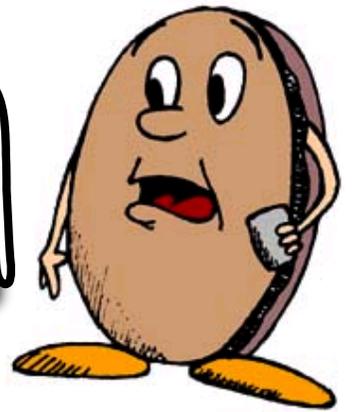


# Menu Math



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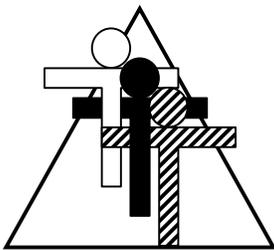
## A Seven-Course Meal For Teaching Algebra Readiness To Absolutely Everyone!

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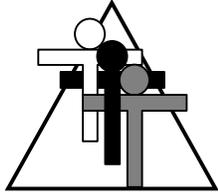
Adapted from

### SIMPLY GREAT MATH ACTIVITIES: ALGEBRA READINESS

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by Brad Fulton and Bill Lombard  
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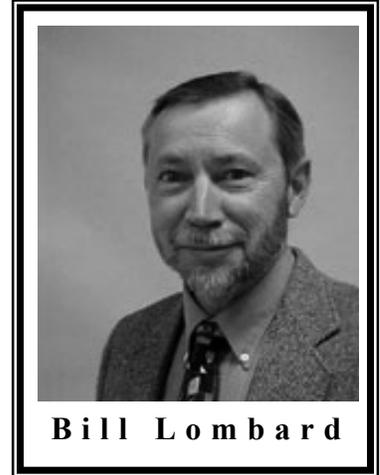
Brad Fulton and Bill Lombard  
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*“Building Mathematical Skill on a Foundation of Understanding”*



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Known throughout the country for motivating and engaging teachers and students, Brad and Bill have authored over ten books that provide easy-to-teach yet mathematically-rich activities for busy teachers. In addition, they have co-authored six teacher training manuals full of activities and ideas that help teachers who believe mathematics must be both meaningful and powerful.

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Happy surfing!

## ACTIVITY 4

### Materials:

- paper
- transparency of activity master

# Menu Math

**Overview:** This activity is so easy to teach you might feel guilty for taking a paycheck! Students will quickly pick up on the meaning and use of variables and will be able to substitute values into formulas to solve them.

**Vocabulary:** variable, formula

## PROCEDURE

### Skills:

- Using variables
- Solving equations
- Problem solving
- Distributive Property

1. Display the transparency master on the overhead projector as the students get out paper. Use a paper to cover the formulas, revealing only the menu at this time.

2. Slide the paper down to reveal the first formula:

$$h + f = ?$$

Students will raise their hands to tell the answer. One will say, "Two dollars and ninety cents!" Ask the student, "What do you mean?" The response will be that a burger and fry cost two dollars and ninety cents. Ask how the student arrived at that answer. Everyone will think it is obvious that the "h" stands for hamburger and the "f" must represent fries.

3. Display the second formula:

$$c + f + s = ?$$

Again a student will volunteer to explain that a cheeseburger, fries, and small soda costs \$4.15. You may wish to ask how the student decided that the "s" must stand for "small" and not for "soda". Again, the class will see that this is the obvious way to interpret the formula since there are three sizes of sodas.

4. Reveal the third formula:

$$7f = ?$$

Students will say that the cost is now \$7.35. Ask the class how they got that answer. Someone will say that you need to multiply seven times \$1.05. Ask why the student decided to multiply when the formula had no multiplication sign in it? Most students will think the answer is obvious. No other operation would make sense.

5. At this stage, students can solve the next two formulas for further practice.

6. The final formula requires students to solve for an unknown, which is letter “d” in this case. Once they realize that the “d” is equal to \$1.55, they should see that it represents a large soda. You can then ask what the “d” might stand for. Someone may suggest it stands for “drink”.

