Approximating Solutions

Home Link 6-1

NAME DATE TIME

For each equation, try to get as close as possible to the exact solution. Use the suggested test numbers to get started. Round numbers to the nearest thousandth.

SRB 214-215

(1) Equation: $r^2 + r = 15$

r	r^2	$r^2 + r$	Compare $(r^2 + r)$ to 15
3	9	12	< 15
4	16	20	> 15
3.5	12.25	15.75	> 15

My closest number: _____

(2) Equation: $x^2 - 2x = 23$

x	x^2	$2x$	$x^2 - 2x$	Compare $(x^2 - 2x)$ to 23
6	36	12	24	> 23
5	25	10	15	< 23
5.5	30.25	11	19.25	< 23

My closest number: _____

Practice

Rewrite each expression in exponential notation.

(3) $9 * 9 * 9$ _____ (4) $7 * 7 * 7 * 7 * 7$ _____ (5) $6.2 * 6.2$ _____

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Solution Sets

Home Link 6-2

NAME DATE TIME

(1) The solution set is {all numbers less than 7}.
Circle inequalities with this solution set.

SRB 210-211

$j > 4$ $7 < j$ $7 > j$ $j < 7$

(2) **a.** The solution set is {all numbers greater than 10}.
Circle inequalities with this solution set.

$m + 10 < 11$ $11 < m + 1$ $6 > 5 + m$ $6 > 5m$

b. Explain how you found your answer for Problem 2a.

_____

_____

(3) Record the solution sets for the equations below.

a. $3x = 45$ Solution set: _____

b. $x + 138 = 204$ Solution set: _____

(4) Write the letter of the solution set that matches each number sentence.

$x \div 4 = 8$	_____	**A.** {All numbers}
$\frac{4}{x} = 8$	_____	**B.** {0}
$10 - x = 7$	_____	**C.** { }
$3x + x = 16$	_____	**D.** $\left\{\frac{1}{2}\right\}$
$5x = 0$	_____	**E.** $\left\{-\frac{1}{2}, \frac{1}{2}\right\}$
$12 * x = x * 12$	_____	**F.** {3}
$0.5 = \lvert x \rvert$	_____	**G.** {32}
$x - 5 = x$	_____	**H.** {4}

Practice

Divide.

(5) $8.8 \div 2 =$ _____

(6) $0.95 \div 5 =$ _____

(7) $98 \div 0.2 =$ _____

(8) $198 \div 0.2 =$ _____

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Modeling and Solving Number Stories

Home Link 6-3 SRB 216

NAME DATE TIME

Use bar models to solve these equations. Check your answers.

(1) $4a + 12 = 96$ Solution: _____ Check: _____

(2) $6d + 7 = d + 22$ Solution: _____ Check: _____

Use bar models to solve the problems.

(3) Jane is 6 years older than twice Martin's age.
Let s be Martin's age.
Write an expression to represent Jane's age. _____
The sum of Jane's and Martin's ages is 39.
Write an equation to represent the situation. _____

How old are Jane and Martin? Jane: _____ Martin: _____

Try This

(4) Dan is thinking of a number. He doubles his number and adds 15.
He multiplies his number by 5 and gets the same answer. Let n be Dan's number.

Write an equation to represent the situation. _____

Dan's number: _____

Practice Solve.

(5) $5 * (6.8 - 2) =$ _____ (6) $8 \div 2 * 3.5 =$ _____ (7) $9.43 - 4.5 + 1.7 =$ _____

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Pan-Balance Problems

Home Link 6-4

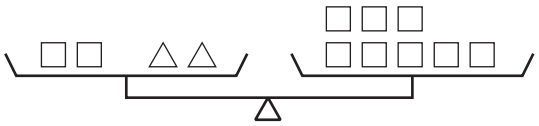
NAME DATE TIME

In each figure, the two pans are balanced.
Solve these pan-balance problems.

SRB 217-218

① One triangle weighs

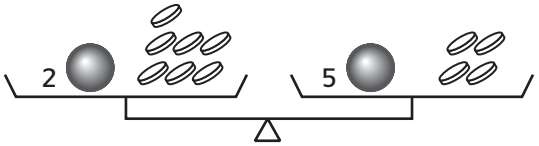
as much as _____ squares.



② One ball weighs

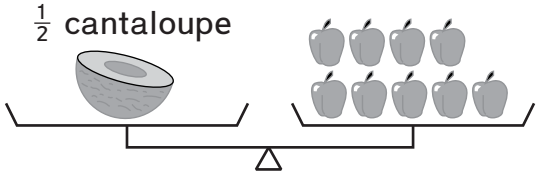
as much as _____ coin(s).

Note: Remember that 2 ● means ● ●.



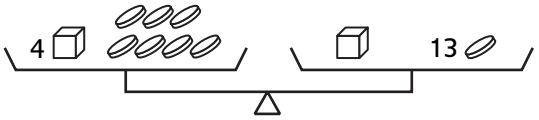
③ Two cantaloupes weigh

as much as _____ apples.



