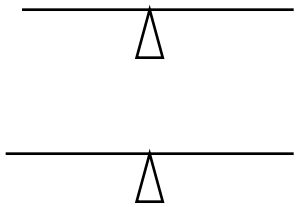
7. $7b = 70$



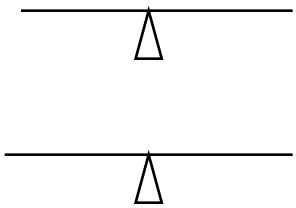
8. $6b = 72$



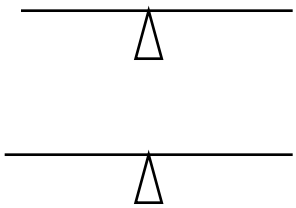
9. $56 = 4b$



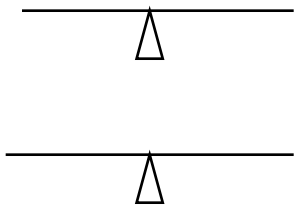
10. $132 = 3b$



11. $0 = 5b$



12. $9b = 135$



Solving Equations 7

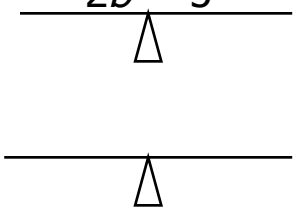
Name_____

Date_____ Class_____

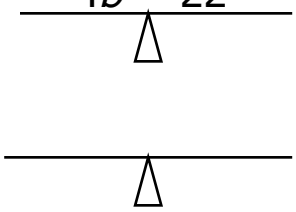
One-step equations, multiplication & decimals

Solve the equations for the unknown variable.

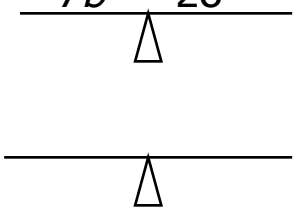
1. $2b = 5$



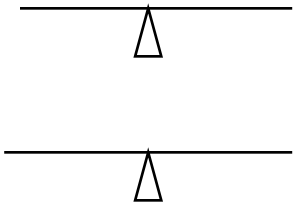
2. $4b = 22$



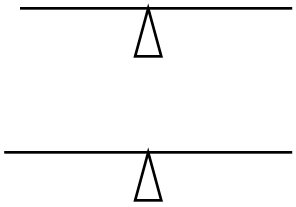
3. $7b = 28$



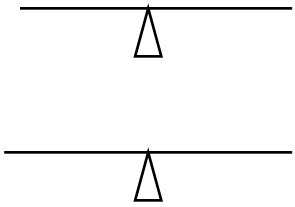
4. $6b = 75$



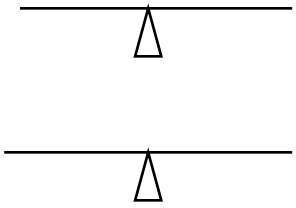
5. $8b = 4$



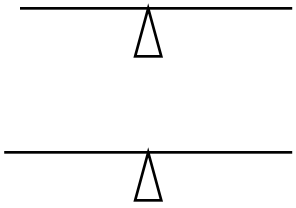
6. $16 = 5b$



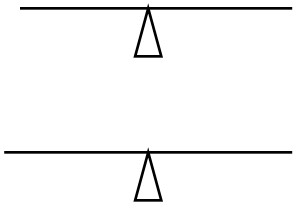
7. $56 = 7b$



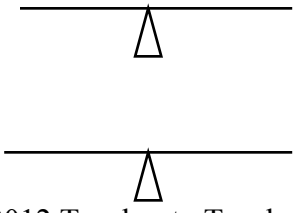
8. $6b = 15$



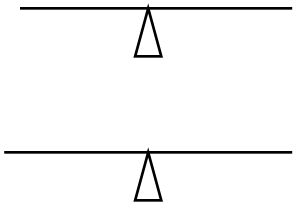
9. $34 = 5b$



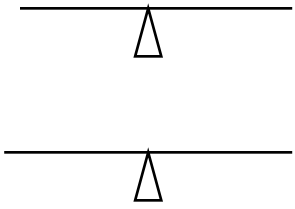
10. $99 = 10b$



11. $5 = 10b$



12. $9b = 17$



Solving Equations 8

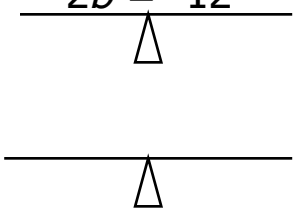
Name_____

Date_____ Class_____

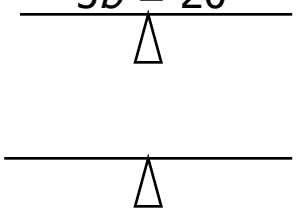
One-step equations, multiplication & integers

Solve the equations for the unknown variable.

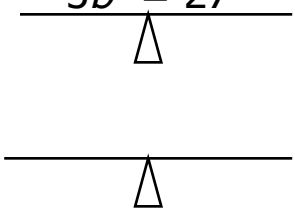
1. $2b = -12$



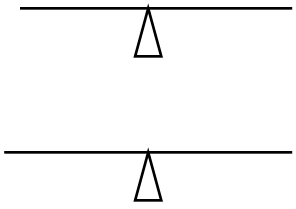
2. $5b = 20$



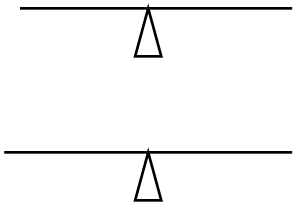
3. $-3b = 27$



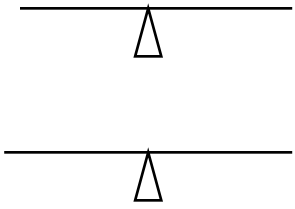
4. $-2b = -8$



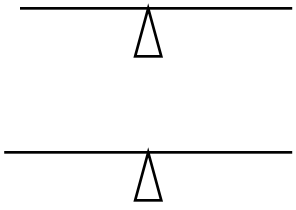
5. $18b = -18$



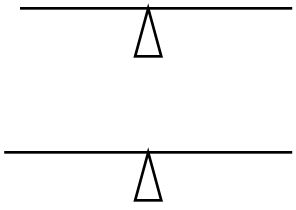
6. $-42 = -3b$



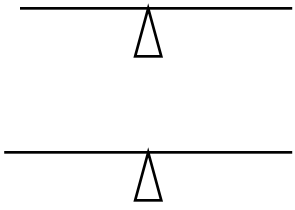
7. $-72 = -4b$



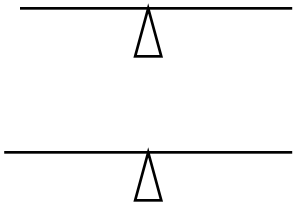
8. $-8b = -96$



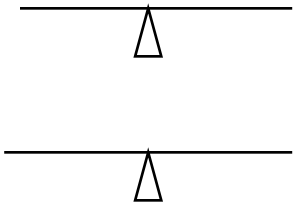
9. $-55 = -b$



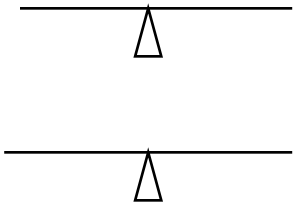
10. $104 = 8b$



11. $64 = -32b$



12. $-7b = 0$



Solving Equations 9

One-step equations with division

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $\frac{b}{2} = 9$

2. $\frac{b}{9} = 2$

3. $\frac{b}{6} = 12$

4. $\frac{b}{4} = 7$

5. $\frac{b}{8} = 4$

6. $\frac{b}{7} = 14$

7. $\frac{k}{-19} = 0$

8. $9 = \frac{b}{9}$

9. $0 = \frac{b}{11}$

10. $\frac{b}{6} = 15$

11. $\frac{b}{18} = 5$

12. $\frac{b}{23} = 7$

Solving Equations 10

One-step equations: mixed operations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $8b = 72$

2. $\frac{n}{4} = 16$

3. $18 = 4n$

4. $\frac{x}{6} = -1$

5. $5x = 85$

6. $-18 = 6x$

7. $7a = -98$

8. $\frac{a}{-3} = -7$

9. $\frac{r}{2.5} = 2$

10. $6v = 3.6$

11. $\frac{k}{-19} = 0$

12. $8r = 5.2$

Solving Equations 11

One-step equations: mixed operations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $v - 8 = 12$

2. $x - 6 = 19$

3. $11 + n = 4$

4. $5m = 15$

5. $a - 9 = {}^{-}12$

6. $7a = {}^{-}4$

7. $\frac{x}{2} = -13$

8. $r + 8 = {}^{-}15$

9. $8 = \frac{u}{-6}$

10. $14k = {}^{-}3$

11. $\frac{p}{-1} = -18$

12. $1 = n - {}^{-}4$

Solving Equations 12

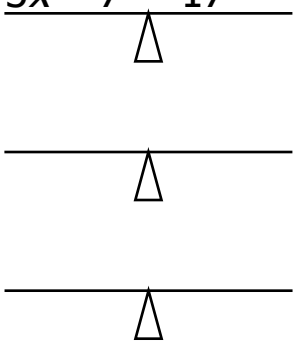
Two-step equations

Name_____

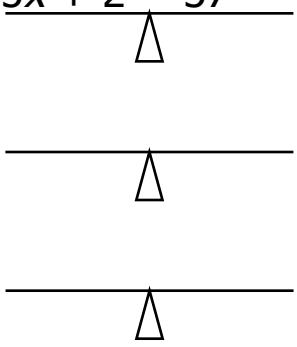
Date_____ Class_____

Solve the equations for the unknown variable.

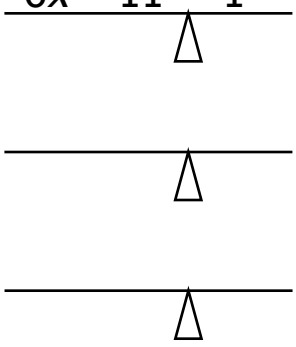
1. $3x - 7 = 17$



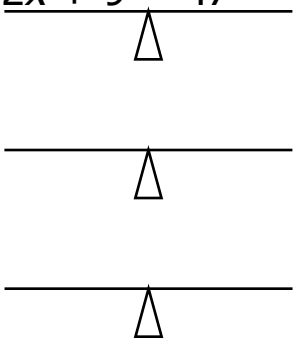
2. $5x + 2 = 37$



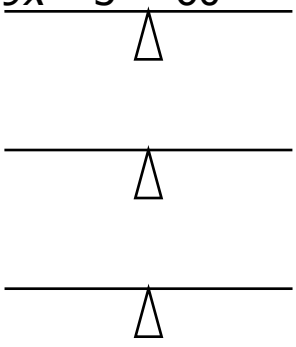
3. $6x - 11 = 1$



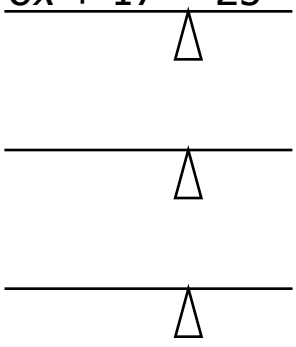
4. $2x + 9 = 47$



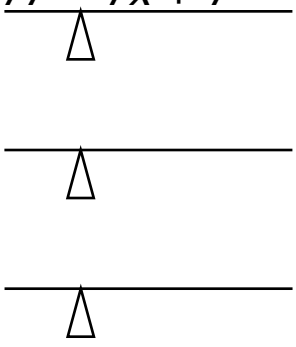
5. $9x - 3 = 60$



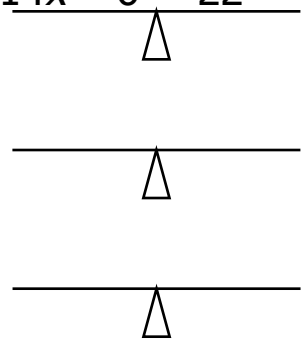
6. $8x + 17 = 25$



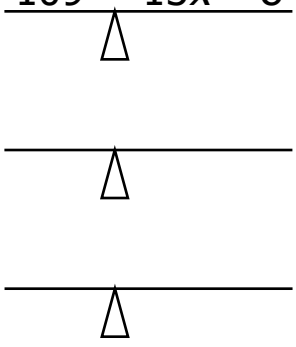
7. $77 = 7x + 7$



8. $14x - 6 = 22$



9. $109 = 13x - 8$



Solving Equations 13

Two-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $\frac{x}{4} - 6 = 3$

2. $7a - 3 = 32$

3. $\frac{x}{5} + 2 = 8$

4. $4 = \frac{m}{3} + 2$

5. $9r + 12 = 84$

6. $13 = 5 + 8x$

7. $\frac{c}{11} + 24 = 68$

8. $17n - 22 = 12$

9. $39 = 5 + \frac{x}{4}$

Solving Equations 14

Two-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $-2d - 2 = 28$

2. $5x + 37 = 22$

3. $4z - 14 = -2$

4. $-9s + 42 = 15$

5. $67 = -3n + 13$

6. $5 - 17x = 5$

7. $12v - 12 = -24$

8. $13 = -18x - 41$

9. $35 + -7x = 0$

Solving Equations 15

Two-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $\frac{n}{3} + 14 = 10$

2. $-2x - 8 = 16$

3. $0 = \frac{x}{-7} - 12$

4. $\frac{m}{-2} + 23 = 6$

5. $-6 = -3r + 15$

6. $-20 - 6x = 16$

7. $\frac{k}{-5} + 26 = 11$

8. $-17n - 63 = -12$

9. $29 + \frac{c}{-4} = 5$

Solving Equations 16

Two-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $6x - 2 = 19$

2. $6x - 2 = 17$

3. $-27 = 8m + 2$

4. $-7c + 21 = 11$

5. $-4f + 21 = 11$

6. $31 + 8p = 14$

7. $-4b - 23 = -11$

8. $12n - 9 = -13$

9. $56 = 13n - 23$

Solving Equations 17

Two-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $-11x + 8 = 7$

2. $9 = \frac{a}{3} + 14$

3. $-13 - 4x = 11$

4. $\frac{x}{8} + 7 = -1$

5. $44 = -2r + 12$

6. $\frac{x}{-5} - 1 = 18$

7. $\frac{b}{14} + 5 = -1$

8. $-83n + 47 = -99$

9. $-1 = -9 + \frac{n}{-8}$

Solving Equations 18

Two-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

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

2. $\frac{4x}{7} = -8$

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

4. $-6 = \frac{5x}{3}$

5. $\frac{3x}{2} = -8$

6. $\frac{7x}{9} = -7$

7. $\frac{3x}{4} + 5 = 17$

8. $\frac{-2x}{5} + 9 = 16$

9. $\frac{-2x}{5} + 9 = 3$

Solving Equations 19-A

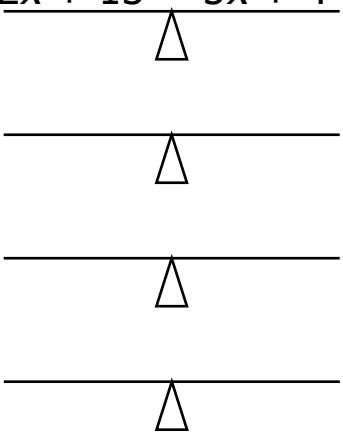
Three-step equations

Name_____

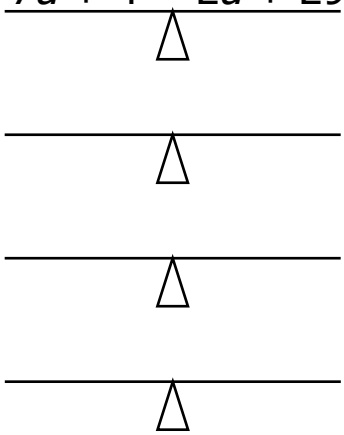
Date_____ Class_____

Solve the equations for the unknown variable.