7. At this point, continue to ask the students to solve more complex formulas and equations depending on their ability. Some samples are given here:

$$\begin{aligned}3c + 5f + 6s &= & 6f + 4s &= \\8h + 4f + 6x &= & 11c + 8m + 2x &= \\5c + 2h + m + 2s &= & 3h + 2s + m &= \\3h + s &= 2c + d & \text{(What does } d = ?\text{)}\end{aligned}$$

Jason gave the clerk a ten dollar bill and received \$3.95 in change. What might he have ordered?



### Journal Prompts:



Here is a formula for an order at a restaurant. Write the dialog the customer may have used when placing the order.

$$2h + c + 3f + 2x + m$$

### Homework:



Ask students to make up formulas and solve them. These formulas can be created toward the end of class and then copied down by the students to be solved for homework.

### Taking a Closer Look:



If you had ten dollars, what different combinations of food could you order? Try to spend as much of the money on each order without exceeding \$10.00. Write each answer as an equation. For example:

### Good Tip!



Students can create their own menus and formulas and exchange them with a partner.

$$3h + 3f + m = \$9.95$$

Ask the students to solve this formula:

$$4h + 4s + 4x =$$

This formula can be used to illustrate the distributive property by solving  $4(h + s + x) =$  and seeing that the same answer results. You can then have the students practice the distributive property by solving similar formulas.

**Assessment:**



Students can verify each other's formulas if working in groups.  
Homework can be checked through a class discussion.

## Menu Math

Hamburger .....	\$1.85
Cheeseburger .....	\$2.15
Fries .....	\$1.05
Sodas:	
Small .....	\$.95
Medium .....	\$1.25
Large .....	\$1.55
Extra Large .....	\$2.05

$$h + f =$$

$$c + f + s =$$

$$7f =$$

$$3h + c + f + 3x =$$

$$4c + 3f + s + m + l =$$

$$3c + 3d = \$11.10 \quad \text{What does } d = ?$$

Write what each customer ordered and calculate how much was paid for each order:

$$3h + 3f =$$

$$3h + f =$$

$$3(h + f) =$$

Which two customers ordered the same food and paid the same price? Write the two orders below:

$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

This is called the "Distributive Property."

*Write the following orders as algebraic expressions.*

I'd like four hamburgers, six orders of French fries, a large soda, two medium sodas, and an extra large soda.

I want three cheeseburgers, one hamburger, a small soda, two fries, a medium soda, and another hamburger.

I want a cheeseburger and an order of fries with a medium soda, my son wants two hamburgers an order of fries, and a medium soda, and my daughter wants a cheeseburger, an order of fries and a large soda. Oh yes, my husband wants two orders of fries, a cheeseburger and a large soda.

Let's see... I think I'd like three hamburgers and a cheeseburger, three fries, a large soda, two medium sodas, and an extra large soda. Add another order of fries on that, and make one of those hamburgers another cheeseburger.

*Write a dialog or skit for each of the following algebraic orders.*

$$3x + h + c$$

$$2h + 2f + 2m$$

$$(h + 2f) + (2c + x)$$

$$(3h + f + x) + (h + f + s)$$

$$(h + f + m) + (h + f + m) + (h + f + m)$$

$$(2c + f + x) + (2h + f + x)$$

*Different members of the same family placed the following orders. Simplify the orders by combining like items.*

$$(2h + f) + (c + f + s) + (h + m + f) =$$

$$(x + c) + (2f + c + x) + (m + 2f + c) =$$

$$(h + x + f) + (h + x + f) + (h + x + f) =$$

$$(3h + m) + (2c + f + m) + (c + m + 2f) =$$

$$(4c + f + m) + (3h + f + m) - h + c =$$

$$(3h + 2f + x) + (c + f + m) - (h + m + f) =$$

$$(5h + 3f + 2m) - (h + f + m) + (c + 2x) =$$

$$(3h + f + x) + (h + f + m) - (h + f) + c =$$

*Someone used the wrong letter in each of these orders. Can you solve the problem?*

