Your Notes

Checkpoint Evaluate the expression.

1. $10 + 3^2$	**2.** $16 - 2^3 + 4$
3. $28 \div 2^2 + 1$	**4.** $4 \cdot 5^2 + 4$

Example 2 *Evaluate expressions with grouping symbols*

Evaluate the expression.

Grouping symbols such as parentheses ( ) and brackets [ ] indicate that operations inside the grouping symbols should be performed first.

a. $6(9 + 3) = 6(\_\_\_\_)$ _____ **within parentheses.**

$= \_\_\_\_$ _____.

b. $50 - (3^2 + 1) = 50 - (\_\_\_ + 1)$ _____ **power.**

$= 50 - (\_\_\_\_)$ _____ **within parentheses.**

$= \_\_\_\_$ _____.

c. $3[5 + (5^2 + 5)] = 3[5 + (\_\_\_\_ + 5)]$ _____ **power.**

$= 3[5 + (\_\_\_\_)]$ _____ **within parentheses.**

$= 3[\_\_\_\_]$ _____ **within brackets.**

$= \_\_\_\_$ _____.

Your Notes

Checkpoint Evaluate the expression.

5. $6(3 + 3^2)$	**6.** $2[(10 - 4) \div 3]$

Example 3 *Evaluate an algebraic expression*

Evaluate the expression $\frac{12k}{3(k^2 + 4)}$ **when** $k = 2$.

Solution

A fraction bar can act as a grouping symbol. Evaluate the numerator and denominator before dividing.

$\frac{12k}{3(k^2 + 4)} = \frac{12(\square)}{3(\square^2 + 4)}$ Substitute ___ for k.

$= \frac{12(\square)}{3(\square + 4)}$ _____ power.

$= \frac{12(\square)}{3(\square)}$ _____ within parentheses.

$= \frac{\square}{\square}$ _____.

$=$ ___ _____.

Checkpoint Evaluate the expression when $x = 3$.

7. $x^3 - 5$	**8.** $\frac{6x + 2}{x + 7}$

Homework

Your Notes

Example 1 *Translate verbal phrases into expressions*

The words "the quantity" tell you what to group when translating verbal phrases.

Translate the verbal phrase into an expression.

Verbal Phrase	Expression
a. 6 less than the quantity 8 times a number x	_____
b. 2 times the sum of 5 and a number a	_____
c. The difference of 17 and the cube of a number n	_____

✔ ***Checkpoint*** **Translate the verbal phrase into an expression.**

1. The product of 5 and the quantity 12 plus a number n

2. The quotient of 10 and the quantity a number x minus 3

Example 2 *Use a verbal model to write an expression*

Food Drive You and three friends are collecting canned food for a food drive. You each collect the same number of cans. Write an expression for the total number of cans collected.

Solution

Step 1 **Write** a verbal model. Amount of cans × Number of _____

Step 2 **Translate** the verbal model into an algebraic expression. ___ × ___

An expression that represents the total number of cans is _____.

Your Notes

Checkpoint **Complete the following exercise.**

3. In Example 2, suppose that the total number of cans collected are distributed equally to 2 food banks. Write an expression that represents the number of cans each food bank receives.

Example 3 ***Find a unit rate***

Three gallons of milk cost $9.15. Find the unit rate.

Solution

$$\frac{\square}{\square \text{ gallons}} = \frac{\square \div 3}{\square \text{ gallons} \div \square}$$

$$= \frac{\square}{\square \text{ gallon}}$$

The unit rate is _____, or _____.

Checkpoint **Find the unit rate.**

4. $\frac{420 \text{ miles}}{3 \text{ hours}}$	**5.** $\frac{\$12}{3 \text{ ft}^2}$	**6.** $\frac{20 \text{ cups}}{8 \text{ people}}$

Homework

1.4 Write Equations and Inequalities

Goal • Translate verbal sentences into equations or inequalities.

Your Notes

VOCABULARY

Open sentence

Equation

Inequality

Solution of an equation

Solution of an inequality

EXPRESSING OPEN SENTENCES

Symbol	Meaning	Associated Words
$a = b$	a is _____ to b	a is the _____ as b
$a < b$	a is _____ b	a is _____ than b
$a \leq b$	a is _____ than or _____ to b	a is _____ b, a is _____ than b
$a > b$	a is _____ b	a is _____ than b
$a \geq b$	a is _____ than or _____ to b	a is _____ b, a is _____ than b

Your Notes

Example 1 *Write equations and inequalities*

Write an equation or an inequality.

	Verbal Sentence	Equation or Inequality
a.	The sum of three times a number a and 4 is 25.	_____
b.	The quotient of a number x and 4 is fewer than 10.	_____
c.	A number n is greater than 6 and less than 12.	_____

Sometimes two inequalities are combined. For example, the inequalities $a < b$ and $b < c$ can be combined to form the inequality $a < b < c$.

