## Chapter <br> 8 Letter

Dear Family,
Throughout the next few weeks, our math class will be learning about equations and inequalities. We will be learning how to write, model, and solve equations, and how to graph solutions to inequalities.
You can expect to see homework on writing and solving equations and inequalities.

Here is a sample of how your child was taught to solve a subtraction equation.

## ? MODEL Solve Subtraction Equations

## Vocabulary

equation A statement that two mathematical expressions are equal.
inverse operations Operations that undo each other, such as addition and subtraction or multiplication and division.
solution of an equation A value of a variable that makes an equation true.

## tips

Solve the equation $m-5=7$.

## STEP 1

Write the equation.
STEP 2
Use the Addition Property of Equality.

## STEP 3

Add.

$$
\begin{gathered}
m-5=7 \\
m-5+5=7+5 \\
m=12
\end{gathered}
$$

## Checking Solutions

You can check the solution of an equation by substituting the value of the variable in the original equation. If the solution is correct, the two sides of the equation will be equal.

## Activity

Pay attention to everyday situations that can be expressed as an equation.
For example, "We bought 5 packages of pens at a discount store. We have a total of 40 pens. How many pens are in each package?" Write and solve an equation to answer the question.

Querida familia,
Durante las próximas semanas, en la clase de matemáticas aprenderemos sobre ecuaciones y desigualdades. También aprenderemos a escribir, modelar y resolver ecuaciones, y representar gráficamente las soluciones a las desigualdades.

Llevaré a la casa tareas para practicar el planteamiento y la solución de ecuaciones y desigualdades.

Este es un ejemplo de la manera como aprenderemos a resolver una ecuación de resta.

## Vocabulario

ecuación Una afirmación que señala que dos expresiones matemáticas son iguales.
operaciones inversas Operaciones que se cancelan entre ellas, como la suma y la resta, o la multiplicación y la división.
solución de una ecuación Un valor de una variable que hace verdadera una ecuación.

## MODELO Resolver ecuaciones de resta

Resuelve la ecuación $m-5=7$.

## PASO 1

Escribe la ecuación.

## PASO 2

Usa la Propiedad de Suma de la Igualdad.

$$
m-5+5=7+5
$$

## Comprobar soluciones

Puedes comprobar la solución de una ecuación substituyendo el valor de la variable en la ecuación original. Si la solución es correcta, los dos lados de la ecuación serán iguales.

## PASO 3

Suma.

$$
m=12
$$

## Actividad

Preste atención a situaciones de la vida diaria que se puedan expresar como una ecuación. Por ejemplo: "Compramos 5 paquetes de bolígrafos en una tienda de descuento. Tenemos un total de 40 bolígrafos. ¿Cuántos bolígrafos hay en cada paquete?" Escriba y resuelva una ecuación para responder la pregunta.

Name $\qquad$

## Solutions of Equations

COMMON CORE STANDARD—6.EE. 5
Reason about and solve one-variable equations and inequalities.
Determine whether the given value of the variable is a solution of the equation.

1. $x-7+15 ; x=8$

$-7 \stackrel{?}{\underline{ }} 15$

2. $\frac{1}{3} h=6 ; h=2$
3. $a-1=70 ; a=71$
4. $\frac{7}{8}+j=1 ; j=\frac{1}{8}$
5. $16.1+d=22 ; d=6.1$
6. $9=\frac{3}{4} e ; e=12$
7. $15.5-y=7.9 ; y=8.4$

## Problem Solving

10. Terrance needs to score 25 points to win a game. He has already scored 18 points. The equation $18+p=25$ gives the number of points $p$ that Terrance still needs to score. Determine whether $p=7$ or $p=13$ is a solution of the equation, and tell what the solution means.
11. Madeline has used 50 sheets of a roll of paper towels, which is $\frac{5}{8}$ of the entire roll. The equation $\frac{5}{8} s=50$ can be used to find the number of sheets $s$ in a full roll. Determine whether $s=32$ or $s=80$ is a solution of the equation, and tell what the solution means.
$\qquad$
$\qquad$
$\qquad$
$\qquad$