$$h + 6w = \$8.15$$

$$8x + 5y = 27.15$$

$$4b + 6l = 13.10$$

$$3m + 6p + 5f = 20.10$$

$$7h + 2f + 3c - 2g = 17.15$$

$$4(h + m) + 6u = 21.70$$

$$8c + 7(s + z) = 19.40$$

*Can you find the price of a hamburger and of an order of fries at each of these restaurants?*

Restaurant A:

$$3h + 2f = \$11$$

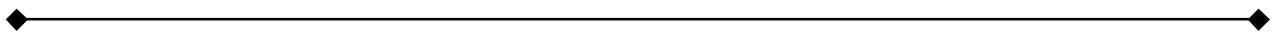
$$h + 2f = \$5$$



Restaurant B:

$$2h + 4f = \$12$$

$$3h + f = \$8$$



Restaurant C: What is the price of a cheeseburger?

$$2h + 3c + f = \$20$$

$$3h + 2c + f = \$19$$

$$h + 5c + 2f = \$27$$

*Something spilled on parts of these orders. What are the missing items?*

Quantity	Item	Subtotal
3	fries	\$3.15
6	hamb	
5		
Total:	\$24.50	

Quantity	Item	Subtotal
4	hamburger	\$7.40
2	ch	
5		5.25
2	\$	
4		
Total:	\$27.45	

# Menu Math

Name \_\_\_\_\_

Evaluate each expression using the menu.  
Show your work below each problem.

Hamburger .....	\$1.85
Cheeseburger.....	\$2.15
Fries .....	\$1.25
Sodas:	
Small .....	\$1.05
Medium .....	\$1.35
Large.....	\$1.65
Extra Large .....	\$1.95

1)  $h + f + m =$

2)  $l + c + x + f =$

3)  $4h =$

4)  $2c + f =$

5)  $6f + 3c + 2x - 2m =$

6)  $8x + 6m + 10c + 5l =$

7)  $4l + 4s + 4m =$

8)  $6c - 2c =$

9)  $6m + 3h + 2c - 4m =$

10)  $8f - 3h =$

11)  $3h - 4c =$

12)  $6x - 3s - 5c + 7h =$

Distribute the following orders and combine like terms.

1)  $4(h + m) =$

2)  $3(x + m + c) =$

3)  $7(2c) =$

4)  $5(3h + s) =$

5)  $8(2c + 4f + x) =$

6)  $4(3h + c + f + 5m) =$

7)  $13(2m + 2c - 4h) =$

8)  $7(3h - 5s + 12m) =$

9)  $-4(3c + f) =$

10)  $-6(4x + 2s - 3f) =$

11)  $-5(7h - c - 9l) =$

12) Evaluate problem number 4 by substituting the values from the menu.

13) Evaluate problem 7.

14) Which problems would have a negative value?

15) Which of these orders would not happen in reality?

Simplify these orders by combining like terms. When necessary, distribute first.

1)  $6h + 3c + h =$

2)  $2c + 3x + 5m + 4x + m =$

3)  $6c + 2f + 4c + 3x + f + 2m + 6x =$

4)  $3(m + h) + 2m =$

5)  $7s + 4(h + 2l) =$

6)  $3m + 6(h + 2m) + 5h + x =$

7)  $4(h + f + m) + 3(c + f + l) =$

8)  $2(5x) + 3c + 4(x + c) =$

9)  $5h + 6m + 3l + f + (h + f) - 2m =$

10)  $(c + x) + 3(h + x) + (2m + c) - h =$

11)  $7(h + 2m) + 2(x + h) + 3h + m - (h + x) =$

12)  $(2c + s) + 4h + 4(h + f + m) - 3(h + s) =$

13) Evaluate problem 8.

