

## Variables and Expressions

Directions: First, underline key words and write the meaning on top if it is an operation.

Second, write an algebraic expression.

Third, evaluate the expression given the value of the variable.

1. Mary earns an allowance of \$5 per week. She also earns \$6 per hour baby-sitting. Write an expression that would represent the total amount of money she earns in one week. If Mary babysits for 6 hours, how much money will she make?

Expression: \_\_\_\_\_

Value of the variable: \_\_\_\_\_ = \_\_\_\_\_

Evaluate:

2. One Middle School sold tickets for a school play. The price of an adult ticket was \$5, and the price of a student ticket was \$3. Write an expression that represents the total amount of money collected. Suppose 150 adult tickets and 100 student tickets were sold. How much money was collected?

Expression: \_\_\_\_\_

Value of the variable: \_\_\_\_\_ = \_\_\_\_\_

Evaluate:

3. Ms. Li's car needs to be repaired. The cost of the repair is going to be \$90 per hour for labor and an additional \$220 for parts. Write an expression that would represent the cost of getting the car repaired if a mechanic works on it for  $h$  hours. Find the total cost if the mechanic works on the car for 4 hours.

Expression: \_\_\_\_\_

Value of the variable: \_\_\_\_\_ = \_\_\_\_\_

Evaluate:

4. The formula that is used to convert Fahrenheit (F) to Celsius (C) is  $5 \cdot (F - 32) \div 9$ . Convert  $77^{\circ}\text{F}$  to degrees in Celsius.

Expression: \_\_\_\_\_

Value of the variable: \_\_\_\_\_ = \_\_\_\_\_

Evaluate:

5. In order to encourage recycling, city of Taiyuan is offering 20 cents for every kilogram of newspapers collected, five cents per plastic bottle. Write an expression for the total amount earned from recycling. If Chen brings in ten kilograms of newspapers, 32 plastic bottles, how much will he receive?

Expression: \_\_\_\_\_

Value of the variable: \_\_\_\_\_ = \_\_\_\_\_

Evaluate:

6. Borders book store is advertising a sale. The price of hardback books is \$8.50 and the price of paperback books is \$4.50. Write an algebraic expression that can be used to find the total amount of money spent at the bookstore. Suppose Tom buys 6 hardback books and 4 paperback books. Find the total amount he spent at the book sale.

Expression: \_\_\_\_\_

Value of the variable: \_\_\_\_\_ = \_\_\_\_\_

Evaluate:

Using Variables

1. A car travels 55 miles per hour. Write an expression for how far the car will have traveled:

- a. After 3 hours                      a. \_\_\_\_\_
- b. After 5 hours                      b. \_\_\_\_\_
- c. After  $h$  hours                      c. \_\_\_\_\_

2. A plain pizza costs \$7.00. Each topping adds an extra cost of \$.50. How much does a pizza cost:

- a. With one topping                      a. \_\_\_\_\_
- b. With two toppings                      b. \_\_\_\_\_
- c. With  $n$  toppings                      c. \_\_\_\_\_

3. Jeff uses this rule to determine how many scoops of ice cream he needs to plan for his friends:

Number of Ice Cream Scoops = 2 times the number of friends

If he has 7 friends, how many scoops of ice cream does he need for his friends and himself?

Explain your reasoning.

# Mathematical Tasks

## Pencil Collections

Abby, Bill, Carol, D'Angelo and Ethan are comparing the amount of pencils that they each have.

Abby has  $A$  pencils.

Bill has 3 less than twice as many as Abby.

Carol has 4 less than the number of Abby's pencils squared.

D'Angelo has 8 more than half as many pencils as Abby.

Ethan has half as many as Abby's pencils squared.

Part 1:

Write an expression for each child to show their number of pencils in terms of the number of pencils that Abby has ( $A$ ).

Part 2:

Write an expression for the total number of pencils that all of the students have. After you write the expression, simplify it.

Part 3:

If Abby had 4 pencils how many pencils does each student have? How many pencils are there total? Show your work.

Part 4:

If each student doubled their amount of pencils, write an expression to show the total number of pencils in terms of the number of pencils that Abby has ( $A$ ). After you write the expression, simplify it. Then find the total number of pencils.

Part 5:

Write an explanation about how you solved Part 4.

# Mathematical Tasks

## The Oldest Pet

Shatzi, Buddy, and Rosie are all dogs in the neighborhood.

Shatzi is three years older than half of Rosie's age.

Buddy is four years younger than double Rosie's age.

Rosie's age can be represented by the letter  $R$ .

Part 1:

Write mathematical expressions for Shatzi's age and Buddy's age.

Part 2:

If Rosie is 4 years old, how old are Shatzi and Buddy?

Part 3:

Explain how you found the answers in Part 2.

# Mathematical Tasks

## Finding the Perimeter

The students in Mrs. Massey's class are exploring how to write the formula for the perimeter of a rectangle.

Part 1:

For each proposed formula, test the formula with two different examples to see if each formula is correct.

- Mike:  $2(l + w)$
- Beth:  $l + w + l + w$
- Sarah:  $2l + w$
- Tryone:  $2w + 2l$
- Phil:  $w^2 + l^2$

Part 2:

If both dimensions of a rectangle were tripled, what formula in terms of  $l$  and  $w$  could represent the perimeter of the new rectangle?

Part 3:

Write an explanation about how you solved Part 2.

# Planning a Trip to the Amazon

You are a biologist visiting the Amazon River for the first time. You have researched the Amazon before coming to South America, but this is the first time you will see it...smell it...touch it in person. You decide to explore all 4,000 miles of the Amazon River by swimming from the source to the mouth (where the river flows into the ocean). Before you take this adventure, you prepare yourself for the challenge ahead. Here are the considerations you take into account:



## Work the Math

**1 You are concerned about getting sunburned during your swim, so you plan on having your support crew give you sunblock to reapply every two hours.**

a. If you swim for  $h$  hours per day, how many times will you have to put on sunblock?

b. If you swim for 12 hours on Sunday, how many times will you have to put on sunblock?

**2 You plan on taking a snack break every 20 minutes of your swim.**

a. If you swim for  $h$  hours per day, how many times will you eat during your swim?

b. If you swim for 12 hours on Sunday, how many times will you eat during your swim?

**3 You estimate that you will burn 7,500 calories each day of your marathon swim.**

a. If you swim for  $d$  days, write an expression for how many calories you will burn in the entire swim.

b. If your swim takes you 73 days, how many calories will you burn during your entire adventure?

c. If your swim takes you 64 days, how many calories will you burn during your entire adventure?

**4 The Amazon rain forest is about 17 times the size of the United Kingdom and Ireland put together.**

a. Write an expression to represent the relationship between the Amazon rain forest and the U.K. and Ireland.

b. If the Amazon rain forest measures about 5.5 million square kilometers, about how big is the U.K. and Ireland?

**5 The average rainfall in the Amazon basin is about 2,300 millimeters (mm) per year.**

a. Write an expression to represent the amount of rain that falls in the Amazon basin for a given number of years.

b. If you are in the Amazon rain forest for three months, about how much rain will fall there during that time?