## Lesson Check (6.Ee.5)

1. Sheena received a gift card for $\$ 50$. She has already used it to buy a lamp for $\$ 39.99$. The equation $39.99+x=50$ can be used to find the amount $x$ that is left on the gift card. What is the solution of the equation?
2. When Pete had a fever, his temperature was $101.4^{\circ} \mathrm{F}$. After taking some medicine, his temperature was $99.2^{\circ} \mathrm{F}$. The equation $101.4-d=99.2$ gives the number of degrees $d$ that Pete's temperature decreased. What is the solution of the equation?
$\qquad$

## Spiral Review (6.RP.3c, 6.EE.1, 6.EE.4, 6.E..6)

3. Melanie has saved $\$ 60$ so far to buy a lawn mower. This is $20 \%$ of the price of the lawn mower. What is the full price of the lawn mower that she wants to buy?
4. Andrew made $p$ picture frames. He sold 2 of them at a craft fair. Write an expression that could be used to find the number of picture frames Andrew has left.
$\qquad$
$\qquad$
$\qquad$
$\square$
$\qquad$
5. Write an expression that is equivalent to
$4+3(5+x)$.
$\qquad$

## Write Equations

COMMON CORE STANDARD—6.EE. 7
Reason about and solve one-variable equations and inequalities.

## Write an equation for the word sentence.

1. 18 is 4.5 times a number.

## $18=4.5 n$

3. The difference of a number and $\frac{2}{3}$ is $\frac{3}{8}$.
4. A number divided by 0.5 is 29 .

## Write a word sentence for the equation.

7. $x-14=52$
8. $25=k \div 5$

## Problem Solving

11. An ostrich egg weighs 2.9 pounds. The difference between the weight of this egg and the weight of an emu egg is 1.6 pounds. Write an equation that could be used to find the weight $w$, in pounds, of the emu egg.
12. Eight more than the number of children is 24 .
13. $m$ minutes less than 80 minutes is 15 minutes.
14. The product of the number of songs and $\$ 0.99$ is $\$ 7.92$.
$\qquad$
15. $2.3 m=0.46$
16. $4 \frac{1}{3}+q=5 \frac{1}{6}$
17. In one week, the number of bowls a potter made was 6 times the number of plates. He made 90 bowls during the week. Write an equation that could be used to find the number of plates $p$ that the potter made.

## Lesson Check (6.EE.7)

1. Three friends are sharing the cost of a bucket of popcorn. The total cost of the popcorn is $\$ 5.70$. Write an equation that could be used to find the amount $a$ in dollars that each friend should pay.

## Spiral Review (6.RP3d, 6.E.E., 6.EE. $\mathbf{3}$. GEE.5)

3. A rope is 72 feet long. What is the length of the rope in yards?
4. The sides of a triangle have lengths $s, s+4$, and $3 s$. Write an expression in simplest form that represents the perimeter of the triangle.
5. Gary knows that $p=2 \frac{1}{2}$ is a solution to one of the following equations. Which one has $p=2 \frac{1}{2}$ as its solution?

$$
\begin{array}{ll}
p+2 \frac{1}{2}=5 & p-2 \frac{1}{2}=5 \\
2+p=2 \frac{1}{2} & 4-p=2 \frac{1}{2}
\end{array}
$$

Name

## Model and Solve Addition Equations

## Model and solve the equation by using algebra tiles.

1. $x+6=9$
2. $x+5=6$
3. $9=x+1$

$$
x=3
$$

4. $8+x=10$
5. $x+7=11$
6. $4=2+x$

Solve the equation by drawing a model.
7. $x+4=7$

- $\qquad$
- 


## ppoblem Solving

9. The temperature at $10: 00$ was $10^{\circ} \mathrm{F}$. This is $3^{\circ} \mathrm{F}$ warmer than the temperature at $8: 00$. Model and solve the equation $x+3=10$ to find the temperature $x$ in degrees Fahrenheit at 8:00.
10. $x+6=10$
11. Jaspar has 7 more checkers left than Karen does. Jaspar has 9 checkers left. Write and solve an addition equation to find out how many checkers Karen has left.