14) Evaluate problem 10.

15) Which two orders are identical?

Oops! Someone wrote the wrong letter on each order. Solve each equation to find out what the cook should make. Show your work neatly.

1)  $h + z = \$2.90$

2)  $6d = \$8.10$

3)  $v + 2c = \$5.35$

4)  $2r + 2f + m = \$7.55$

5)  $3(c + s) + t + 2s = \$13.35$

6)  $4p + 7(3c) = \$50.15$

7)  $2(h + 2l) + b = \$11.55$

8)  $4(h + 2x) - g = \$21.35$

9)  $6(h + f) + 5n - 3h = \$23.80$

10)  $4(c + w) = \$14$

If your students are a little younger, the following version of “Menu Math” should work well. They have been used in numerous 4<sup>th</sup> and 5<sup>th</sup> grade classrooms with great success.

By simplifying the menu prices to reflect more kid-friendly decimals, even younger learners can grasp the concepts we expect of much older students. Bon appetit!

# Menu Math

Hamburger .....	\$1.50
Cheeseburger .....	\$2.00
Fries .....	\$1.20
Sodas:	
Small .....	\$.75
Medium .....	\$1.25
Large .....	\$1.50
Extra Large .....	\$2.25

# Menu Math

Hamburger .....

Cheeseburger .....

Fries .....

Sodas:

    Small .....

    Medium .....

    Large .....

    Extra Large .....

Name \_\_\_\_\_

Date \_\_\_\_\_

Use your menu to evaluate each expression.

1.  $m + f =$

2.  $c + x =$

3.  $h + s + f =$

4.  $m + 2f =$

5.  $2h + l =$

6.  $3m + 2c + 4s =$

7.  $4m + 2m + m =$

8.  $3c + h + 3c =$

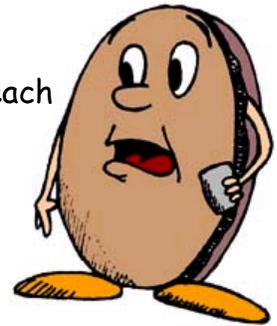
9.  $h + 3m + 3x + s =$

10.  $2h + 2c + 2m + 3f + 2x =$

Name \_\_\_\_\_

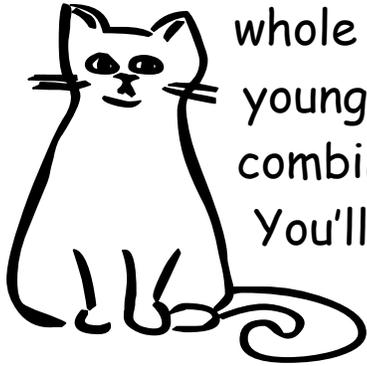
Date \_\_\_\_\_

Oops! Someone wrote these orders incorrectly. Can you identify each mystery item? Use your menu to help you.



- 1)  $c + d = \$3$
- 2)  $x + y + s = \$4.05$
- 3)  $10h + 6g = 19.50$
- 4)  $3h + r = \$6.50$
- 5)  $f + 2z = \$5.25$
- 6)  $20m + 10a + 15c = \$68$
- 7)  $2m + 2w = \$4.60$
- 8)  $2(c + m) + p = \$7.80$
- 9)  $2(m + 2h) + 2b = \$10.60$
- 10)  $3(h + n) + c + 2x = \$16.10$

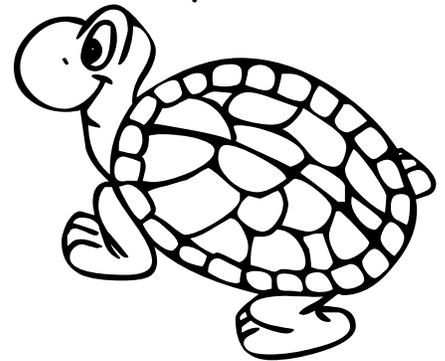
Do you teach primary children? No problem. They can do "Menu Math" too! We simply change the prices to