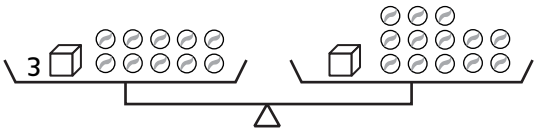
④ One cube weighs

as much as _____ coin(s).



⑤ One cube weighs

as much as _____ marbles.



Practice

Solve.

⑥ $1 = \frac{3}{5} * \_\_\_\_\_$

⑦ $\frac{1}{6} * \_\_\_\_\_ = 1$

⑧ $\_\_\_\_\_ * 1\frac{1}{2} = 1$

⑨ $1 = 1\frac{5}{6} * \_\_\_\_\_$

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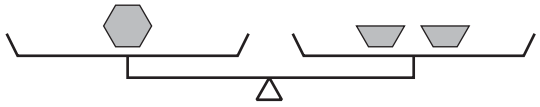
Solving Pan-Balance Problems

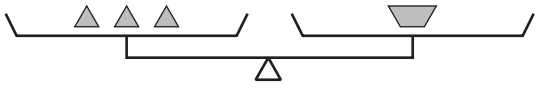
Home Link 6-5

NAME DATE TIME

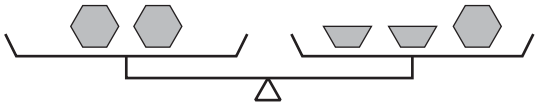
SRB 217-218

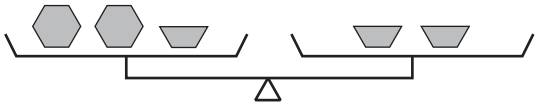
(1) These two pan balances are in perfect balance.

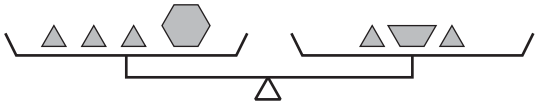


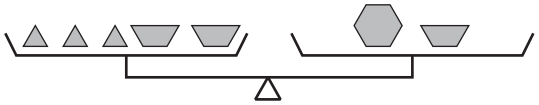


a. Use the relationships in the pan balances shown above to determine which of the pan balances below are balanced. Circle the ones that are in balance.









b. For any pan balance above that you did not circle, add or cross out objects to balance the pans.

(2) Find the value of the missing number that will balance each set of pans below. The same number is missing from both sides of a pan balance.

a. $\square * 15$ $5 * \square + 30$

$\square =$ _____

b. $\square \div 6$ $\square - 20$

$\square =$ _____

(3) Make up two of your own missing-number pan balances.

a.

$\square =$ _____

b.

$\square =$ _____

Fill in the missing numbers for the pan-balance problems you made.

Practice Solve.

(4) $4.3 * 7 =$ _____ (5) $0.2 * 1.5 =$ _____ (6) $1.9 * 2.3 =$ _____

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Simplifying Expressions

Home Link 6-6

NAME DATE TIME

SRB 206

(1) Simplify each expression by combining the like terms.

a. $42x + 12x$ _____ **b.** $17w - 8w$ _____

c. $25.42e - 23.3e$ _____ **d.** $88h + 30.5h$ _____

(2) Simplify. Check that your expressions are equivalent.

a. $12m + 24m$

b. $90a - 30a$

c. $14b + 15b + 8$

d. $58d + 25 - 22d$

e. $3(14 + 15f) + 79$

f. $20(18 + 5t) - 47 + 28t$

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Practice

Insert =, <, or >.

(3) -5 ____ -10 (4) 0.23 ____ 0.009 (5) -11 ____ 1 (6) 0.092 ____ 0.0920

Exploring Equivalent Equations

Home Link 6-7

NAME DATE TIME

(1) **a.** Use the Commutative Property (turn-around rule) to create an equivalent expression in which like terms are next to each other.

SRB 206, 216

$12k + 2 * 3 + 3k + 1$ _____

b. Combine like terms from Problem 1a and write a simplified equivalent expression. _____

Write the expressions in simplest form.

(2) $4a + 5 - a + 10$ _____

(3) $10(b + 5) + 15 + w$ _____

For Problems 4–5, identify the equations that are equivalent to the given equation. Circle ALL that apply.

(4) $6x + (7 - 2) * x = 8 + 3x - 4$

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

$6x + (7 - 2) * x = 3x + 12$

$11x = 3x + 4$

(5) $b + 2b - 10 = 10(b + 5) + 15 + b$

$3b - 10 = 10(b + 5) + 15 + b$

$b + 2b - 10 = 10b + 50 + 15b$

$b(1 + 2) - 10 = 10b + 50 + 15 + b$

(6) Use a bar model or pan-balance model to solve one of the equations you circled in Problem 4.

$x =$ _____

Practice

Multiply.

(7) $2\frac{1}{3} * \frac{3}{7} =$ _____

(8) $1\frac{2}{3} * 2\frac{1}{2} =$ _____

(9) _____ $= 3\frac{7}{10} * 2\frac{1}{4}$

(10) $5\frac{3}{4} * 4\frac{2}{5} =$ _____

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Comparing Racing Times

Home Link 6-8

NAME DATE TIME

Katya runs at a rate of 6.25 meters per second. Her younger cousin, Liova, runs 2.5 meters per second. Because Katya runs faster than Liova, she gives Liova a 100-meter head start in a 200-meter race.