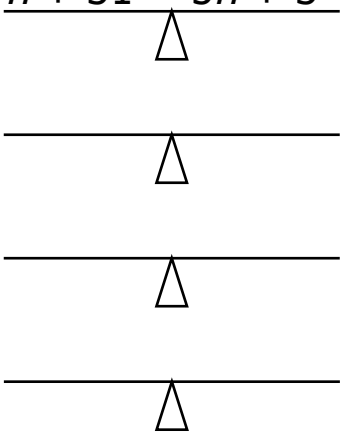
1. $2x + 13 = 5x + 4$



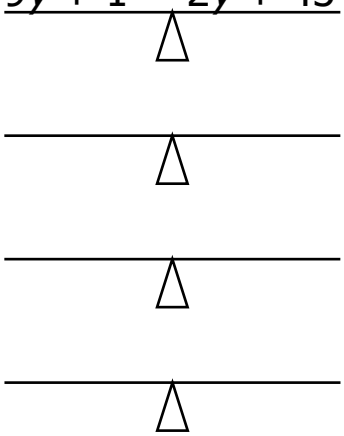
2. $7a + 4 = 2a + 29$



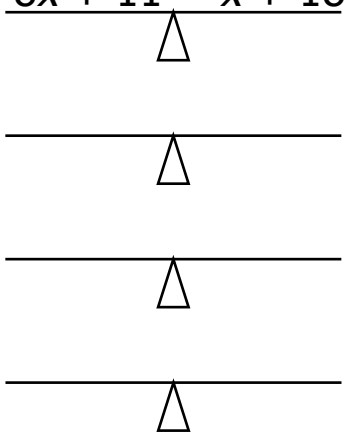
3. $n + 31 = 5n + 3$



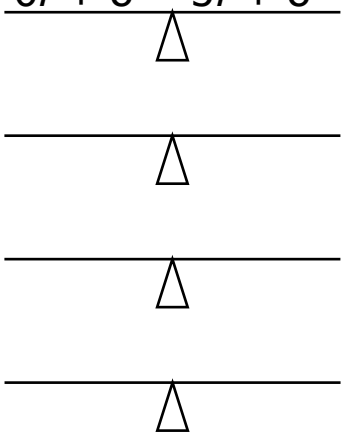
4. $9y + 1 = 2y + 43$



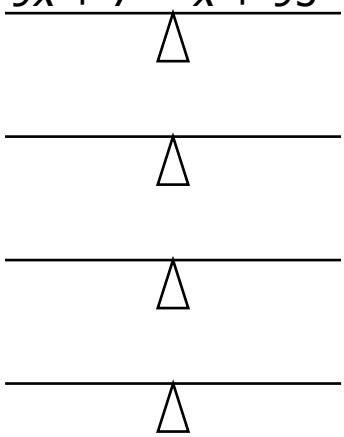
5. $8x + 11 = x + 18$



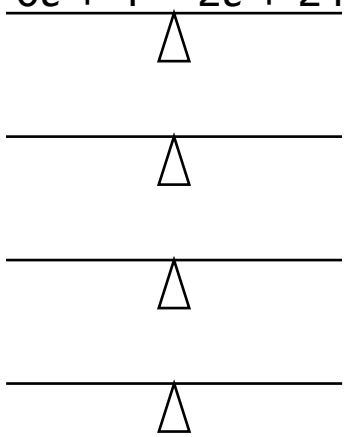
6. $6r + 8 = 3r + 8$



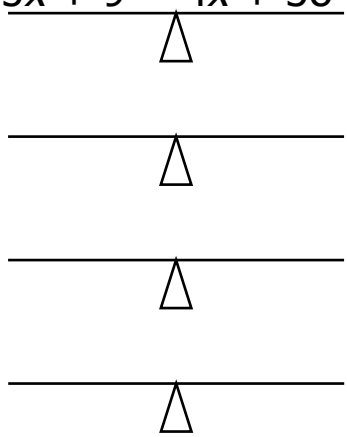
7. $9x + 7 = x + 95$



8. $6c + 4 = 2c + 24$



9. $5x + 9 = 4x + 38$



Solving Equations 19-B

Three-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $2x + 13 = 5x + 4$

2. $7a + 4 = 2a + 29$

3. $n + 31 = 5n + 3$

4. $9y + 1 = 2y + 43$

5. $8x + 11 = x + 18$

6. $6r + 8 = 3r + 8$

7. $9x + 7 = x + 95$

8. $6c + 4 = 2c + 24$

9. $5x + 9 = 4x + 38$

Solving Equations 20-A

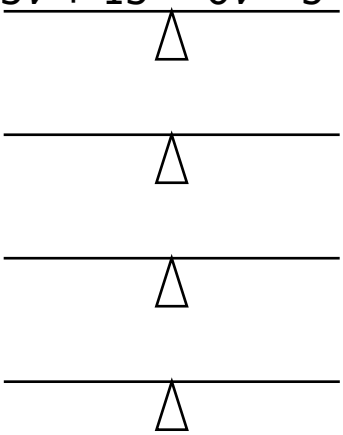
Three-step equations

Name_____

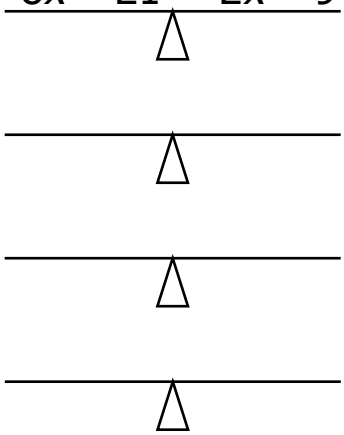
Date_____ Class_____

Solve the equations for the unknown variable.

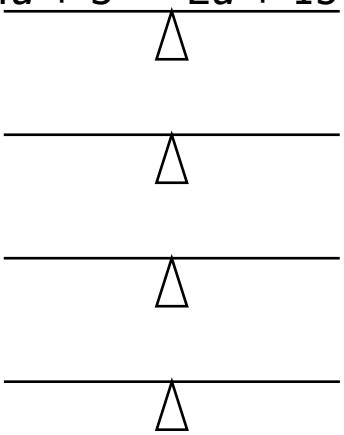
1. $3v + 13 = 6v - 5$



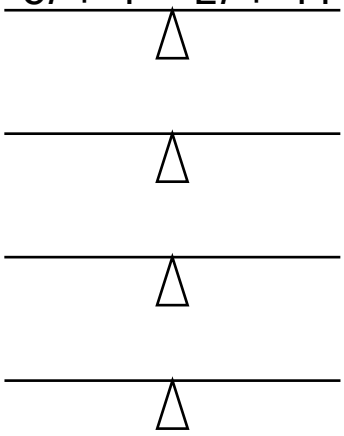
2. $8x - 21 = 2x - 9$



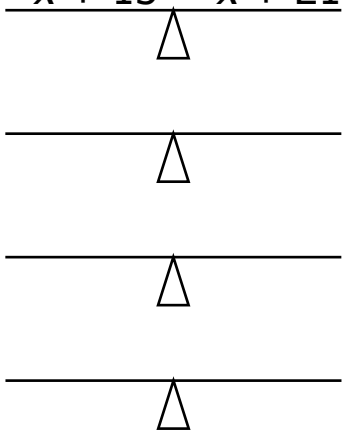
3. $4d + 3 = -2d + 15$



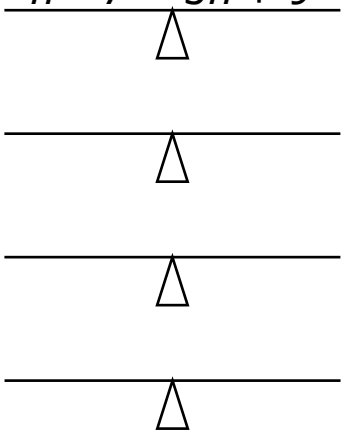
4. $-8i + 4 = 2i + 44$



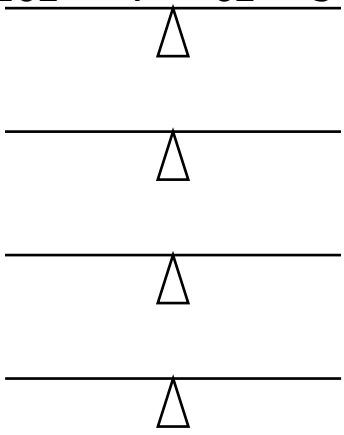
5. $-x + 13 = x + 21$



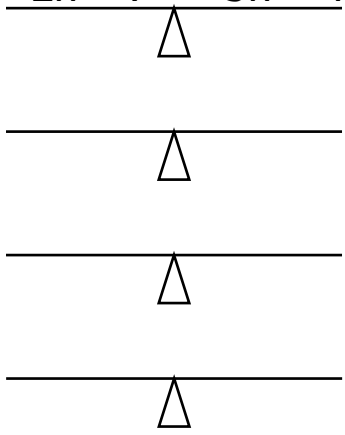
6. $-n - 7 = 3n + 9$



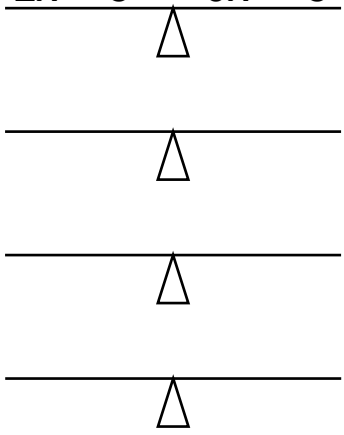
7. $10z + -7 = 6z + 5$



8. $-2h - 7 = -5h - 4$



9. $-2x - 8 = -6x + 8$



Solving Equations 20-B

Three-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $3v + 13 = 6v - 5$

2. $8x - 21 = 2x - 9$

3. $4d + 3 = -2d + 15$

4. $-8i + 4 = 2i + 44$

5. $-x + 13 = x + 21$

6. $-n - 7 = 3n + 9$

7. $10z + -7 = 6z + 5$

8. $-2h - 7 = -5h - 4$

9. $-2x - 8 = -6x + 8$

Solving Equations 21-A

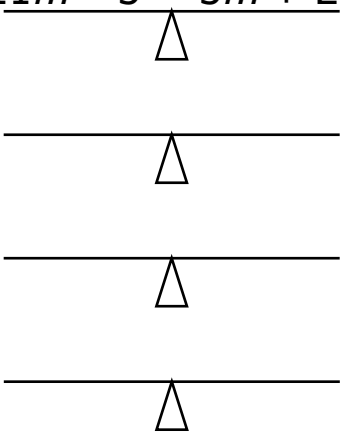
Three-step equations

Name_____

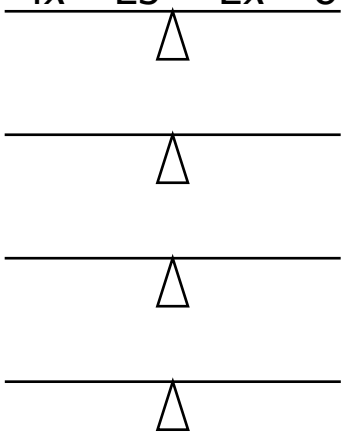
Date_____ Class_____

Solve the equations for the unknown variable.

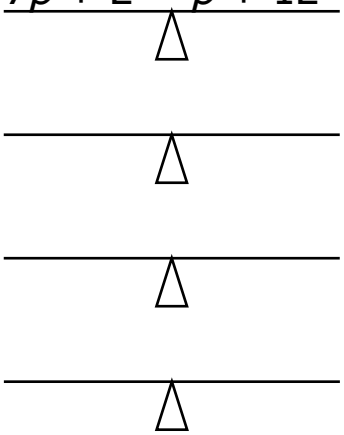
1. $11m - 3 = 3m + 2$



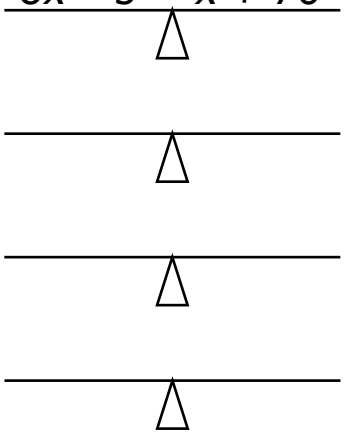
2. $4x - 23 = 2x - 8$



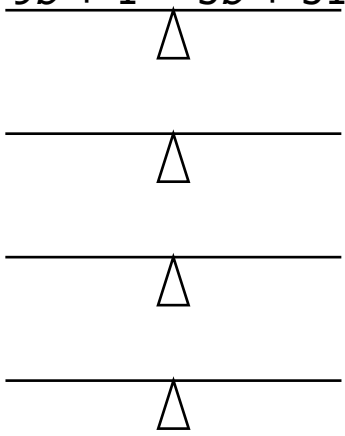
3. $7p + 2 = p + 12$



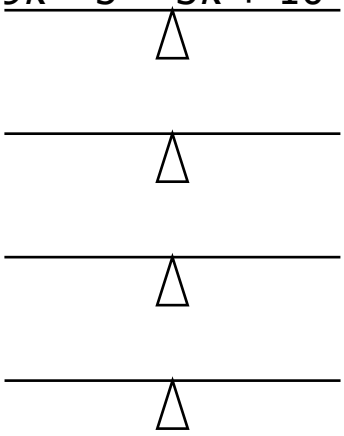
4. $8x - 5 = x + 76$



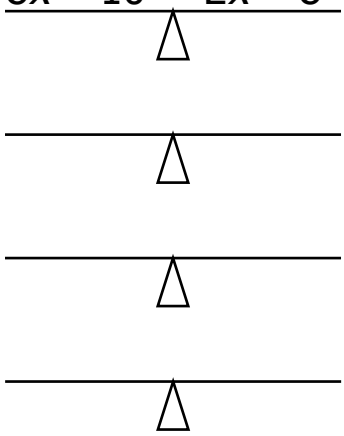
5. $9b + 1 = 5b + 51$



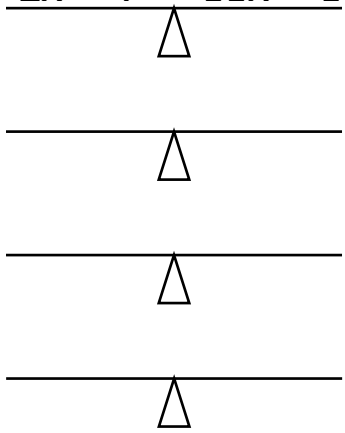
6. $9k - 5 = 3k + 10$



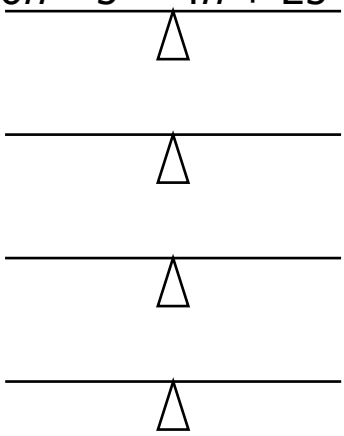
7. $8x - 10 = 2x - 8$



8. $2x + 7 = 11x - 1$



9. $6n - 5 = 4n + 25$



Solving Equations 21-B

Three-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $11m - 3 = 3m + 2$

2. $4x - 23 = 2x - 8$

3. $7p + 2 = p + 12$

4. $8x - 5 = x + 76$

5. $9b + 1 = 5b + 51$

6. $9k - 5 = 3k + 10$

7. $8x - 10 = 2x - 8$

8. $2x + 7 = 11x - 1$

9. $6n - 5 = 4n + 25$

Solving Equations 22-A

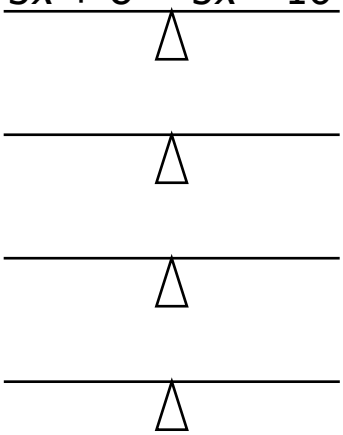
Three-step equations

Name_____

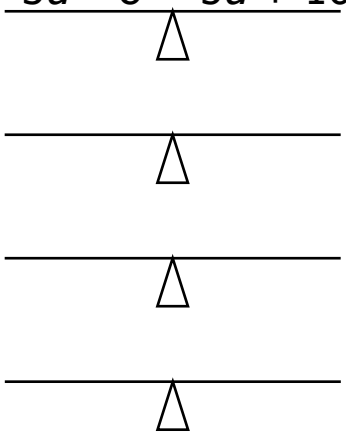
Date_____ Class_____

Solve the equations for the unknown variable.