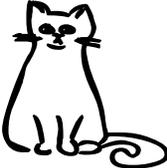
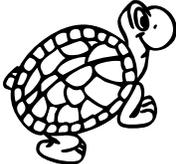
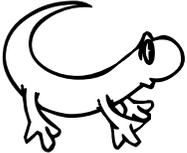
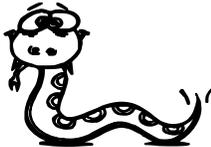
whole numbers from one to nine. Now even very young students can work with variables, combining like terms and even solving equations.

You'll see that the following worksheets will help them learn their ten pairs and even lay a foundation for their multiplication

facts. So don't hesitate-take them on an algebra field trip to "Al Jibra's Pet Store"!

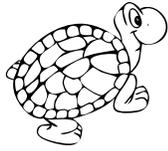


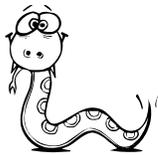
# Al Jibra's Pet Store

	Cats .....	\$7
	Dogs.....	\$9
	Rabbits .....	\$8
	Mice .....	\$2
	Birds.....	\$5
	Fish .....	\$1
	Turtles.....	\$3
	Geckos.....	\$6
	Snakes.....	\$4

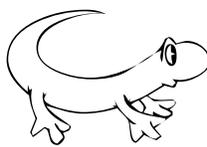
Name \_\_\_\_\_

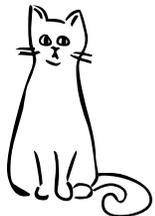
Use your pet store price list write a number sentence to solve each problem. Solve your number sentences.

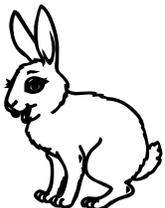
 +  = \_\_\_\_\_

 +  = \_\_\_\_\_

 +  = \_\_\_\_\_

 +  = \_\_\_\_\_

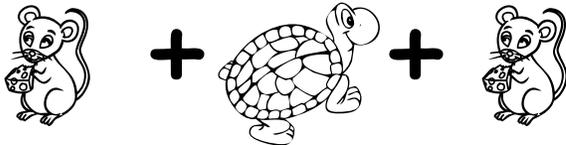
 +  = \_\_\_\_\_

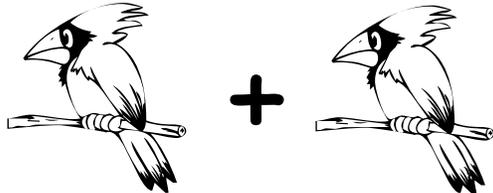
 +  = \_\_\_\_\_

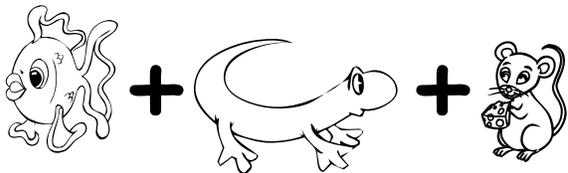
Name \_\_\_\_\_

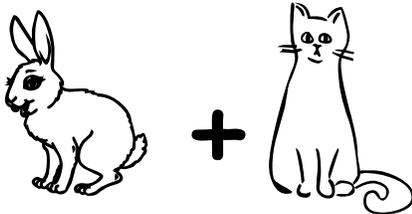
Use your pet store price list write a number sentence for each problem. Then solve them.