## Lesson Check (6.EE.7)

1. What is the solution of the equation that is modeled by the algebra tiles?

2. Alice has played soccer for 8 more years than Sanjay has. Alice has played for 12 years. The equation $y+8=12$ can be used to find the number of years $y$ Sanjay has played. How long has Sanjay played soccer?
$\qquad$

3. A car's gas tank has a capacity of 16 gallons. What is the capacity of the tank in pints?
4. Simplify $3 x+2(4 y+x)$.
5. Craig scored $p$ points in a game. Marla scored twice as many points as Craig but 5 fewer than Nelson scored. How many points did Nelson score?
6. The Empire State Building in New York City is 443.2 meters tall. This is 119.2 meters taller than the Eiffel Tower in Paris. Write an equation that can be used to find the height $h$ in meters of the Eiffel Tower.

Name

## Solve Addition and Subtraction Equations

Solve the equation, and check the solution.

1. $y-14=23$
2. $x+3=15$
3. $n+\frac{2}{5}=\frac{4}{5}$

$$
\begin{aligned}
& y-14+14=23+14 \\
& y=37 \\
& \hline
\end{aligned}
$$

4. $16=m-14$
5. $w-13.7=22.8$
6. $s+55=55$
7. $23=x-12$
8. $p-14=14$
9. $m-2 \frac{3}{4}=6 \frac{1}{2}$
10. $t+0.95=1.25$
11. $3 \frac{1}{3}=b-\frac{2}{3}$
12. $48=d+23$

## Problem Solving

13. A recipe calls for $5 \frac{1}{2}$ cups of flour. Lorenzo only has $3 \frac{3}{4}$ cups of flour. Write and solve an equation to find the additional amount of flour Lorenzo needs to make the recipe.
14. Jan used 22.5 gallons of water in the shower. This amount is 7.5 gallons less than the amount she used for washing clothes. Write and solve an equation to find the amount of water Jan used to wash clothes.

## Lesson Check (6.EE.7)

1. The price tag on a shirt says $\$ 21.50$. The final cost of the shirt, including sales tax, is $\$ 23.22$. The equation $21.50+t=23.22$ can be used to find the amount of sales tax $t$ in dollars. What is the sales tax?
2. The equation $l-12.5=48.6$ can be used to find the original length $l$ in centimeters of a wire before it was cut. What was the original length of the wire?
$\qquad$

Spiral Review (6.RP.3d, 6.Ee.2b, 6.EE.4, 6.Ee.7)
3. How would you convert a mass in centigrams to a mass in milligrams?
5. Write an expression that is equivalent to $10 c$.
6. Miranda bought a movie ticket and popcorn for a total of $\$ 10$. The equation $7+x=10$ can be used to find the cost $x$ in dollars of the popcorn. How much did the popcorn cost?
$\qquad$
$\qquad$
$\qquad$

Name $\qquad$

## Model and Solve Multiplication Equations

Model and solve the equation by using algebra tiles.

1. $2 x=8$
2. $5 x=10$
3. $21=3 x$

$$
x=4
$$

4. $4 x=20$
5. $6 x=6$
6. $4=2 x$

Solve the equation by drawing a model.
7. $6=3 x$
8. $4 x=12$

## Problem Solving

9. A chef used 20 eggs to make 5 omelets. Model and solve the equation $5 x=20$ to find the number of eggs $x$ in each omelet.
10. Last month, Julio played 3 times as many video games as Scott did. Julio played 18 video games. Write and solve an equation to find the number of video games Scott played.