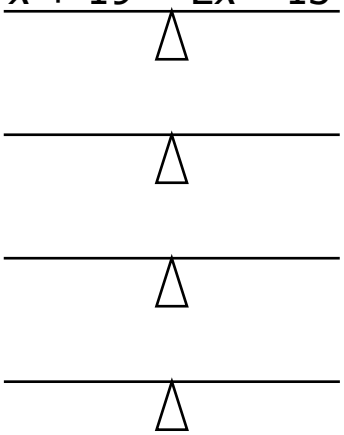
1. $-3x + 8 = 5x - 16$



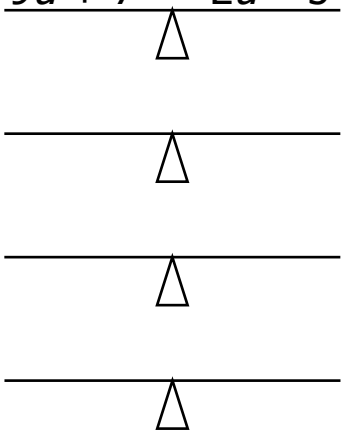
2. $-3d - 8 = 5d + 16$



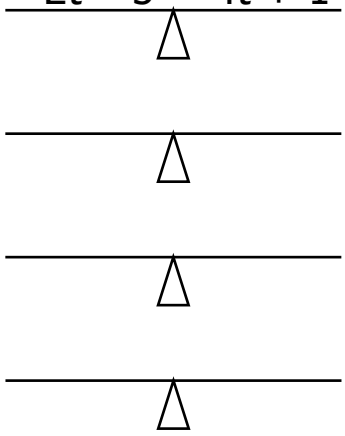
3. $-x + 19 = 2x - 13$



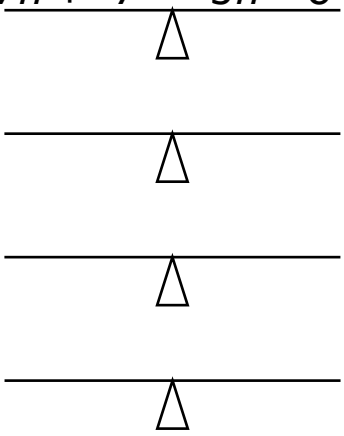
4. $9u + 7 = -2u - 5$



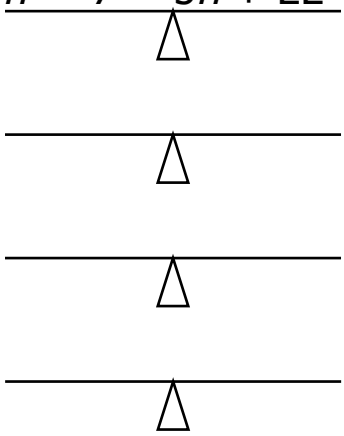
5. $-2t - 5 = 4t + 1$



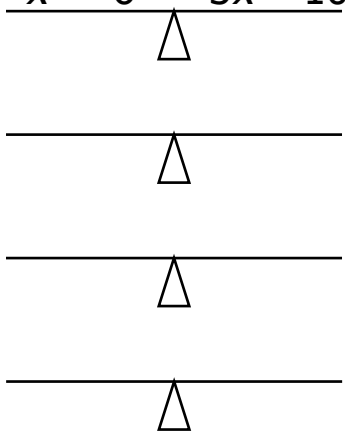
6. $7n + -7 = -3n - 8$



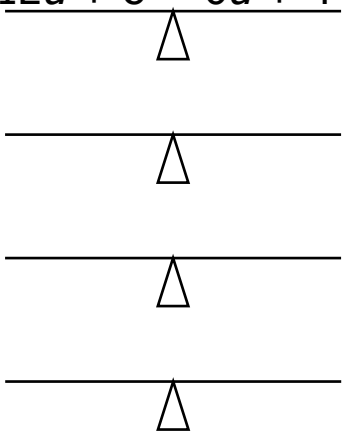
7. $n - -7 = 5n + 22$



8. $-x - -6 = -3x - 10$



9. $12d + 8 = 6d + 4$



Solving Equations 22-B

Three-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $-3x + 8 = 5x - 16$

2. $-3d - 8 = 5d + 16$

3. $-x + 19 = 2x - 13$

4. $9u + 7 = -2u - 5$

5. $-2t - 5 = 4t + 1$

6. $7n + -7 = -3n - 8$

7. $n - -7 = 5n + 22$

8. $-x - -6 = -3x - 10$

9. $12d + 8 = 6d + 4$

Solving Equations 23-A

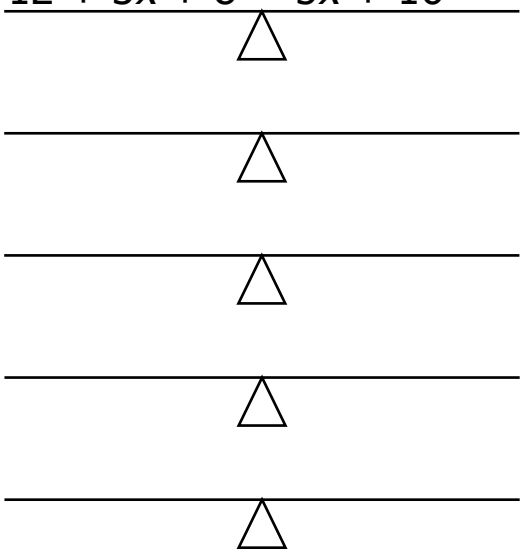
Four-step equations: Combining like terms

Name_____

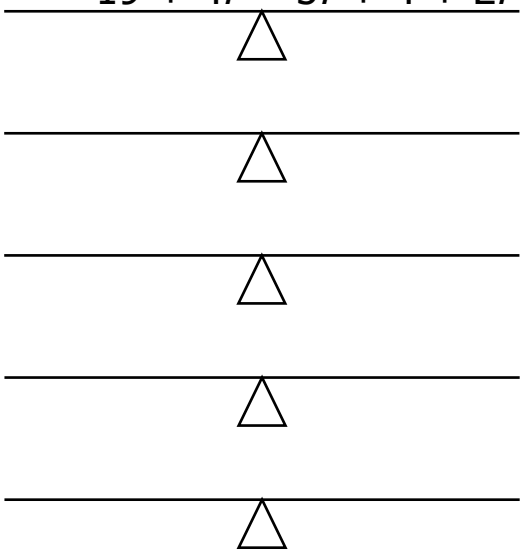
Date_____ Class_____

Solve the equations for the unknown variable.

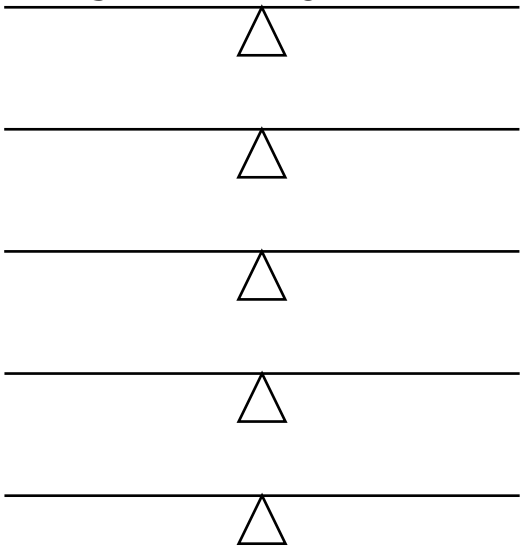
1. $12 + 3x + 8 = 5x + 16$



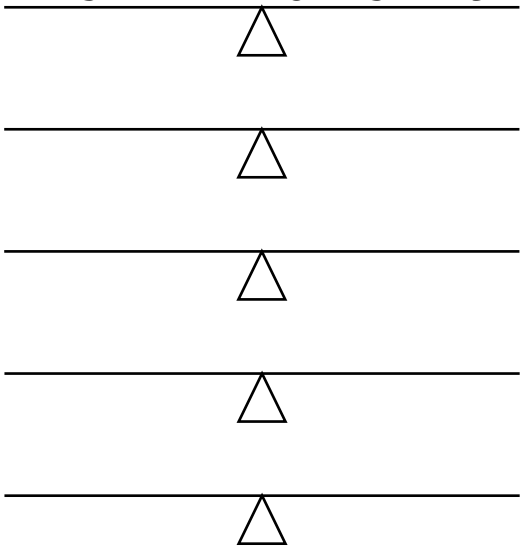
2. $19 + 4r = 5r + 4 + 2r$



3. $2n + 3n + 11 = 8n + 2$

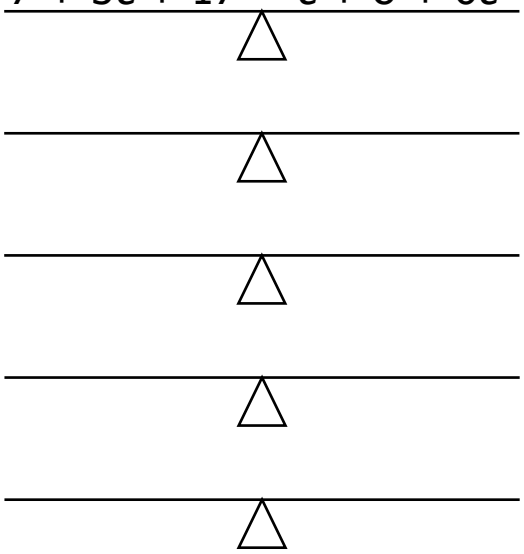


4. $15k + 17 = 8 + 5k + 9$

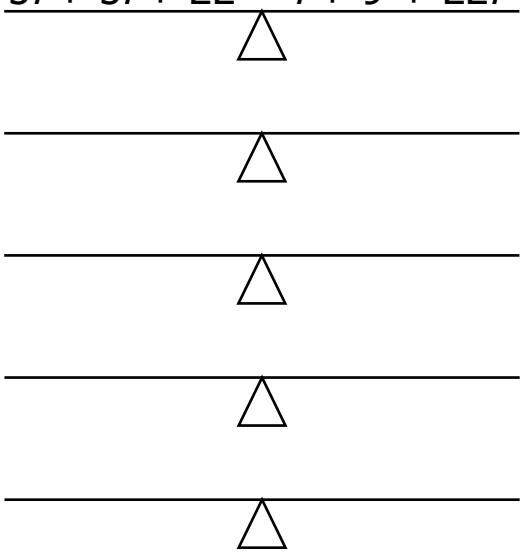


Solving Equations 23-A: Page 2
Four-step equations: Combining like terms

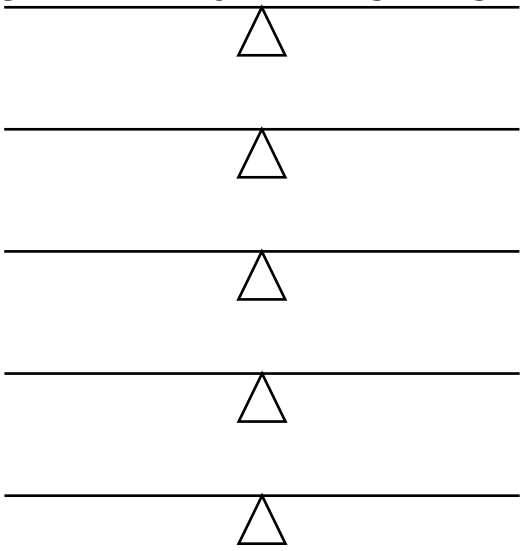
5. $7 + 3c + 17 = c + 8 + 6c$



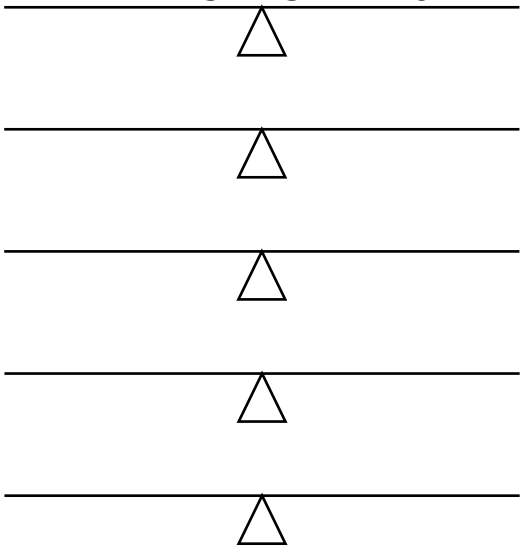
6. $5i + 5i + 22 = i + 9 + 22i$



7. $9 + 4x + 26 = x + 5x + 3x$



8. $21 + 7n + 5 = 3n + 16 + 4n$



Solving Equations 23-B

Four-step equations: Combining like terms

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $12 + 3x + 8 = 5x + 16$

2. $19 + 4r = 5r + 4 + 2r$

3. $2n + 3n + 11 = 8n + 2$

4. $15k + 17 = 8 + 5k + 9$

Solving Equations 23-B: Page 2
Four-step equations: Combining like terms

5. $7 + 3c + 17 = c + 8 + 6c$

6. $5i + 5i + 22 = i + 9 + 22i$

7. $9 + 4x + 26 = x + 5x + 3x$

8. $21 + 7n + 5 = 3n + 16 + 4n$

Solving Equations 24-A

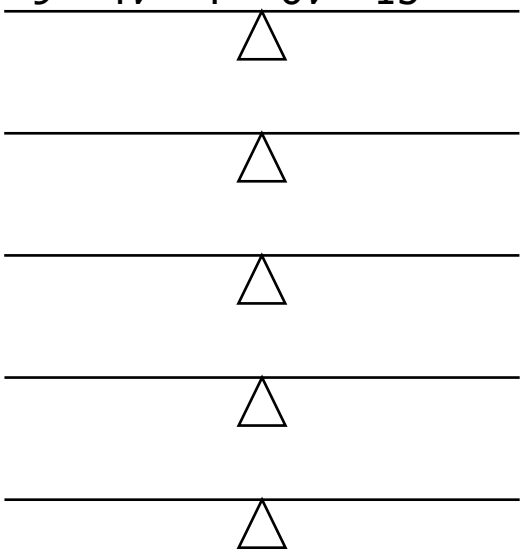
Four-step equations: Combining like terms

Name_____

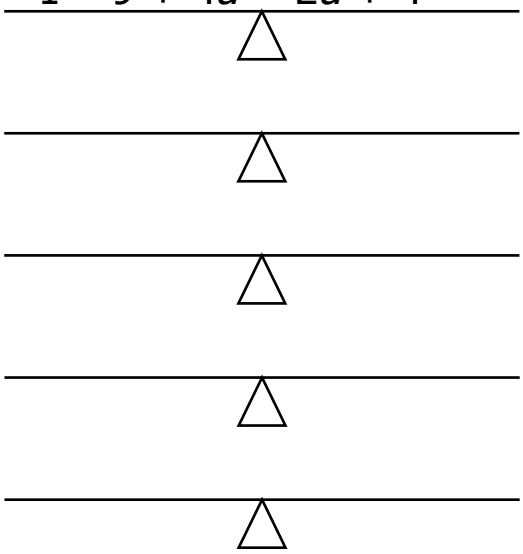
Date_____ Class_____

Solve the equations for the unknown variable.