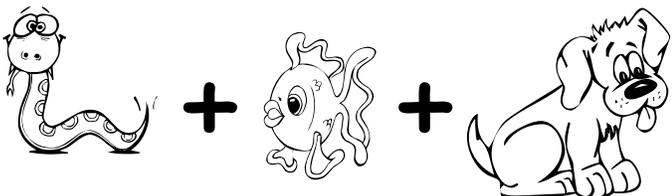
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 + + = \_\_\_\_\_

 + = \_\_\_\_\_

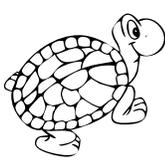
 + + = \_\_\_\_\_

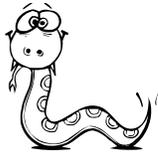
 + = \_\_\_\_\_

 + + = \_\_\_\_\_

Name \_\_\_\_\_

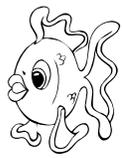
Use your pet store price list write a number sentence for each problem and solve it.

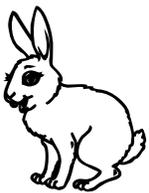
 -  = \_\_\_\_\_

 -  = \_\_\_\_\_

 -  = \_\_\_\_\_

 -  = \_\_\_\_\_

 -  = \_\_\_\_\_

 -  = \_\_\_\_\_

Name \_\_\_\_\_

Write the name of the missing pet in the blank.  
Use your pet store price list to help you.

$$\begin{array}{c} \text{fish} \\ + \\ \text{_____} \\ = \$4 \end{array}$$

$$\begin{array}{c} \text{cat} \\ + \\ \text{_____} \\ = \$9 \end{array}$$

$$\begin{array}{c} \text{snake} \\ + \\ \text{_____} \\ = \$10 \end{array}$$

$$\begin{array}{c} \text{_____} \\ + \\ \text{bird} \\ = \$10 \end{array}$$

$$\begin{array}{c} \text{_____} \\ + \\ \text{frog} \\ = \$9 \end{array}$$

$$\begin{array}{c} \text{_____} \\ + \\ \text{mouse} \\ = \$8 \end{array}$$

$$\begin{array}{c} \text{turtle} \\ + \\ \text{snake} \\ \text{_____} \\ = \$8 \end{array}$$

Name \_\_\_\_\_

Use your pet store price list write and solve a number sentence for each problem.

How much do two mice cost?

$$2 \text{  = \underline{\hspace{2cm}}$$

How much do five fish cost?

$$5 \text{  = \underline{\hspace{2cm}}$$

How much do three turtles cost?

$$3 \text{  = \underline{\hspace{2cm}}$$

How much do two birds cost?

$$2 \text{  = \underline{\hspace{2cm}}$$

How much do four mice cost?

$$4 \text{  = \underline{\hspace{2cm}}$$

How much do three snakes cost?

$$3 \text{  = \underline{\hspace{2cm}}$$

How much do two geckos cost?

$$2 \text{  = \underline{\hspace{2cm}}$$

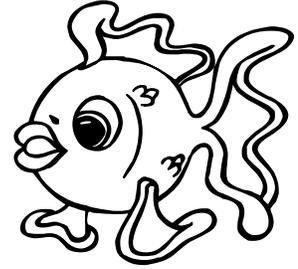
How much do two fish and one cat cost?

$$2 \text{  +  = \underline{\hspace{2cm}}$$

Name \_\_\_\_\_

Write a number sentence for each equation and solve it. The letters are the first letter of each pet's name.

$$c + f = \underline{\hspace{10em}}$$



$$f + r = \underline{\hspace{10em}}$$

$$m + m = \underline{\hspace{10em}}$$

$$m + g = \underline{\hspace{10em}}$$

$$s + f = \underline{\hspace{10em}}$$

$$s + s = \underline{\hspace{10em}}$$

$$b + t = \underline{\hspace{10em}}$$

$$c + s = \underline{\hspace{10em}}$$

$$d + d = \underline{\hspace{10em}}$$

$$b + r = \underline{\hspace{10em}}$$

Name \_\_\_\_\_

Use your pet store price list to find the cost of these sales. Write and solve the number sentence.