## Lesson Check (6.EE.7)

1. What is the solution of the equation that is modeled by the algebra tiles?


## Spiral Review (6.RP.3d, 6.EE.2c, 6.E.5.5, 6.EE.7)

3. A rectangle is 12 feet wide and 96 inches long. What is the area of the rectangle?
4. Carlos bought 5 tickets to a play for a total of $\$ 20$. The equation $5 c=20$ can be used to find the $\operatorname{cost} c$ in dollars of each ticket. How much does each ticket cost?
$\qquad$
5. Evaluate the algebraic expression $24-x \div y$ for $x=8$ and $y=2$.
6. A pet store usually keeps 12 birds per cage, and there are 7 birds in the cage now. The equation $7+x=12$ can be used to find the remaining number of birds $x$ that can be placed in the cage. What is the solution of the equation?

Name

## Solve Multiplication and Division Equations

COMMON CORE STANDARD—6.EE. 7
Reason about and solve one-variable equations and inequalities.
Solve the equation, and check the solution.

1. $8 p=96$
2. $\frac{z}{16}=8$
3. $3.5 x=14.7$

$$
\begin{aligned}
& \frac{8 p}{8}=\frac{96}{8} \\
& p=12
\end{aligned}
$$

4. $32=3.2 c$
5. $\frac{2}{5} w=40$
6. $\frac{a}{14}=6.8$
7. $1.6 x=1.6$
8. $23.8=3.5 b$
9. $\frac{3}{5}=\frac{2}{3} t$
10. $\frac{x}{7}=0$
11. $4 n=9$
12. $\frac{3}{4} g=\frac{5}{8}$

## Ppoblem Solving

13. Anne runs 6 laps on a track. She runs a total of 1 mile, or 5,280 feet. Write and solve an equation to find the distance, in feet, that she runs in each lap.
14. DeShawn uses $\frac{3}{4}$ of a box of rice to cook dinner. The portion he uses weighs 12 ounces. Write and solve an equation to find the weight of the full box of rice.

## Lesson Check (6.EE.7)

1. Estella buys 1.8 pounds of walnuts for a total of $\$ 5.04$. She solves the equation $1.8 p=5.04$ to find the price $p$ in dollars of one pound of walnuts. What does one pound of walnuts cost?
2. Gabriel wants to solve the equation $\frac{5}{8} m=25$. What step should he do to get $m$ by itself on one side of the equation?

## Spiral Review (6.r.P.3d, 6.EE.6, 6.EE.7)

3. At top speed, a coyote can run at a speed of 44 miles per hour. If a coyote could maintain its top speed, how far could it run in 15 minutes?
4. A ring costs $\$ 27$ more than a pair of earrings. The ring costs $\$ 90$. Write an equation that can be used to find the cost $c$ in dollars of the earrings.
5. An online store sells DVDs for $\$ 10$ each. The shipping charge for an entire order is $\$ 5.50$. Frank orders $d$ DVDs. Write an expression that represents the total cost of Frank's DVDs.
6. The equation $3 s=21$ can be used to find the number of students $s$ in each van on a field trip. How many students are in each van?

Name

## Problem Solving•Equations with Fractions

## Read each problem and solve.

1. Stu is 4 feet tall. This height represents $\frac{6}{7}$ of his brother's height. The equation $\frac{6}{7} h=4$ can be used to find the height $h$, in feet, of Stu's brother. How tall is

$$
\begin{aligned}
& 7 \times \frac{6}{7} h=7 \times 4 \\
& 6 h=28 \\
& \frac{6 h}{6}=\frac{28}{6} \\
& h=4 \frac{2}{3} \\
& 4 \frac{2}{3} \text { feet }
\end{aligned}
$$

