

Algebra 1 · Linear Equations and Literal Equations · Worksheet Answer Key

Common Core A-REI.A.1, A-REI.B.3, A-CED.A.1, A-CED.A.4 · mathovore.fr

Every solution below shows each step and ends with a check in the original equation. Compare your reasoning, not only your final answer: the standards ask students to justify each step. If your answer differs, find the first line where your work and the key disagree.

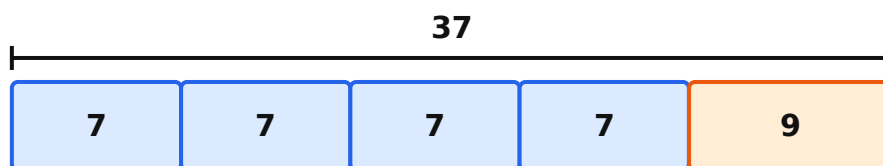
Algebra 1 Common Core: A-REI.A.1 · A-REI.B.3 · A-CED.A.1 · A-CED.A.4

Problem 1: Two steps with a tape diagram

Subtract 9 from both sides: $4x = 28$.

Divide both sides by 4: $x = 7$.

Check: $4(7) + 9 = 37$.



Four equal parts of size 7 and a part of size 9 make 37.

Problem 2: Variables on both sides

Subtract $5x$ from both sides: $2x - 3 = 11$.

Add 3: $2x = 14$. Divide by 2: $x = 7$.

Check: $7(7) - 3 = 46$ and $5(7) + 11 = 46$.

Problem 3: Distribute first

Distribute: $3x + 12 = 2x + 19$.

Subtract $2x$: $x + 12 = 19$. Subtract 12: $x = 7$.

Check: $3(11) = 33$ and $2(7) + 19 = 33$.

Problem 4: Fractional coefficient

Add 5: $\frac{2}{3}x = 12$.

Multiply by the reciprocal $\frac{3}{2}$: $x = 12 \cdot \frac{3}{2}$, so $x = 18$.

Check: $\frac{2}{3}(18) - 5 = 12 - 5 = 7$.

Problem 5: Fractions with a common denominator

Multiply every term by the least common denominator 6: $3x + 2x = 60$.

Combine: $5x = 60$. Divide by 5: $x = 12$.

Check: $6 + 4 = 10$.

Problem 6: Fractions on both sides

Multiply both sides by 12: $3(x+3) = 4(2x-1)$.

Distribute: $3x+9=8x-4$. Subtract $3x$: $9=5x-4$. Add 4: $13=5x$.

Divide by 5: $x = \frac{13}{5}$.

Check: $\frac{13/5+3}{4} = \frac{28/5}{4} = \frac{7}{5}$ and $\frac{26/5-1}{3} = \frac{21/5}{3} = \frac{7}{5}$.

Problem 7: Decimals on both sides

Subtract $0.4x$: $1.2 = 0.3x - 0.3$. Add 0.3: $1.5 = 0.3x$.

Divide by 0.3: $x = 5$.

Check: $0.4(5) + 1.2 = 3.2$ and $0.7(5) - 0.3 = 3.2$.

Problem 8: Give the reasons

Step 2: distributive property. Step 3: combine like terms. Step 4: subtraction property of equality (subtract x from both sides). Step 5: addition property of equality (add 1 to both sides).

Check: $x = 8$ gives $2(5) + 5 = 15$ and $8 + 7 = 15$.

$2(x - 3) + 5 = x + 7$	→ Given
$2x - 6 + 5 = x + 7$	→ Distributive property
$2x - 1 = x + 7$	→ Combine like terms
$x - 1 = 7$	→ Subtraction property of equality
$x = 8$	→ Addition property of equality

Reasons for each step of $2(x-3)+5=x+7$.

Problem 9: Find the error

Jamal multiplied only the first term. The distributive property gives $3x-6=12$.

Add 6: $3x=18$. Divide by 3: $x=6$.

Check: $3(6-2)=12$.

Problem 10: No solution or not?

Distribute: $2x+6=2x+5$. Subtract $2x$: $6=5$.

This is false for every x , so the equation has **no solution**.

Problem 11: Infinitely many solutions?

Distribute and combine: $4x-8+3=4x-5$, so $4x-5=4x-5$.

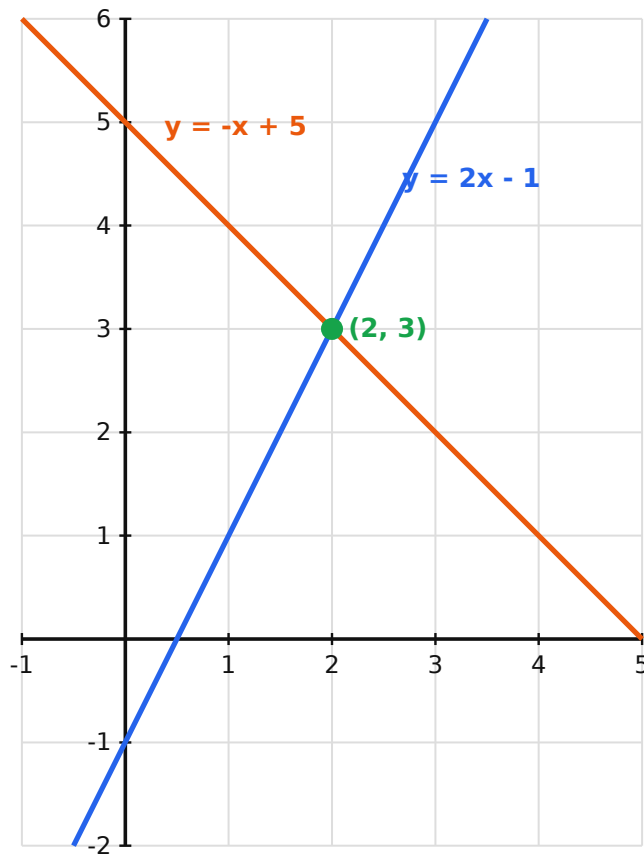
Both sides are identical, so the statement is always true: **infinitely many solutions** (all real numbers).