$$r + f + m = \underline{\hspace{2cm}}$$

$$f + c + f = \underline{\hspace{2cm}}$$

$$g + f + m = \underline{\hspace{2cm}}$$

$$t + t + t = \underline{\hspace{2cm}}$$

$$s + m + m + f = \underline{\hspace{2cm}}$$

$$c + f + f + f = \underline{\hspace{2cm}}$$

$$b + b + b = \underline{\hspace{2cm}}$$

$$b + s + t = \underline{\hspace{2cm}}$$

$$f + m + f + m = \underline{\hspace{2cm}}$$

$$m + s + m + s = \underline{\hspace{2cm}}$$

Name \_\_\_\_\_

Use your pet store price list to find the difference between the prices of these pets. Write and solve the number sentence.

$$c - m = \underline{\hspace{10em}}$$

$$r - c = \underline{\hspace{10em}}$$

$$g - b = \underline{\hspace{10em}}$$

$$r - f = \underline{\hspace{10em}}$$

$$r - t = \underline{\hspace{10em}}$$

$$b - s = \underline{\hspace{10em}}$$

$$d - c = \underline{\hspace{10em}}$$

$$c - b = \underline{\hspace{10em}}$$

$$c - f = \underline{\hspace{10em}}$$

$$r - r = \underline{\hspace{10em}}$$



Name \_\_\_\_\_

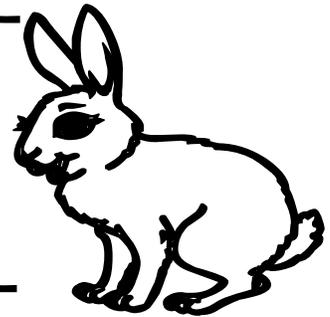
Write and solve the number sentence for each problem.

$$2m = \underline{\hspace{10em}}$$

$$3f = \underline{\hspace{10em}}$$

$$4f = \underline{\hspace{10em}}$$

$$3t = \underline{\hspace{10em}}$$



$$2s = \underline{\hspace{10em}}$$

$$5m = \underline{\hspace{10em}}$$

$$3b = \underline{\hspace{10em}}$$

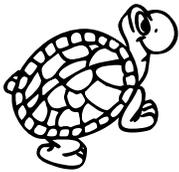
$$2s + f = \underline{\hspace{10em}}$$

$$2m + s = \underline{\hspace{10em}}$$

$$3f + 2m = \underline{\hspace{10em}}$$

Name \_\_\_\_\_

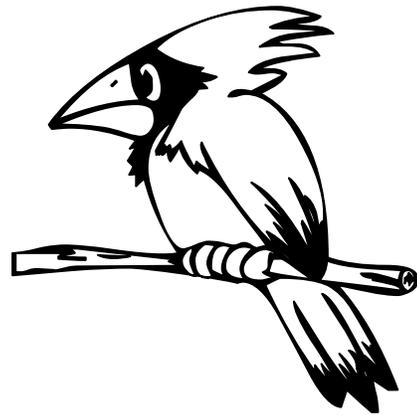
Brittany has ten dollars to spend at the pet store.  
Write equations to show what pets she could buy for  
ten dollars. One example has been done.



$$t + c = \$10$$

$$\underline{\quad} + \underline{\quad} + \underline{\quad} = \$10$$

$$\underline{\quad} + \underline{\quad} + \underline{\quad} = \$10$$



Name \_\_\_\_\_

Try to find the price of the missing pet using your price list.

$$r + \underline{\quad} = \$10$$

$$\underline{\quad} + s = \$7$$

$$b + \underline{\quad} = \$6$$

$$m + \underline{\quad} = \$9$$

$$\underline{\quad} + f = \$10$$

$$g + \underline{\quad} = \$8$$

$$f + f + \underline{\quad} = \$7$$

$$m + \underline{\quad} + f = \$10$$

$$2f + \underline{\quad} = \$5r$$

$$\underline{\quad} + 2m = \$9$$