Stu's brother?
2. Bryce bought a bag of cashews. He served $\frac{7}{8}$ pound of cashews at a party. This amount represents $\frac{2}{3}$ of the entire bag. The equation $\frac{2}{3} n=\frac{7}{8}$ can be used to find the number of pounds $n$ in a full bag. How many pounds of cashews were in the bag that Bryce bought?
3. In Jaime's math class, 9 students chose soccer as their favorite sport. This amount represents $\frac{3}{8}$ of the entire class. The equation $\frac{3}{8} s=9$ can be used to find the total number of students $s$ in Jaime's class. How many students are in Jaime's math class?
4. There are 15 blueberry muffins in a large basket. This represents $\frac{5}{9}$ of all the muffins that are in the basket. The equation $\frac{5}{9} m=15$ can be used to find the total number of muffins $m$ in the basket. How many muffins are in the basket?

## Lesson Check (6.EE.7)

1. Roger served $\frac{5}{8}$ pound of crackers, which was $\frac{2}{3}$ of the entire box. What was the weight of the crackers originally in the box?
2. Bowser ate $4 \frac{1}{2}$ pounds of dog food. That amount is $\frac{3}{4}$ of the entire bag of dog food. How many pounds of dog food were originally in the bag?

Spiral Review (6.Ns. 1, .RRP3d, 6.EE.2a, 6.EE.7)
3. What is the quotient $4 \frac{2}{3} \div 4 \frac{1}{5}$ ?
5. The amount Denise charges to repair computers is $\$ 50$ an hour plus a $\$ 25$ service fee. Write an expression to show how much she will charge for $h$ hours of work.
4. Miranda had 4 pounds, 6 ounces of clay. She divided it into 10 equal parts. How heavy was each part?
6. Luis has saved $\$ 14$ for a skateboard that costs $\$ 52$. He can use the equation $14+m=52$ to find how much more he needs. How much more does he need?

## Lesson 8.8

Name $\qquad$

## Solutions of Inequalities

COMMON CORE STANDARD—6.EE. 5
Reason about and solve one-variable equations and inequalities.
Determine whether the given value of the variable is a solution of the inequality.

1. $s \geq^{-} 1 ; s=1$
$1 \stackrel{?}{\gtrless}-1$

## solution

2. $p<0 ; p=4$
3. $y \leq{ }^{-} 3 ; y={ }^{-} 1$
4. $u>-\frac{1}{2} ; u=0$
5. $q \geq 0.6 ; q=0.23$
6. $b<2 \frac{3}{4} ; b=\frac{2}{3}$
7. $j \leq{ }^{-} 5.7 ; j={ }^{-} 6$
8. $a>{ }^{-} 8 ; a={ }^{-} 7.5$
9. $w \geq 4.5 ; w=4.45$

Give two solutions of the inequality.
10. $k<2$
11. $z \geq^{-} 3$
12. $f \leq{ }^{-} 5$

## Problem Solving


13. The inequality $s \geq 92$ represents the score $s$ that Jared must earn on his next test to get an A on his report card. Give two possible scores that Jared could earn to get the A.
14. The inequality $m \leq \$ 20$ represents the amount of money that Sheila is allowed to spend on a new hat. Give two possible money amounts that Sheila could spend on the hat.

## Lesson Check (6.EE.5)

1. Three of the following are solutions of $g<-1 \frac{1}{2}$. Which one is not a solution?
$g=-4$
$g=-7 \frac{1}{2}$
$g=0$
$g=-2 \frac{1}{2}$

## Spiral Review (6.EE.1, 6.E.-3, 6.EE.7)

3. What is the value of $8+(27 \div 9)^{2}$ ?
4. Tina bought a t-shirt and sandals. The total cost was $\$ 41.50$. The $t$-shirt cost $\$ 8.95$. The equation $8.95+c=41.50$ can be used to find the cost $c$ in dollars of the sandals. How much did the sandals cost?
5. The inequality $w \geq 3.2$ represents the weight of each pumpkin, in pounds, that is allowed to be picked to be sold. The weights of pumpkins are listed. How many pumpkins can be sold? Which pumpkins can be sold?
$3.18 \mathrm{lb}, 4 \mathrm{lb}, 3.2 \mathrm{lb}, 3.4 \mathrm{lb}, 3.15 \mathrm{lb}$
$\qquad$
$\qquad$
6. Write an expression that is equivalent to $5(3 x+2 z)$.
7. Two-thirds of a number is equal to 20 . What is the number?
$\qquad$

Write an inequality for the word sentence. Tell what type of numbers the variable in the inequality can represent.