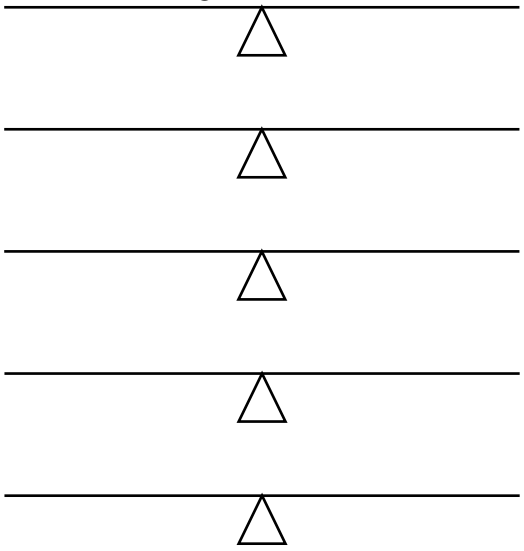
1. $9 - 4v - 4 = 6v - 15$



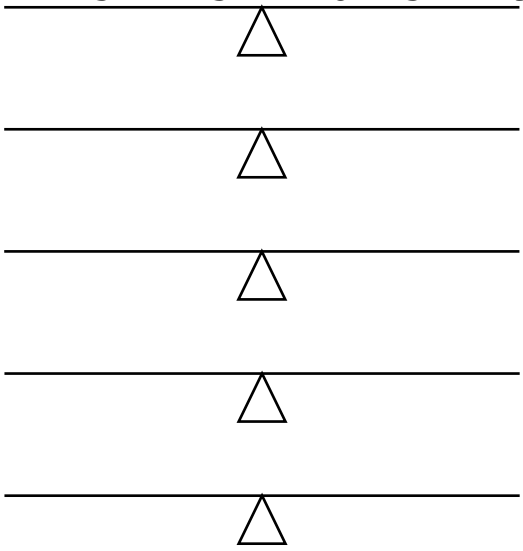
2. $1 - 9 + 4a = 2a + 4$



3. $2n + 17 + 6n = -7n + 2$

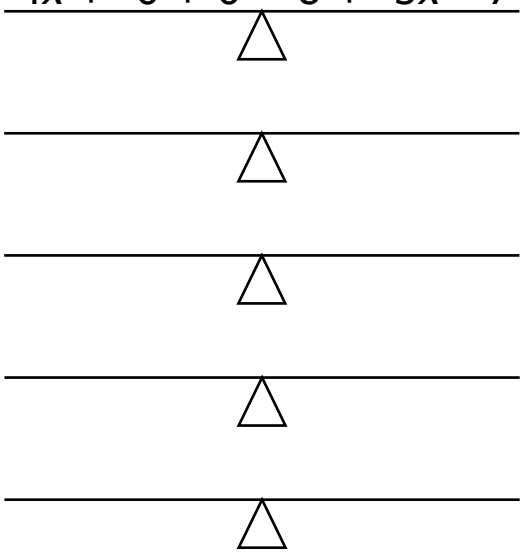


4. $-5x - 23 = -16 - 3x - -9$

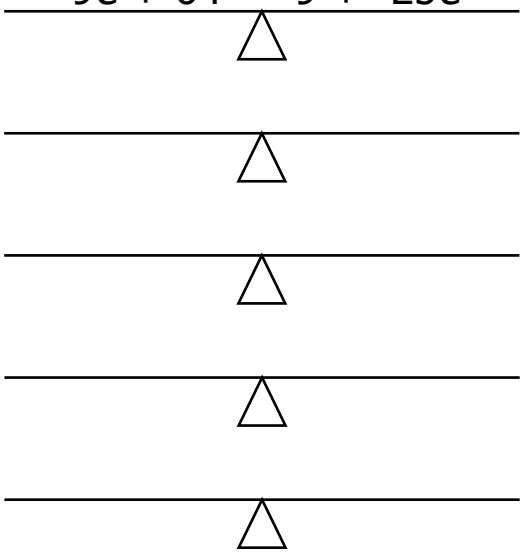


Solving Equations 24-A: Page 2
Four-step equations: Combining like terms

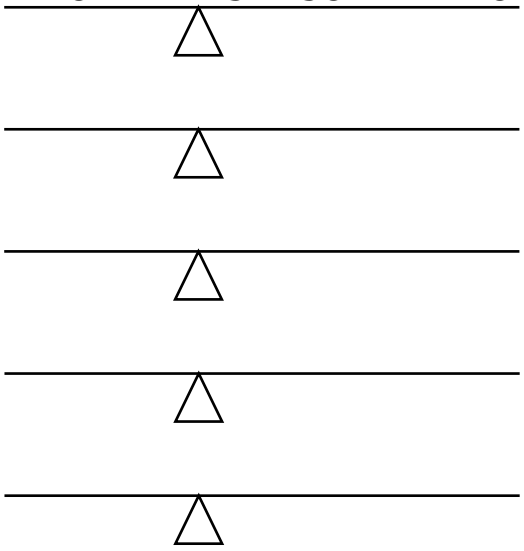
5. $-4x + -6 + 6 = 8 + -3x - 7$



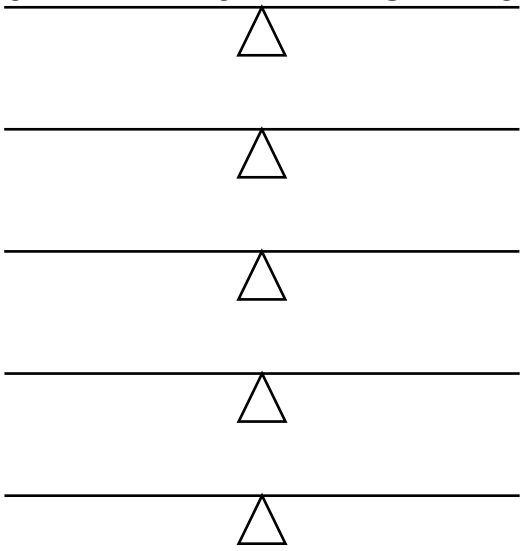
6. $9e + 64 = -9 + -25e - -5$



7. $-c + 7 = 3 - 5c - 1 + -c$



8. $-61 - 7n - -6 = -n - 31 - -6n$



Solving Equations 24-B

Four-step equations: Combining like terms

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $9 - 4v - 4 = 6v - 15$

2. $1 - 9 + 4a = 2a + 4$

3. $2n + 17 + 6n = -7n + 2$

4. $-5x - 23 = -16 - 3x - -9$

Solving Equations 24-B: Page 2
Four-step equations: Combining like terms

5. $-4x + -6 + 6 = 8 + -3x - 7$

6. $9e + 64 = -9 + -25e - -5$

7. $-c + 7 = 3 - 5c - 1 + -c$

8. $-61 - 7n - -6 = -n - 31 - -6n$

Solving Equations 25-A

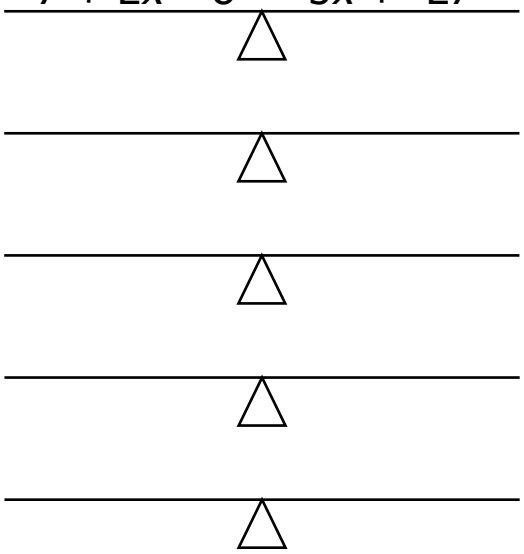
Four-step equations: Combining like terms

Name_____

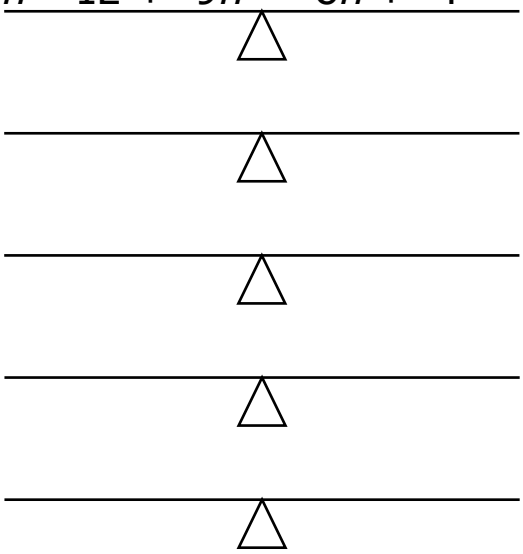
Date_____ Class_____

Solve the equations for the unknown variable.

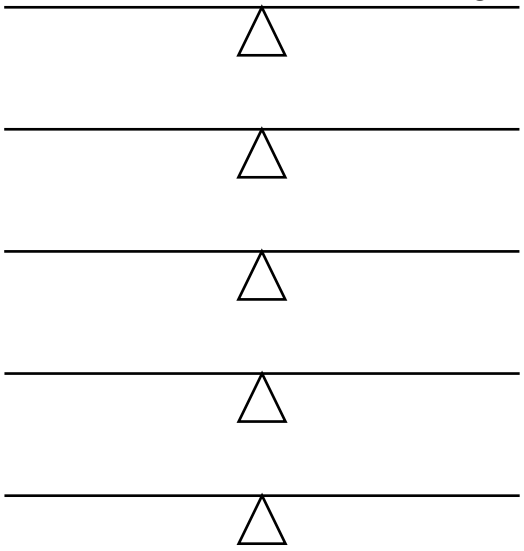
1. $-7 + 2x - 8 = -3x + -27$



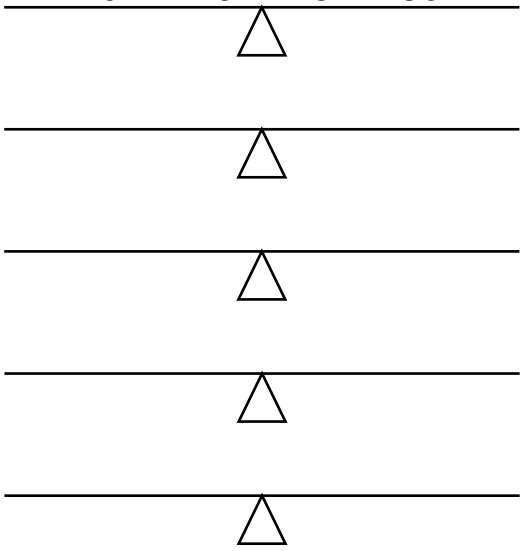
2. $n - 12 + -9n = -8n + -4$



3. $-x - -7 + -x = -22x - -10$

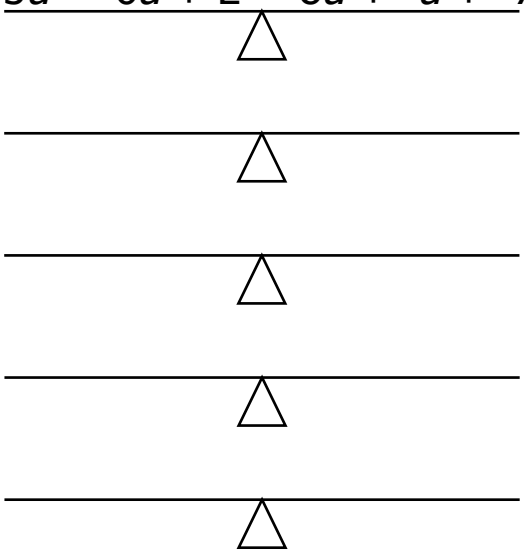


4. $-2u - -16 = -6 - -8u + -10$

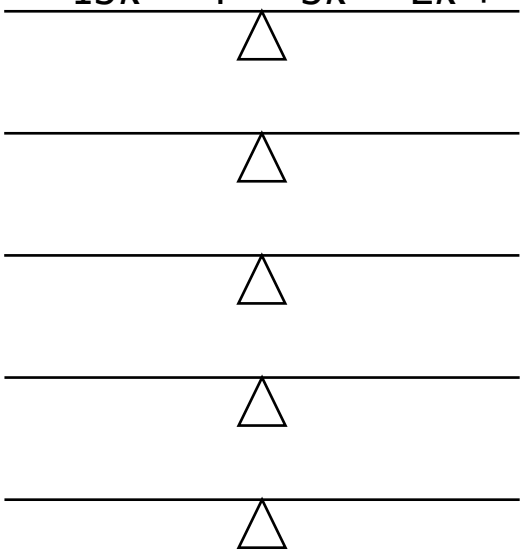


Solving Equations 25-A: Page 2
Four-step equations: Combining like terms

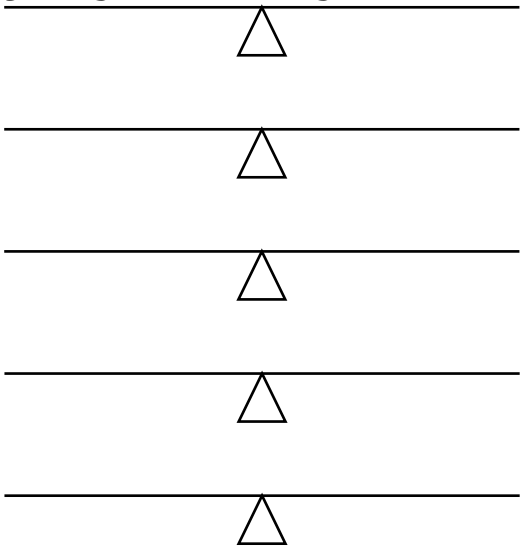
5. $-3a - -6a + 2 = 8a + -a + -7$



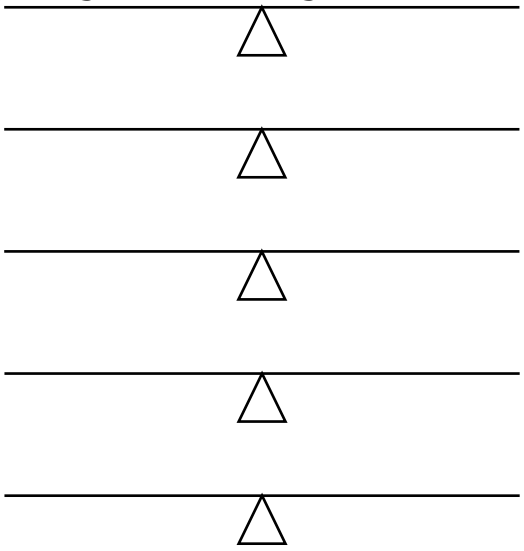
6. $-13k - -4 = -3k - -2k + -6$



7. $9 - -5x + -7 = 15x - -1 + -2x$



8. $9 - -5x + -7 = 15x - -1 - -2x$



Solving Equations 25-B

Four-step equations: Combining like terms

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $-7 + 2x - 8 = -3x + -27$

2. $n - 12 + -9n = -8n + -4$

3. $-x - -7 + -x = -22x - -10$

4. $-2u - -16 = -6 - -8u + -10$

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Solving Equations 25-B: Page 2
Four-step equations: Combining like terms

5. $-3a - -6a + 2 = 8a + -a + -7$

6. $-13k - -4 = -3k - -2k + -6$

7. $9 - -5x + -7 = 15x - -1 + -2x$

8. $9 - -5x + -7 = 15x - -1 - -2x$

Solving Equations 26-A

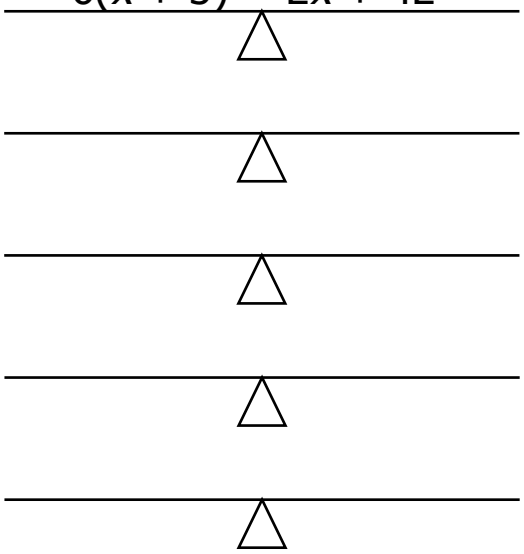
Four-step equations: Using distribution

Name_____

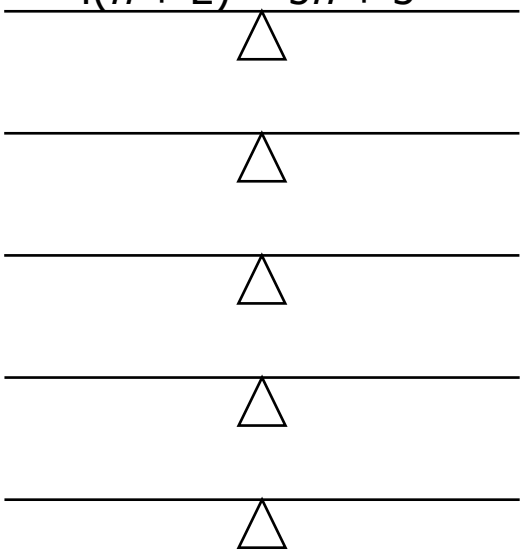
Date_____ Class_____

Solve the equations for the unknown variable.

