RUSLI PREP
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FREE PRACTICE PACKET · GRADE 8

Solving Linear Equations

One-step to multi-step equations, variables on both sides and word problems

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Tips for parents

The golden rule: whatever you do to one side, do to the other. Encourage your child to check every answer by plugging it back into the original equation. It takes 30 seconds and catches most mistakes.

Made by Tim Rusli, Math & Physics Tutor in Union, NJ · Aligned to NJ Student Learning Standards 8.EE.C.7

Name _____ Date _____

Part A · One- and two-step equations

Undo operations in reverse order: first undo adding or subtracting, then undo multiplying or dividing.

Example $2x + 5 = 17$ → subtract 5: $2x = 12$ → divide by 2: $x = 6$ Check: $2(6) + 5 = 17$ ✓

Solve for x.

1. $x + 7 = 15$

2. $3x = 27$

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

4. $2x + 5 = 17$

5. $5x - 8 = 22$

6. $\frac{x}{3} + 4 = 10$

7. $-4x + 3 = -9$

8. $7 - 2x = 1$

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Part B · Multi-step equations

Distribute, combine like terms, get the variable on one side, then solve.

Example $5x + 2 = 3x + 14$ → subtract $3x$: $2x + 2 = 14$ → $2x = 12$ → $x = 6$

Solve for x. Check your answer.

1. $3(x + 4) = 27$

2. $2x + 3x - 4 = 21$

3. $5x + 2 = 3x + 14$

4. $4(x - 2) = 2x + 6$

5. $6x - 5 = 2(x + 7) + 1$

6. $2(3x - 1) = 4x + 10$

7. $8 - (x + 3) = 2x - 7$

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

9. $0.5x + 3 = 0.25x + 5$

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Part C · Word problems

Let a variable stand for the unknown, write an equation, then solve it.

1. A gym charges a $25 sign-up fee plus $15 per month. Jen has paid $130 in total. How many months has she been a member?

   Answer: _____

2. Two consecutive numbers add up to 47. What are the numbers?

   Answer: _____

3. Phone Plan A costs $40 plus $5 per GB of data. Plan B costs $55 plus $2 per GB. For how many GB do the plans cost the same?

   Answer: _____

4. A rectangle's length is 5 cm more than its width. Its perimeter is 46 cm. Find the length and width.

   Answer: _____

5. Mia solved $3(x + 2) = 18$ by writing $3x + 2 = 18$. What mistake did she make? Solve it correctly.

Challenge How many solutions does each equation have? (a) $2(x + 3) = 2x + 6$ (b) $2(x + 3) = 2x + 5$

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Answer key

Answers are shown in simplest form.

Part A

A1	x = **8**
A2	x = **9**
A3	x = **24**
A4	x = **6**
A5	x = **6**
A6	x = **18**
A7	x = **3**
A8	x = **3**

Part B

B1	x = **5**
B2	x = **5**
B3	x = **6**
B4	x = **7**
B5	x = **5**
B6	x = **6**
B7	x = **4**
B8	x = **7**
B9	x = **8**

Part C

C1	25 + 15m = 130, so m = **7** months
C2	n + (n + 1) = 47, so the numbers are **23 and 24**
C3	40 + 5g = 55 + 2g, so g = **5 GB** (both cost $65)
C4	2w + 2(w + 5) = 46, so width = **9 cm**, length = **14 cm**
C5	She only multiplied the x by 3. It should be 3x + 6 = 18, so 3x = 12 and x = **4**.
★	(a) **Infinitely many**: both sides equal 2x + 6. (b) **No solution**: 2x + 6 can never equal 2x + 5.

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NEED A LITTLE MORE HELP?

One-on-one tutoring with Tim Rusli

I'm a Math and Physics tutor in Union, NJ with a Bachelor's in Applied Mathematics from Rutgers. I break hard problems into small, clear steps so students build real confidence, from elementary math to SAT Math, Calculus and Physics.

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