1. The width $w$ is greater than 4 centimeters.

The inequality symbol for "is greater than" is $>$.
$w>4$, where $w$ is the width in centimeters. $w$ is

## a positive number.

2. The score $s$ in a basketball game is greater than or equal to 10 points.
$\qquad$
$\qquad$
3. The height $h$ is greater than 2.5 meters.

Write a word sentence for the inequality.
6. $k<{ }^{-} 7$
8. $m \leq 2 \frac{3}{5}$

Problem Solving
10. Tabby's mom says that she must read for at least 30 minutes each night. If $m$ represents the number of minutes reading, what inequality can represent this situation?
3. The mass $m$ is less than 5 kilograms.
5. The temperature $t$ is less than or equal to ${ }^{-} 3^{\circ}$.
7. $z \geq 14$
9. $f>0.24$
11. Phillip has a $\$ 25$ gift card to his favorite restaurant. He wants to use the gift card to buy lunch. If $c$ represents the cost of his lunch, what inequality can describe all of the possible amounts of money, in dollars, that Phillip can spend on lunch?

## Lesson Check (6.EE.8)

1. At the end of the first round in a quiz show, Jeremy has at most ${ }^{-} 20$ points. Write an inequality that means "at most ${ }^{-} 20$ ".

## Spiral Review (6.E.E.2a, 6.EE.4, 6.EE.5, 6.EE.7)

3. Let $y$ represent Jaron's age in years. If Dawn were 5 years older, she would be Jaron's age. Which expression represents Dawn's age?
4. What is the solution of the equation $8=8 f$ ?
5. Describes the meaning of $y \geq 7.9$ in words.
$\qquad$
$\qquad$
$\qquad$
6. Simplify the expression $7 \times 3 g$.
7. Which of the following are solutions of the inequality $k \leq{ }^{-} 2$ ?

$$
k=0, k={ }^{-} 2, k={ }^{-} 4, k=1, k={ }^{-} 1 \frac{1}{2}
$$

## Graph Inequalities

## Graph the inequality.

1. $h \geq 3$

Draw a filled-in circle at 3 to show that 3 is a solution. Shade to the $\square$ of 3 to show that values greater than 3 are solutions.
2. $x<\frac{-4}{5}$

4. $b<8$

6. $n \geq 1 \frac{1}{2}$


## Write the inequality represented by the graph.

8. 



## Problem Solving

10. The inequality $x \leq 2$ represents the elevation $x$ of a certain object found at a dig site. Graph the solutions of the inequality on the number line.


COMMON CORE STANDARD—6.EE. 8
Reason about and solve one-variable equations and inequalities.
3. $y>-2$

5. $m \leq 3$

7. $c \leq{ }^{-} 0.4$

9.

11. The inequality $x \geq 144$ represents the possible scores $x$ needed to pass a certain test. Graph the solutions of the inequality on the number line.


## Lesson Check (6.EE.8)

1. Write the inequality that is shown by the graph.

$\qquad$
$\qquad$

## Spiral Review (6.EE.2b, 6.EE.5, 6.EE.7, 6.EE.8)

3. Write an expression that shows the product of 5 and the difference of 12 and 9 .
4. The equation $12 x=96$ gives the number of egg cartons $x$ needed to package 96 eggs. Solve the equation to find the number of cartons needed.
5. What is the solution of the equation $8.7+n=15.1$.
6. The lowest price on an MP3 song is $\$ 0.35$. Write an inequality that represents the cost $c$ of an MP3 song.