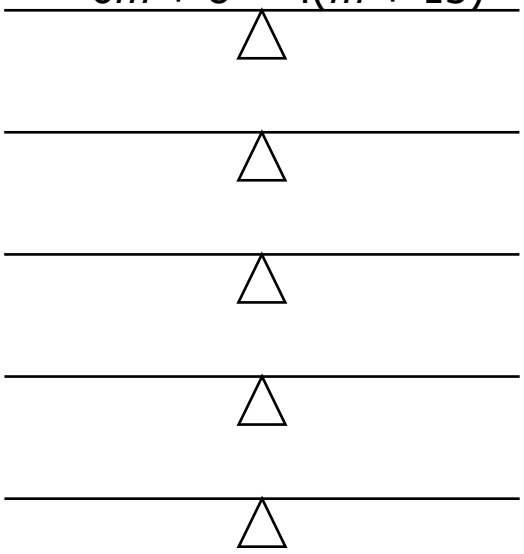
1. $6(x + 3) = 2x + 42$



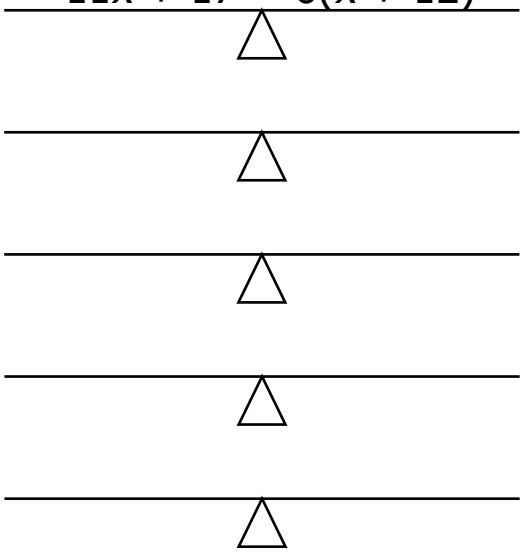
2. $4(n + 2) = 5n + 3$



3. $6m + 8 = 4(m + 13)$

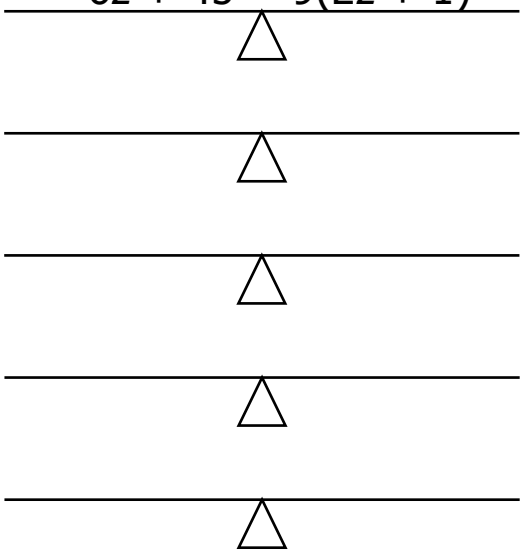


4. $11x + 17 = 6(x + 12)$

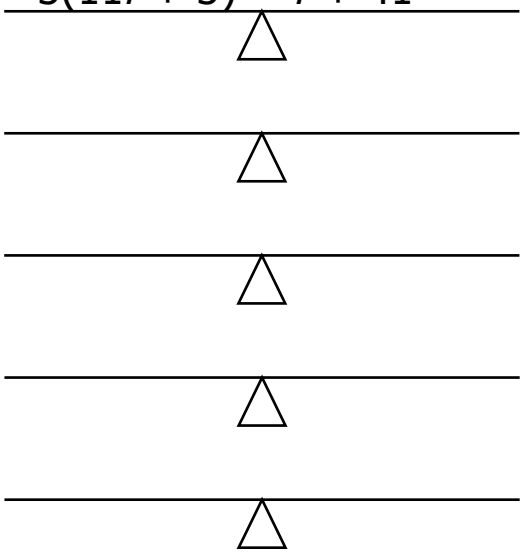


Solving Equations 26-A: Page 2
Four-step equations: Using distribution

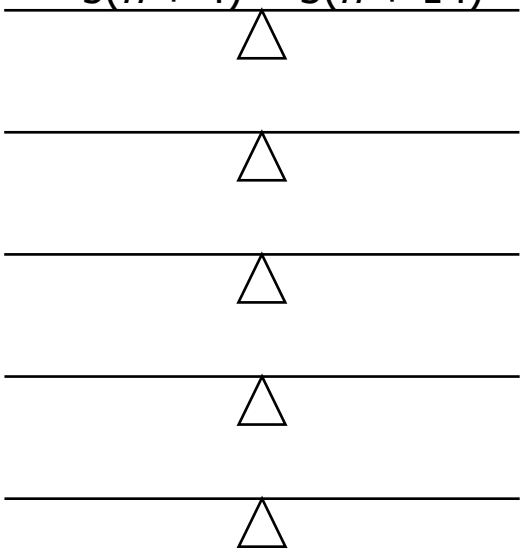
5. $6z + 45 = 9(2z + 1)$



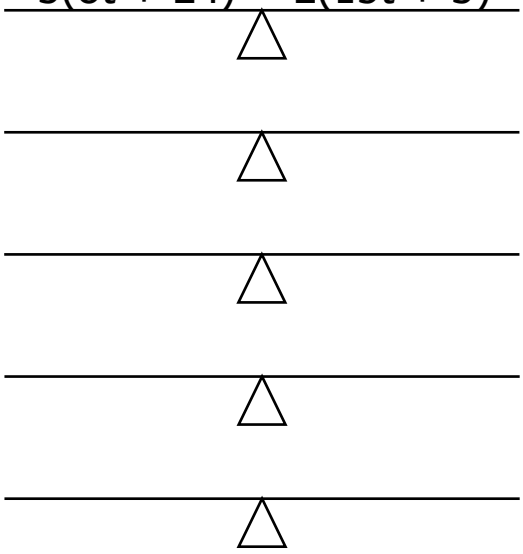
6. $3(11r + 3) = r + 41$



7. $5(n + 4) = 3(n + 14)$



8. $3(8t + 24) = 2(15t + 3)$



Solving Equations 26-B

Four-step equations: Using distribution

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $6(x + 3) = 2x + 42$

2. $4(n + 2) = 5n + 3$

3. $6m + 8 = 4(m + 13)$

4. $11x + 17 = 6(x + 12)$

Solving Equations 26-B: Page 2
Four-step equations: Using distribution

5. $6z + 45 = 9(2z + 1)$

6. $3(11r + 3) = r + 41$

7. $5(n + 4) = 3(n + 14)$

8. $3(8t + 24) = 2(15t + 3)$

Solving Equations 27-A

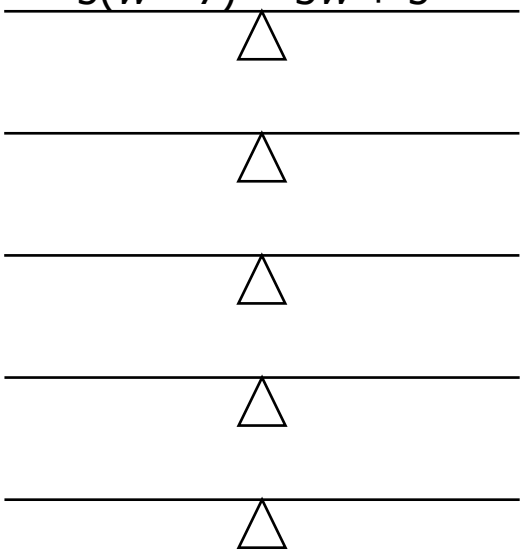
Four-step equations: Using distribution

Name_____

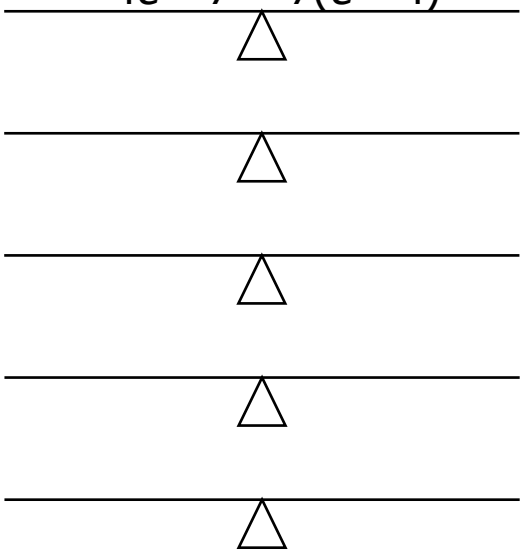
Date_____ Class_____

Solve the equations for the unknown variable.

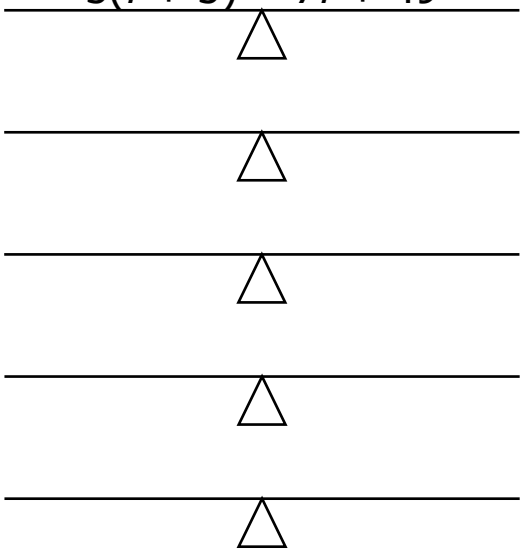
1. $5(w - 7) = 3w + 5$



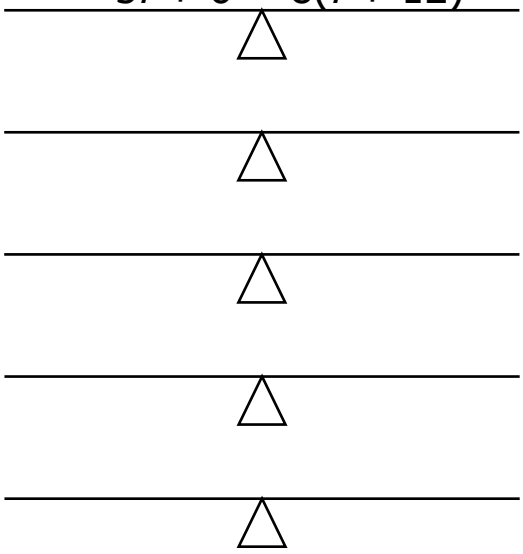
2. $4e - 7 = 7(e - 4)$



3. $3(r + 3) = 7r + 49$

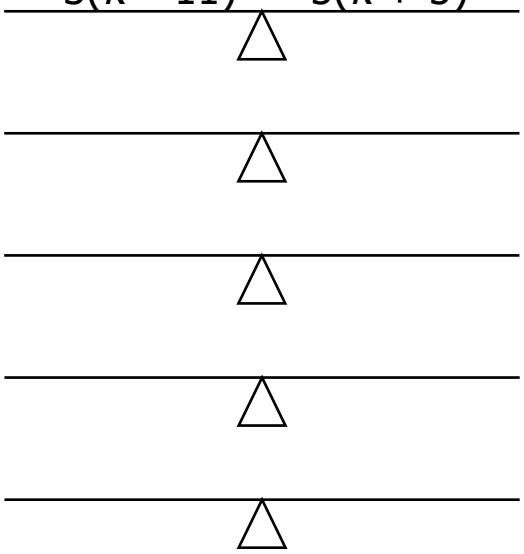


4. $5f + 6 = 8(f + 12)$

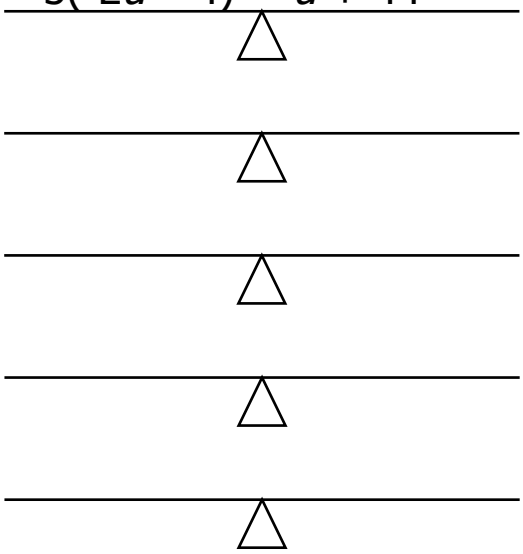


Solving Equations 27-A: Page 2
Four-step equations: Using distribution

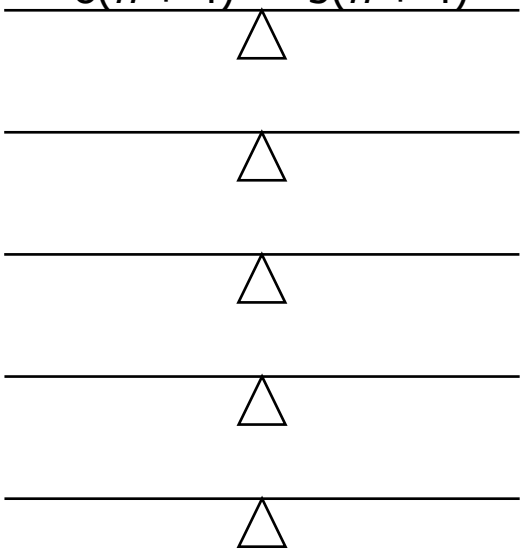
5. $-3(k - 11) = -5(k + 5)$



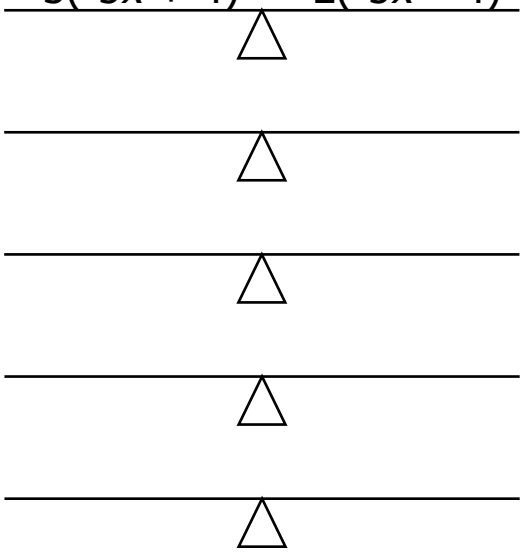
6. $3(-2u - 4) = u + 44$



7. $-8(n + 4) = -3(n + 4)$



8. $-3(-5x + 4) = -2(-5x - 4)$



Solving Equations 27-B

Four-step equations: Using distribution

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $5(w - 7) = 3w + 5$

2. $4e - 7 = 7(e - 4)$

3. $3(r + 3) = 7r + 49$

4. $5f + 6 = 8(f + 12)$

Solving Equations 27-B: Page 2
Four-step equations: Using distribution

5. $-3(k - 11) = -5(k + 5)$

6. $3(-2u - 4) = u + 44$

7. $-8(n + 4) = -3(n + 4)$

8. $-3(-5x + 4) = -2(-5x - 4)$

Solving Equations 28-A

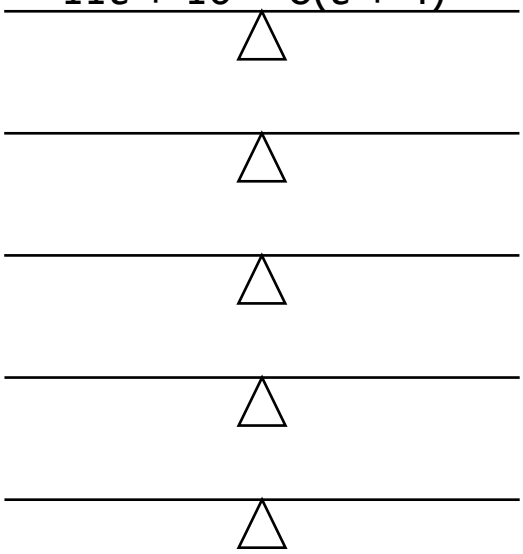
Four-step equations: Using distribution

Name_____

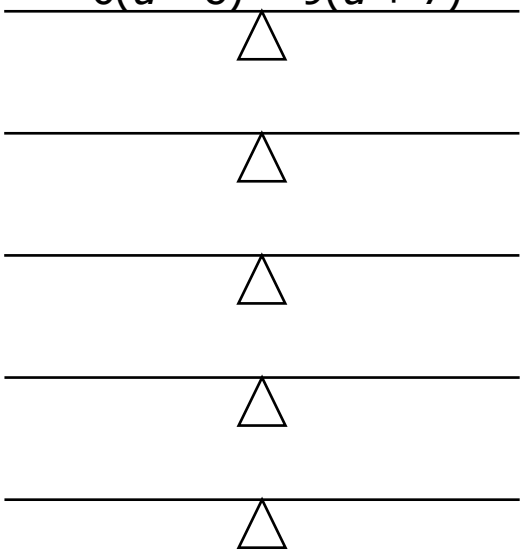
Date_____ Class_____

Solve the equations for the unknown variable.