(1) Using the variable t to represent the number of seconds, write two expressions—one for Katya and one for Liova—that model how far from the start line they will be after t seconds.

Expression for Katya: _____ Expression for Liova: _____

(2) Use your expressions from Problem 1 to figure out who will win the race. Show your work and explain your answer.

Winner: _____

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Practice

Solve.

(3) 5% of 66 is _____.

(4) 18% of 50 is _____.

(5) 45% of 120 is _____.

(6) 90% of 8,000 is _____.

Using Inverse Operations

Home Link 6-9

NAME DATE TIME

SRB 219-220

(1) Linda has a secret number.
She doubles the number, adds 5, and then subtracts 7. Her result is 8.

What was her original secret number? _____

Explain what you did to find her secret number.

_____

_____

For Problems 2–5, solve the equations using the inverse-operations strategy. Show all of your steps and check your work.

(2) $257 = a - 105$

Check:

(3) $12 = \frac{r}{4}$

Check:

(4) $j + 3\frac{3}{4} = 8$

Check:

(5) $6.72 = 4u$

Check:

Practice

Write a unit rate for each rate below.

(6) 55 pages in 10 minutes _____

(7) $46.50 for 6 hours _____

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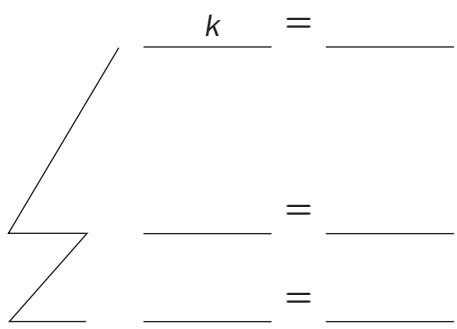
Solving Pan-Balance Equations

Home Link 6-10 SRB 217-218

NAME DATE TIME

1. Build an equation with two operations that is equivalent to the equation $k = 19$. Record the operations that you use to create each equation below.

Original equation:
Operation (in words)



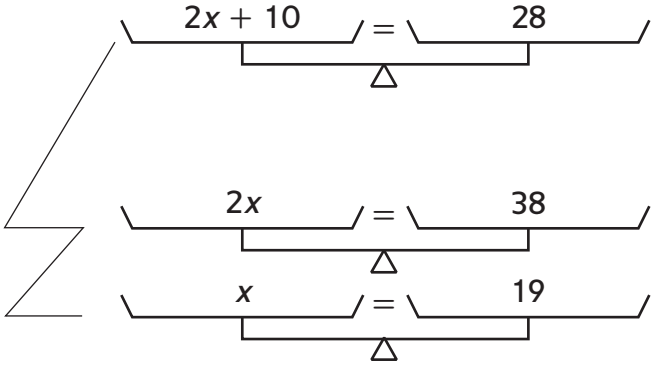
2. Check that 19 is a solution to your equations.

3. Find the mistake in the work below.

Original pan-balance equation:
Operation (in words)

Subtract 10.

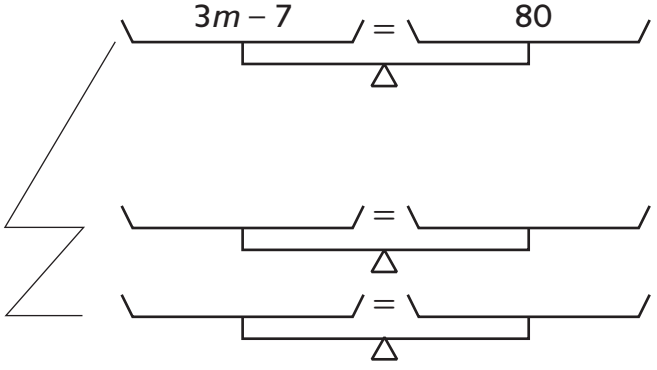
Divide by 2.



Describe the mistake and how to correct it.

4. Record the operations you use to create equivalent equations and solve the equation.

Original equation:
Operation (in words)



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Solving Multistep Equations

Home Link 6-11

NAME DATE TIME

Solve the equations below. Use each of these strategies once:

Trial and Error Bar Model Pan-Balance Model Inverse-Operations Strategy

SRB 214-220

Plan ahead to make sure you use the strategy or model that you think works better for each equation.

(1) $54 = 4m + 2$

Strategy: _____

Solution: _____

(2) $6n + 8 = 10n + 4$

Strategy: _____

Solution: _____

(3) $3p + 3 = 2p + 4.5$

Strategy: _____

Solution: _____

(4) $\frac{2}{3}q + 8 = q - 10$

Strategy: _____

Solution: _____

Practice List the numbers in order from least to greatest.

(5) $\frac{9}{4}$, 2.35, $\frac{1}{8}$, 1.5, $\frac{3}{8}$

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