Test $x=0$: $-5=-5$.

Problem 12: Solve by graphing

The lines cross at $(2,3)$, so $x=2$.

Algebra: add x : $3x-1=5$; add 1: $3x=6$; divide: $x=2$.

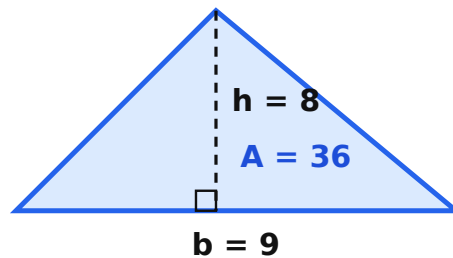


The lines meet at $(2, 3)$, so the equation $2x - 1 = -x + 5$ has solution $x = 2$.

Problem 13: Solve for the height

Multiply both sides by 2: $2A = bh$. Divide by b : $h = \frac{2A}{b}$.

Substitute: $h = \frac{2(36)}{9} = 8$.



A triangle with $b = 9$, $h = 8$ and $A = 36$.

Problem 14: Solve for width

Subtract $2l$: $P - 2l = 2w$. Divide by 2: $w = \frac{P - 2l}{2}$.

Substitute: $w = \frac{50-30}{2} = 10$.

Problem 15: Standard form to y

Subtract $2x$: $3y = 12 - 2x$. Divide every term by 3: $y = 4 - \frac{2}{3}x$.

When $x = 3$: $y = 4 - 2 = 2$. Check: $2(3) + 3(2) = 12$.

Problem 16: Temperature formula

Multiply by $\frac{9}{5}$: $\frac{9}{5}C = F - 32$. Add 32: $F = \frac{9}{5}C + 32$.

Substitute $C = 35$: $F = 63 + 32 = 95$, so $35^\circ\text{C} = 95^\circ\text{F}$.

Problem 17: Taxi fare

Let m be the miles: $3.50 + 2.25m = 17$.

Subtract 3.50: $2.25m = 13.50$. Divide: $m = 6$ **miles**.

Check: $3.50 + 2.25(6) = 17$.

Problem 18: Gym plans

Let n be months: $60 + 25n = 40n$.

Subtract $25n$: $60 = 15n$. Divide: $n = 4$ **months**.

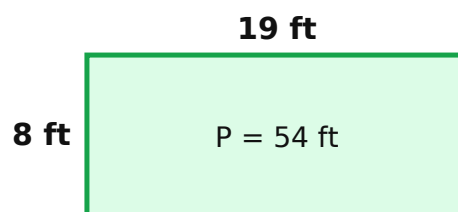
Cost: $60 + 25(4) = 160$ and $40(4) = 160$, so \$160 each.

Problem 19: Garden fence

Let w be the width, so the length is $2w + 3$.

Perimeter: $2(w + 2w + 3) = 54$, so $6w + 6 = 54$. Subtract 6 and divide: $w = 8$.

Width 8 ft, length 19 ft. Check: $2(8 + 19) = 54$.



The solved garden.

Problem 20: Consecutive odd integers

Let the integers be n , $n+2$, $n+4$.

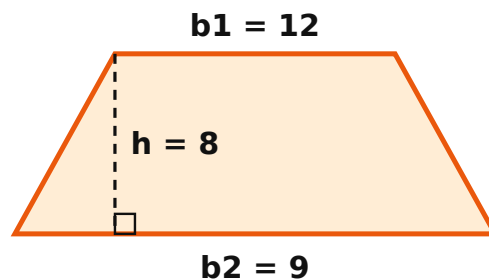
$3n+6=87$, so $3n=81$ and $n=27$.

27, 29 and 31. Check: $27+29+31=87$.

Problem 21: Trapezoid base

Multiply by 2: $2A=(b_1+b_2)h$. Divide by h : $\frac{2A}{h}=b_1+b_2$. Subtract b_2 : $b_1=\frac{2A}{h}-b_2$.

Substitute: $b_1=\frac{168}{8}-9=21-9=12$.



The solved trapezoid: bases 12 and 9, height 8, area 84.

Problem 22: Shopping with fractions

Let s be his savings: $s-\frac{s}{3}-\frac{s}{4}=35$.

Multiply by 12: $12s-4s-3s=420$, so $5s=420$ and $s=\$84$.

Check: $84-28-21=35$.