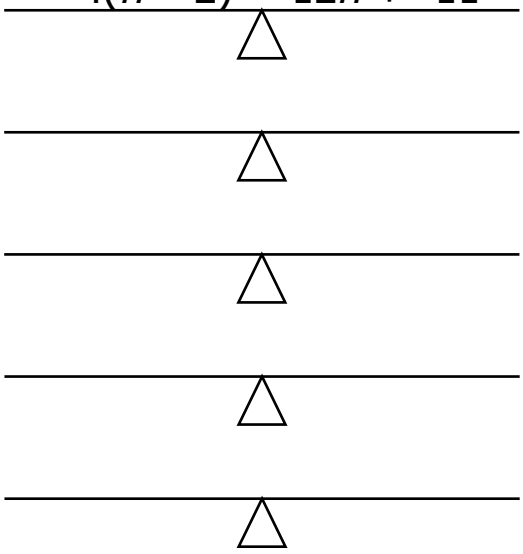
1. $11c + 16 = 8(c + 4)$



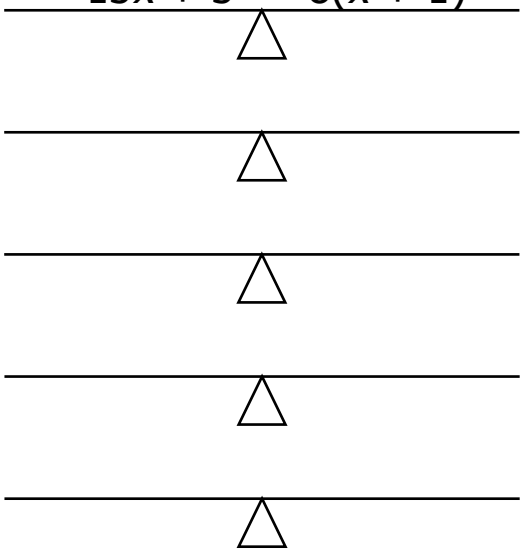
2. $6(d - 8) = 9(d + 7)$



3. $-4(n - 2) = 12n + -11$

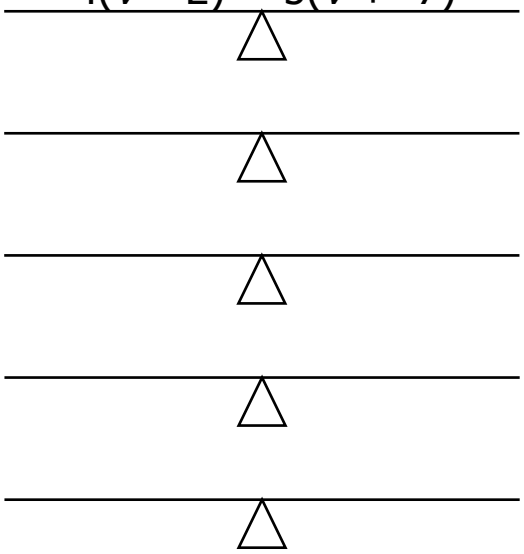


4. $-13x + 3 = -8(x + 1)$

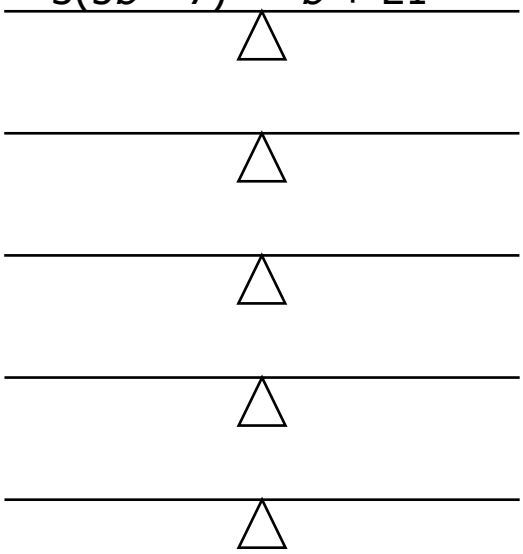


Solving Equations 28-A: Page 2
Four-step equations: Using distribution

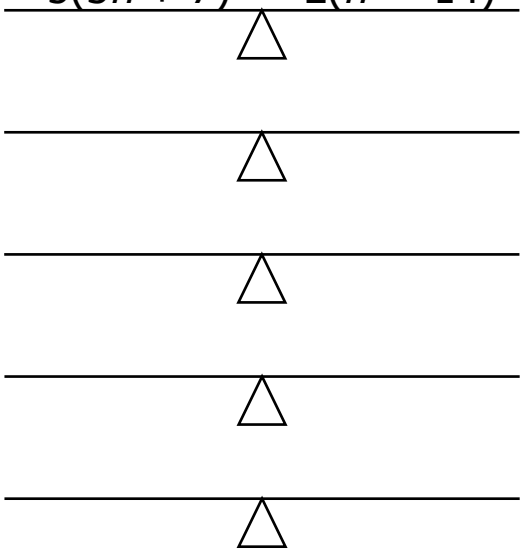
5. $-4(v - 2) = 5(v + -7)$



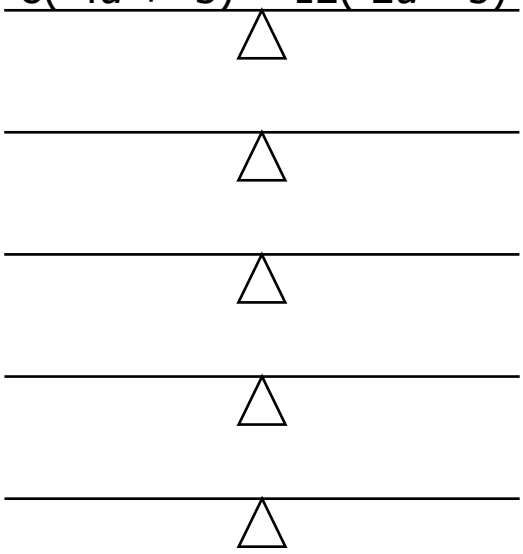
6. $-3(5b - 7) = -b + 21$



7. $-5(3n + 7) = -2(n - -14)$



8. $-8(-4d + -3) = 12(-2d - 5)$



Solving Equations 28-B

Four-step equations: Using distribution

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $11c + 16 = 8(c + 4)$

2. $6(d - 8) = 9(d + 7)$

3. $-4(n - 2) = 12n + -11$

4. $-13x + 3 = -8(x + 1)$

Solving Equations 28-B: Page 2
Four-step equations: Using distribution

5. $-4(v - 2) = 5(v + -7)$

6. $-3(5b - 7) = -b + 21$

7. $-5(3n + 7) = -2(n - -14)$

8. $-8(-4d + -3) = 12(-2d - 5)$

Solving Equations 29-A

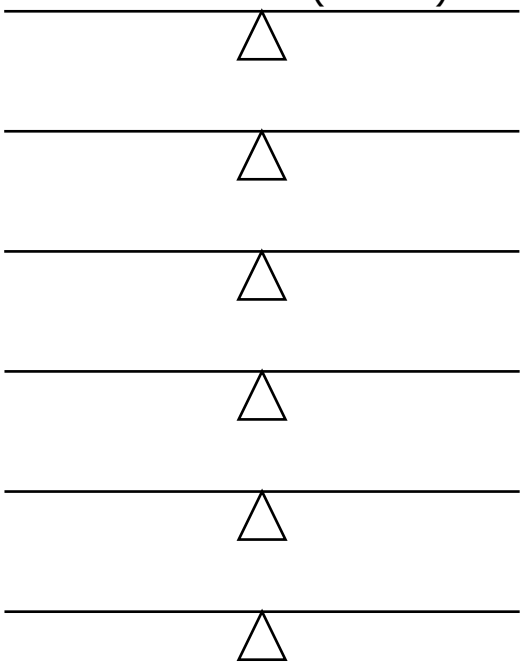
Five-step equations

Name_____

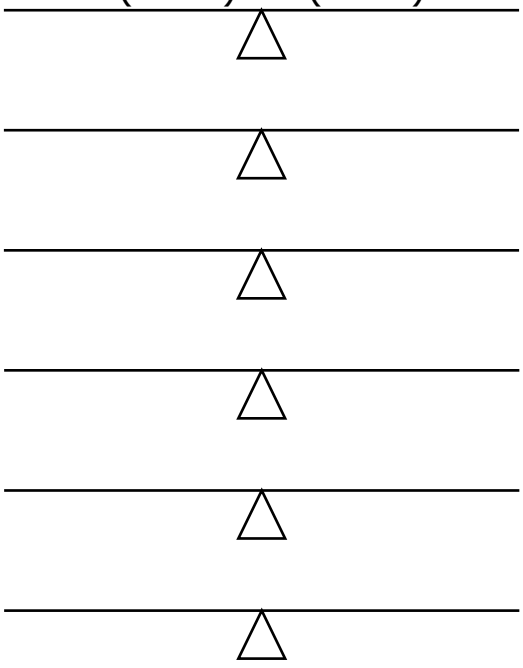
Date_____ Class_____

Solve the equations for the unknown variable.

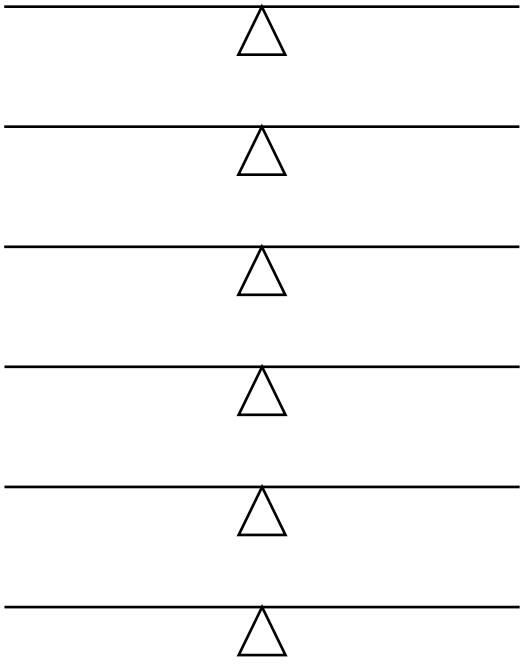
1. $16 + 4x = 2(x + 12) + 4$



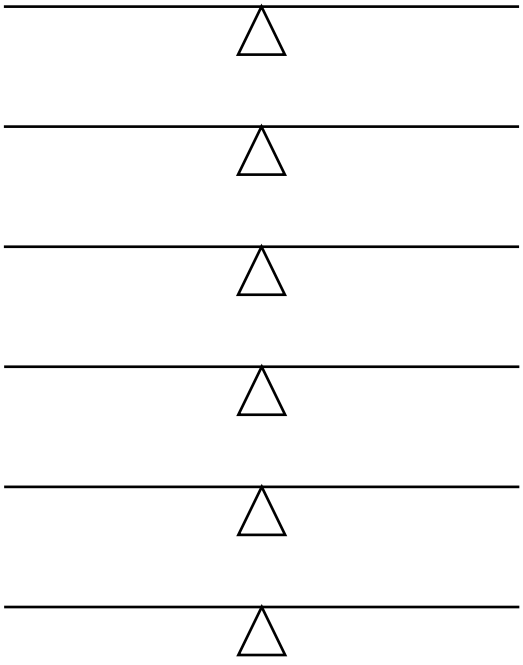
2. $5(v + 3) = 2(v + 6) + 18$



3. $10 + 7(n + 2) = 12(n + 1) + n$

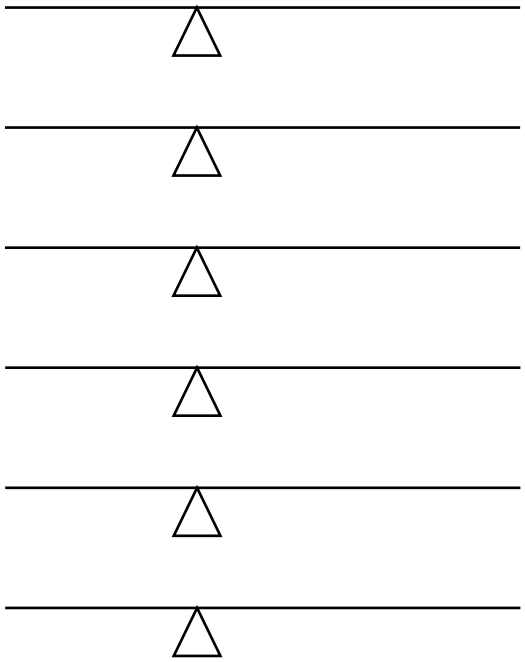


4. $f + 3(2f + 11) = 8(f + 1) + 4f$

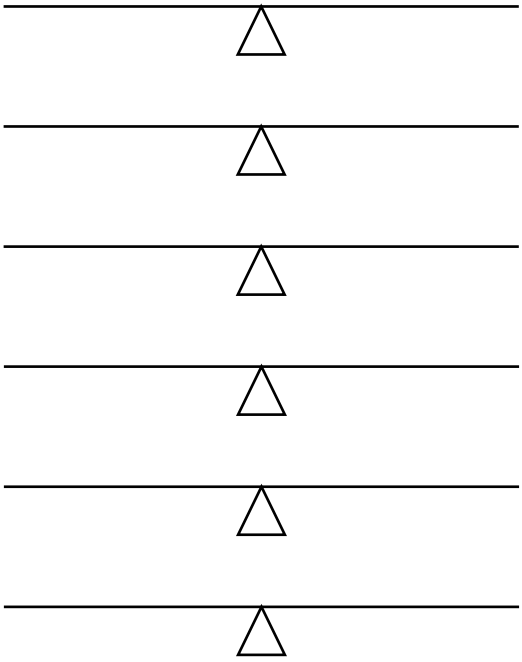


Solving Equations 29-A: Page 2
Five-step equations

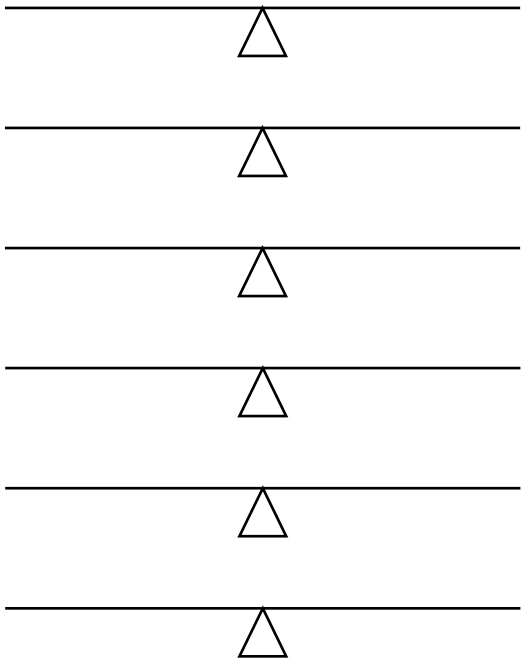
5. $5(u + 18) = 3(u + 6) + 4(u + 1)$



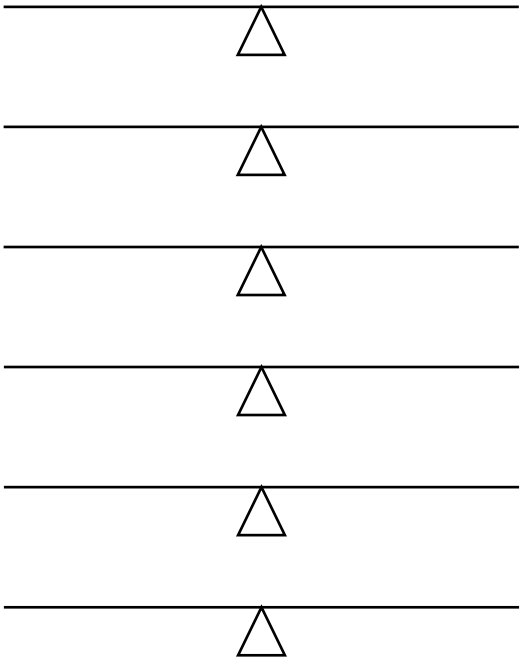
6. $7(6s + 2) + 26 = 8(3s + 12) + 4s$



7. $6 + 5(x + 2) = 3(x + 6) + 2x$



8. $2(6r) + 9(8r + 3) = 11(7r + 6) + 17$



Solving Equations 29-B

Five-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $16 + 4x = 2(x + 12) + 4$

2. $5(v + 3) = 2(v + 6) + 18$

3. $10 + 7(n + 2) = 12(n + 1) + n$

4. $f + 3(2f + 11) = 8(f + 1) + 4f$

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Solving Equations 29-B: Page 2
Five-step equations

5. $5(u + 18) = 3(u + 6) + 4(u + 1)$

6. $7(6s + 2) + 26 = 8(3s + 12) + 4s$

7. $6 + 5(x + 2) = 3(x + 6) + 2x$

8. $2(6r) + 9(8r + 3) = 11(7r + 6) + 17$

Solving Equations 30-A

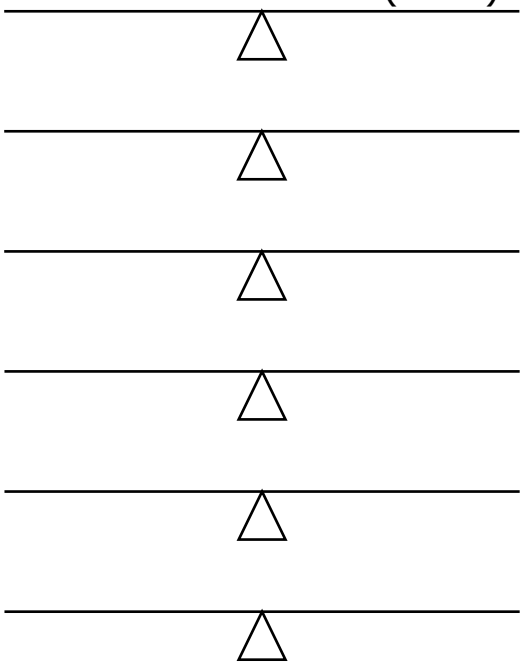
Five-step equations

Name_____

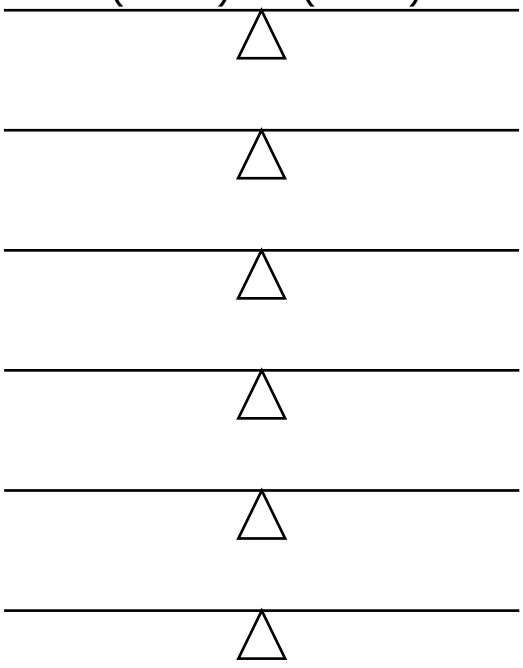
Date_____ Class_____

Solve the equations for the unknown variable.

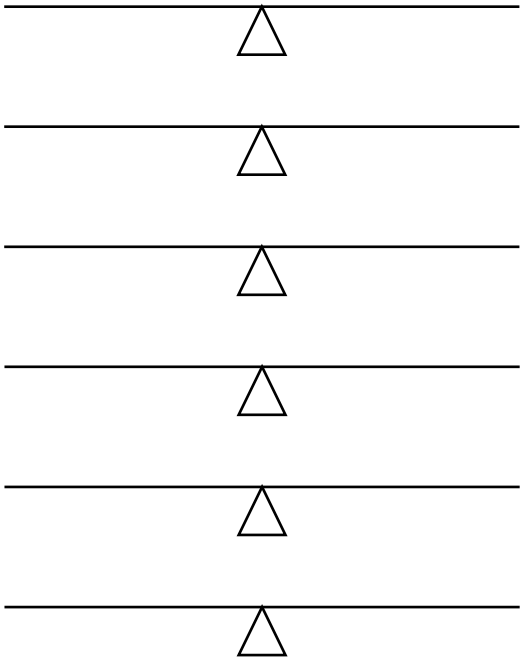
1. $4s - 6 - s = 9 + 5(s + 7)$



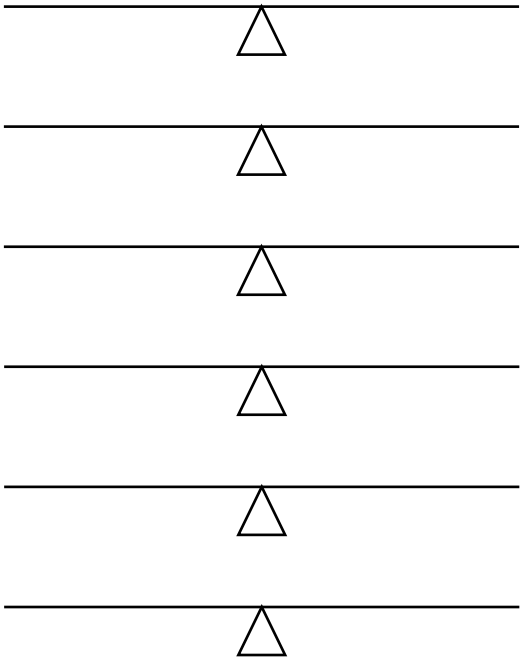
2. $-8(n + 6) = 2(n + 7) + -22$



3. $-3 + 4(-d + 6) = 8(d + 4) + -d$

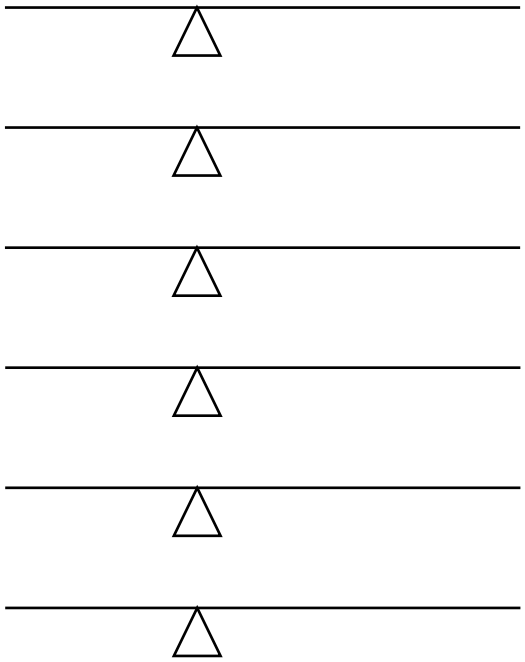


4. $-3(-2x - 5) + x = -4(4x + 1) - -4x$

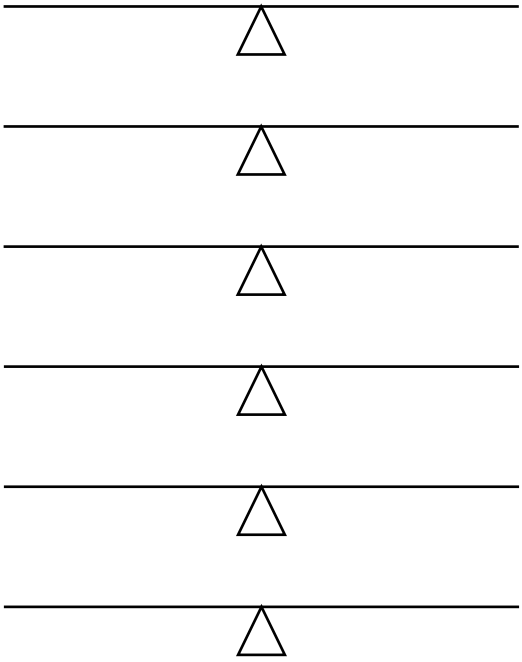


Solving Equations 30-A: Page 2
Five-step equations

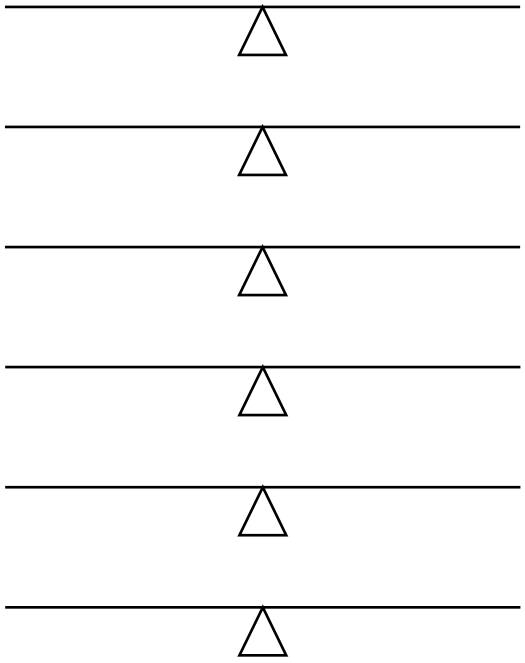
5. $3(a + 13) = -7(a + 6) + 4a + 3$



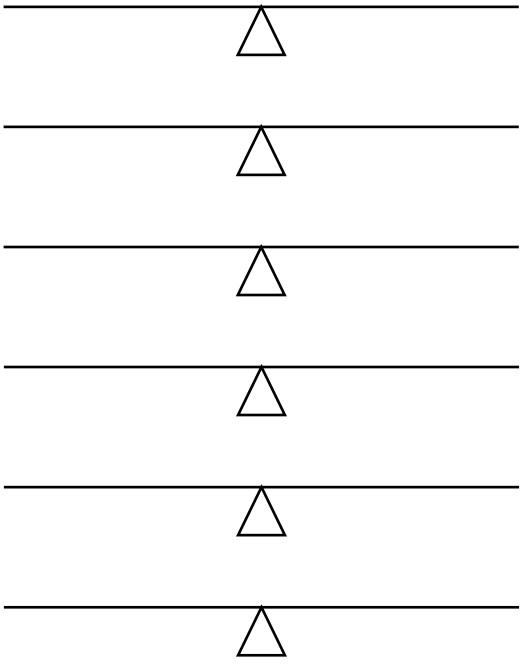
6. $-3(-4c + 7) + 6 = 5(2c + 18) - 5c$



7. $5 - 4(k - 7) = 5k + 3(k - 9)$



8. $5 - 4(k - 7) = 5k - 3(k - 9)$



Solving Equations 30-B

Five-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $4s - 6 - s = 9 + 5(s + 7)$

2. $-8(n + 6) = 2(n + 7) + -22$

3. $-3 + 4(-d + 6) = 8(d + 4) + -d$

4. $-3(-2x - 5) + x = -4(4x + 1) - -4x$

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Solving Equations 30-B: Page 2
Five-step equations

5. $3(a + 13) = -7(a + 6) + 4a + 3$

6. $-3(-4c + 7) + 6 = 5(2c + 18) - 5c$

7. $5 - 4(k - 7) = 5k + 3(k - 9)$

8. $5 - 4(k - 7) = 5k - 3(k - 9)$

Solving Equations 31-A

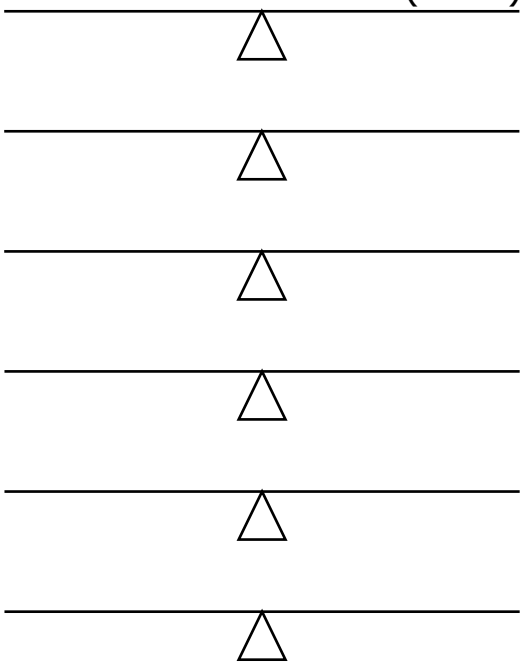
Five-step equations

Name_____

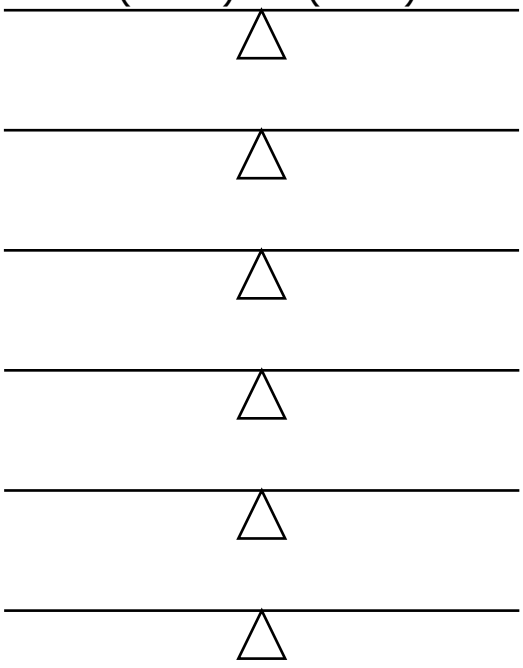
Date_____ Class_____

Solve the equations for the unknown variable.

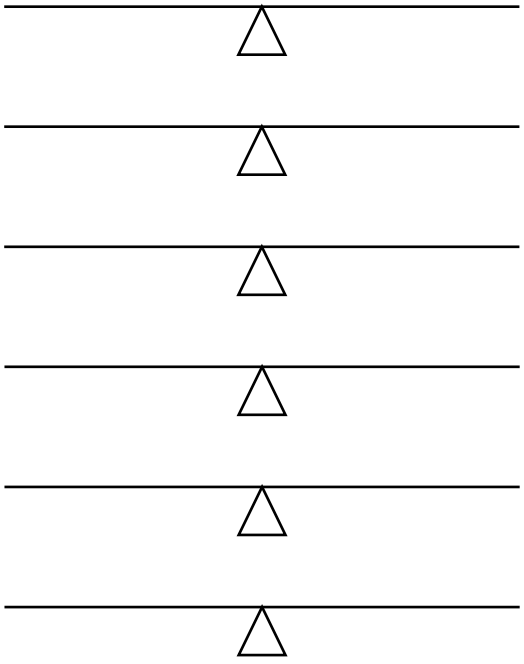
1. $11x - 5 + 27 = 11 + 6(x + 4)$



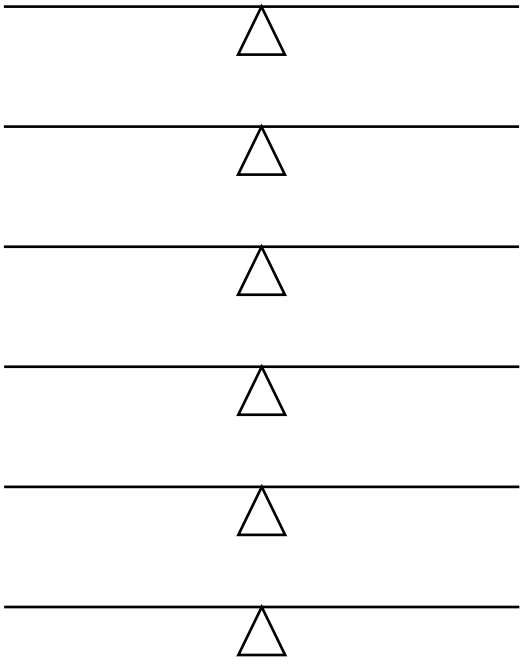
2. $-6(v + 7) = 9(v - 8) + 12$



3. $-6(v + 7) = 9(v - 8) + 13$

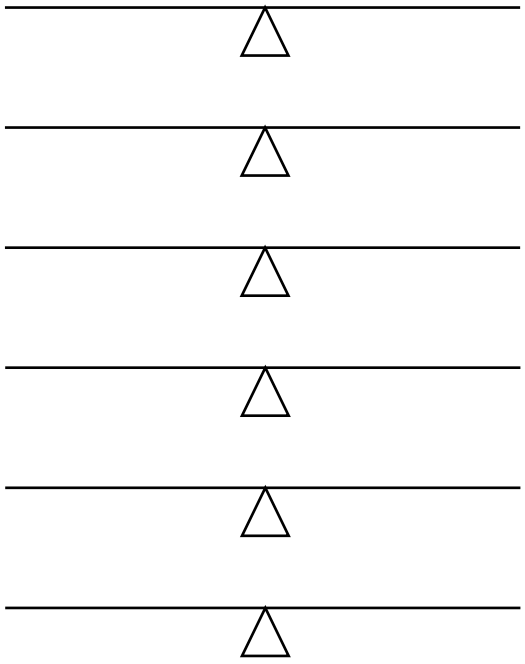


4. $-6(-z - 1) - z = -7(z + 1) + 10z$

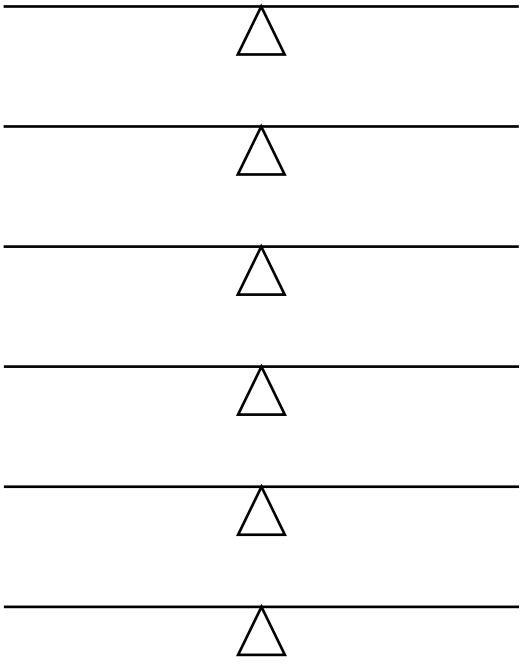


Solving Equations 31-A: Page 2
Five-step equations

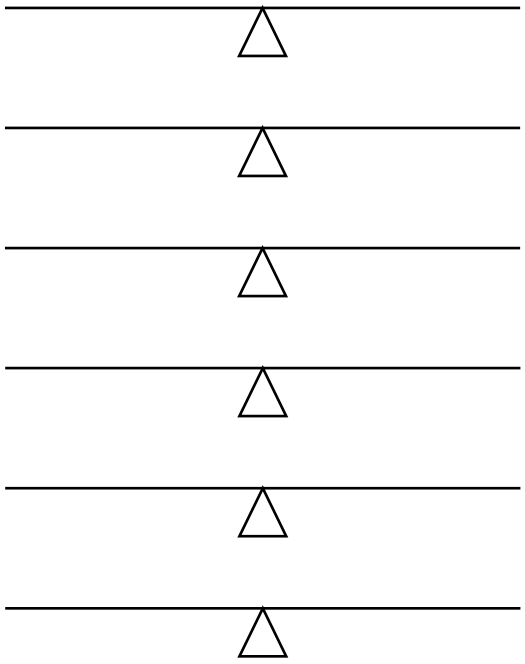
5. $-4e - 3(e - 14) = -4(e + -9) + -15$



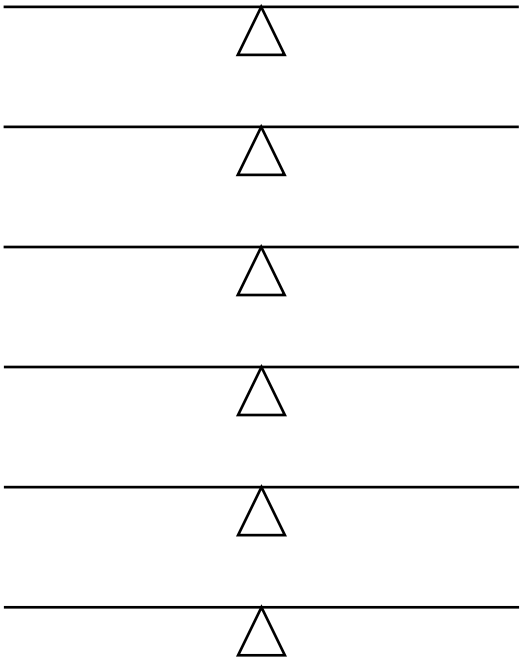
6. $-4e - 3(e - 14) = -4(-e + -9) + -15$



7. $11n - 5(n + 1) = 49 + 6(-n - 9)$



8. $-7 - 4(-2x - 1) = -3x - 5(x - 2)$



Solving Equations 31-B

Five-step equations

Name_____

Date_____ Class_____

Solve the equations for the unknown variable.

1. $11x - 5 + 27 = 11 + 6(x + 4)$

2. $-6(v + 7) = 9(v - 8) + 12$

3. $-6(v + 7) = 9(v - 8) + 13$

4. $-6(-z - 1) - z = -7(z + 1) + 10z$

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Solving Equations 31-B: Page 2
Five-step equations

5. $-4e - 3(e - 14) = -4(e + -9) + -15$

6. $-4e - 3(e - 14) = -4(-e + -9) + -15$

7. $11n - 5(n + 1) = 49 + 6(-n - 9)$

8. $-7 - 4(-2x - 1) = -3x - 5(x - 2)$

Answer Keys:

Solving Equations 1

1.	26	2.	33	3.	32	4.	59
5.	46	6.	47	7.	66	8.	123
9.	71	10.	48	11.	48	12.	73

Solving Equations 2

1.	31	2.	36	3.	38	4.	8
5.	9	6.	14	7.	11	8.	14
9.	18	10.	11	11.	15	12.	88

Solving Equations 3

1.	21	2.	13	3.	34	4.	53
5.	33	6.	7	7.	47	8.	0
9.	71	10.	56	11.	27	12.	14

Solving Equations 4

1.	2.9	2.	1.9	3.	1.5	4.	1.2
5.	.4	6.	1.6	7.	3.39	8.	9
9.	3.53	10.	3.472	11.	.015	12.	3.19

Solving Equations 5

1.	9	2.	¯ 5	3.	¯ 5	4.	¯ 1
5.	4	6.	¯ 1	7.	¯ 18	8.	6
9.	¯ 14	10.	¯ 25	11.	25	12.	2

Solving Equations 6

1.	13	2.	6	3.	4	4.	14
5.	4	6.	1	7.	10	8.	12
9.	14	10.	44	11.	0	12.	15

Solving Equations 7 You may prefer to have students leave answers in improper form.

1.	2.5 or $^{5}/_{2}$	2.	5.5 or $^{11}/_{2}$	3.	4	4.	12.5 or $^{25}/_{2}$
5.	0.5 or $^{1}/_{2}$	6.	3.2 or $^{16}/_{5}$	7.	8	8.	2.5 or $^{5}/_{2}$
9.	6.8 or $^{34}/_{5}$	10.	9.9 or $^{99}/_{10}$	11.	0.5 or $^{1}/_{2}$	12.	$^{17}/_{9}$

Solving Equations 8

1.	-6	2.	4	3.	-9	4.	4
5.	-1	6.	14	7.	18	8.	12
9.	55	10.	13	11.	-2	12.	0

Solving Equations 9

1.	18	2.	18	3.	72	4.	28
5.	32	6.	98	7.	0	8.	81
9.	0	10.	90	11.	90	12.	161

Solving Equations 10

1.	9	2.	64	3.	4.5	4.	-6
5.	17	6.	-3	7.	-14	8.	21
9.	5	10.	0.6	11.	0	12.	.65

Solving Equations 11

1.	20	2.	25	3.	-7	4.	3
5.	-3	6.	$^{-4}/_{7}$	7.	-26	8.	-23
9.	-48	10.	$^{-3}/_{14}$	11.	18	12.	-3

Solving Equations 12

1.	8	2.	7	3.	2
4.	19	5.	7	6.	1
7.	10	8.	2	9.	9

Solving Equations 13

1.	36	2.	5	3.	30
4.	6	5.	8	6.	1
7.	484	8.	2	9.	136

Solving Equations 14

1.	-15	2.	-3	3.	3
4.	3	5.	-18	6.	0
7.	-1	8.	-3	9.	5

Solving Equations 15

1.	-12	2.	-12	3.	-84
4.	34	5.	7	6.	-6
7.	75	8.	-3	9.	96

Solving Equations 16

1.	$^{7}/_{2}$	2.	$^{19}/_{6}$	3.	$^{-29}/_{8}$
4.	$^{10}/_{7}$	5.	$^{5}/_{2}$	6.	$^{-17}/_{8}$
7.	-3	8.	$^{-1}/_{3}$	9.	$^{79}/_{13}$

Solving Equations 17

1.	$^{1}/_{11}$	2.	-15	3.	-6
4.	-64	5.	-16	6.	-95
7.	-84	8.	$^{146}/_{83}$	9.	-64

Solving Equations 18

1.	12	2.	-14	3.	-10
4.	$^{-18}/_{5}$	5.	$^{-16}/_{3}$	6.	-9
7.	16	8.	$^{-35}/_{2}$	9.	15

Solving Equations 19

1.	3	2.	5	3.	7
4.	6	5.	1	6.	0
7.	11	8.	5	9.	29

Solving Equations 20

1.	6	2.	2	3.	2
4.	-4	5.	-4	6.	-4
7.	3	8.	1	9.	4

Solving Equations 21

1.	$^{5}/_{8}$	2.	$^{15}/_{2}$	3.	$^{5}/_{3}$
4.	$^{81}/_{7}$	5.	$^{25}/_{2}$	6.	$^{5}/_{2}$
7.	$^{1}/_{3}$	8.	$^{8}/_{9}$	9.	15

Solving Equations 22

1.	3	2.	-3	3.	$^{32}/_{3}$
4.	$^{-12}/_{11}$	5.	-1	6.	$^{-1}/_{10}$
7.	$^{-15}/_{4}$	8.	-8	9.	$^{-2}/_{3}$

Solving Equations 23

1.	2	2.	5	3.	3	4.	0
5.	4	6.	1	7.	7	8.	no solution

Solving Equations 24

1.	2	2.	6	3.	-1	4.	-8
5.	-1	6.	-2	7.	-1	8.	-2

Solving Equations 25

1.	$^{-12}/_{5}$	2.	no solution	3.	$^{3}/_{20}$	4.	$^{16}/_{5}$
5.	$^{9}/_{4}$	6.	$^{5}/_{6}$	7.	$^{1}/_{8}$	8.	$^{1}/_{12}$

Solving Equations 26

1.	6	2.	5	3.	22	4.	11
5.	3	6.	1	7.	11	8.	11

Solving Equations 27

1.	20	2.	7	3.	-10	4.	-30
5.	-29	6.	-8	7.	-4	8.	4

Solving Equations 28

1.	$^{16}/_{3}$	2.	-37	3.	$^{19}/_{16}$	4.	$^{11}/_{5}$
5.	$^{43}/_{9}$	6.	0	7.	$^{-7}/_{13}$	8.	$^{-3}/_{2}$

Solving Equations 29

1.	6	2.	5	3.	2	4.	5
5.	34	6.	4	7.	no solution	8.	8

Solving Equations 30

1.	-25	2.	-4	3.	-1	4.	-1
5.	-13	6.	15	7.	5	8.	1

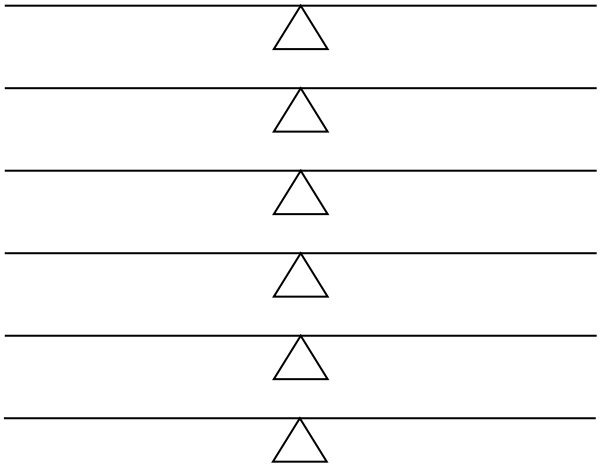
Solving Equations 31

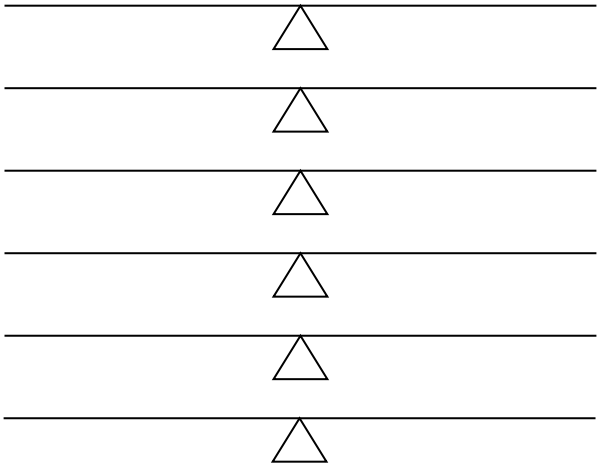
1.	$^{13}/_{5}$	2.	$^{6}/_{5}$	3.	$^{17}/_{15}$	4.	$^{-13}/_{2}$
5.	7	6.	$^{21}/_{11}$	7.	0	8.	$^{13}/_{16}$

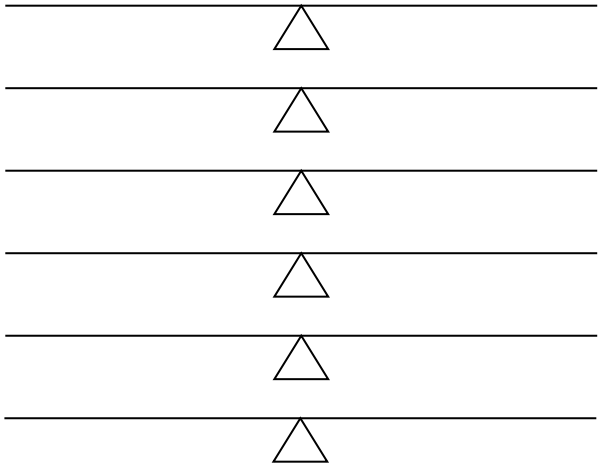
Solve for the unknown showing your work on each step.

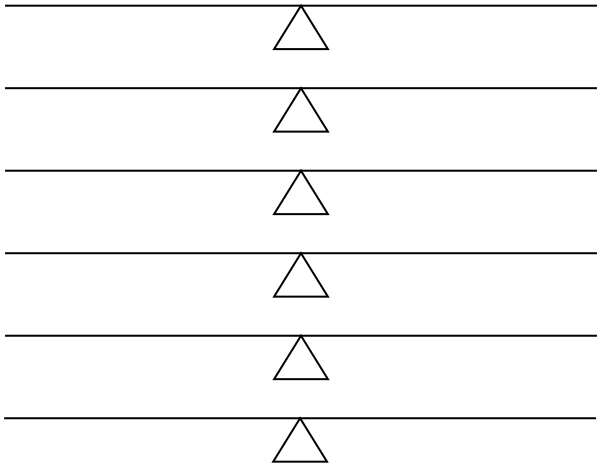
Name _____

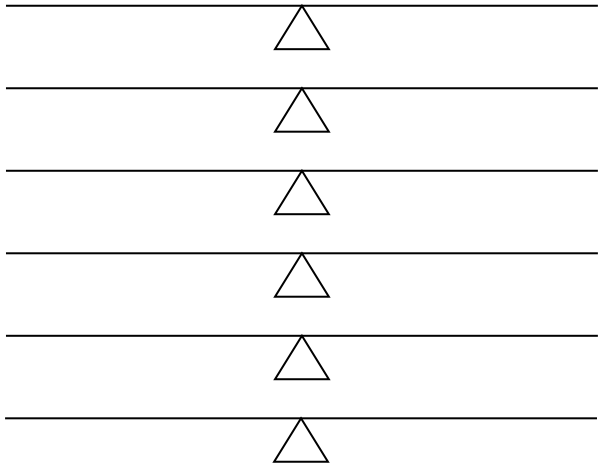
Date _____ Class _____

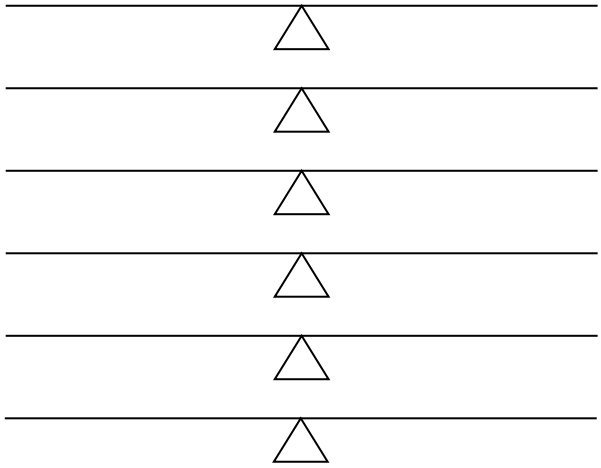
1. 

2. 

3. 

4. 

5. 

6. 

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Feel free to contact me if you have questions or comments or would like to discuss a staff development training or keynote address at your site.

Happy teaching,

Brad