Example 2 *Check possible solutions*

Check whether 2 is a solution of the equation or inequality.

	Equation or Inequality	Substitute	Conclusion
a.	$7x - 8 = 9$	$7(2) - 8 \stackrel{?}{=} 9$	_____ _____ a solution.
b.	$4 + 5y < 18$	$4 + 5(2) \stackrel{?}{<} 18$	_____ _____ a solution.
c.	$6n - 9 \geq 2$	$6(2) - 9 \stackrel{?}{\geq} 2$	_____ _____ a solution.

✔ ***Checkpoint*** **Check whether the given number is a solution of the equation or inequality.**

1. $6r + 1 = 25$ $r = 4$	**2.** $x^2 - 5 > 10$ $x = 5$	**3.** $7a \leq 21$ $a = 6$

1.5 Use a Problem Solving Plan

Goal • Use a problem solving plan to solve problems.

Your Notes

VOCABULARY

Formula

A PROBLEM SOLVING PLAN

Use the following four-step plan to solve a problem.

Step 1 _____ Read the problem carefully. Identify what you want to know and what you want to find out.

Step 2 _____ Decide on an approach to solving the problem.

Step 3 _____ Carry out your plan. Try a new approach if the first one isn't successful.

Step 4 _____ Check that your answer is reasonable.

Example 1 ***Read a problem and make a plan***

You have $7 to buy orange juice and bagels at the store. A container of juice costs $1.25 and a bagel costs $.75. If you buy two containers of juice, how many bagels can you buy?

Solution

Step 1 _____ *What do you know?* You know how much money you have and the price of a _____ and a container of juice.

What do you want to find out? You want to find out the number of _____ you can buy.

Step 2 _____ Use what you know to write a _____ that represents what you want to find out. Then write an _____ and solve it.

Your Notes

Example 2 *Solve a problem and look back*

Solve the problem in Example 1 by carrying out the plan. Then check your answer.

Solution

Step 3 _____ Write a verbal model. Then write an equation. Let b be the number of bagels you buy.

Price of juice (in dollars)	Number of containers	Price of bagel (in dollars)	Number of bagels	Cost (in dollars)
↓	↓	↓	↓	↓
_____	• ___	+ _____	• b	= ___

The equation is _____ + _____b = ___. One way to solve the equation is to use the strategy *guess*, *check*, and *revise*.

Guess an even number that is easily multiplied by _____. Try 4.

_____ + _____b = ___ **Write equation.**

_____ + _____(4) $\stackrel{?}{=}$ ___ **Substitute 4 for b.**

_____ **Simplify; 4 _____ check.**

Because _____, try an even number _____ 4. Try 6.

_____ + _____b = _ **Write equation.**

_____ + _____(6) $\stackrel{?}{=}$ _ **Substitute 6 for b.**

_____ **Simplify.**

For ____ you can buy ___ bagels and ___ containers of juice.

Step 4 _____ Each additional bagel you buy adds _____ to the _____ you pay for the juice. Make a table.

Bagels	0	1	2	3	4	5	6
Total Cost							

The total cost is ____ when you buy ___ bagels and ___ containers of juice. The answer in step 3 is _____.

Your Notes

Checkpoint **Complete the following exercise.**

1. Suppose in Example 1 that you have \$12 and you decide to buy three containers of juice. How many bagels can you buy?

FORMULA REVIEW

Temperature

$C = \frac{5}{9}(F - 32)$, where $F =$ _____

and $C =$ _____

Simple interest

$I = Prt$, where $I =$ _____, $P =$ _____, $r =$ _____ (as a decimal), and $t =$ _____

Distance traveled

$d = rt$, where $d =$ _____, $r =$ _____, and $t =$ _____

Profit

$P = I - E$, where $P =$ _____, $I =$ _____, and $E =$ _____

Checkpoint **Complete the following exercise.**

2. In Example 1, the store where you bought the juice and bagels had an income of \$7 from your purchase. The profit the store made from your purchase is \$2.50. Find the store's expense for the juice and bagels.

Homework

Your Notes

Example 3 *Use mental math to solve an equation*

Solve the equation using mental math.

a. $n + 6 = 11$ **b.** $18 - x = 10$

c. $7a = 56$ **d.** $\frac{b}{11} = 3$

Solution

Equation	Think	Solution	Check
a. $n + 6 = 11$	What number plus 6 equals 11?	___	___ + 6 = 11
b. $18 - x = 10$	_____	___	18 − ___ = 10
c. $7a = 56$	_____	___	7(___) = 56
d. $\frac{b}{11} = 3$	_____	___	$\frac{\square}{11} = 3$

Think of an equation as a question when solving using mental math.

Checkpoint **Solve the equation using mental math.**

4. $x + 9 = 14$	**5.** $5t - 4 = 11$	**6.** $\frac{y}{4} = 15$

Homework

1.6 Represent Functions as Rules and Tables

Goal • Represent functions as rules and as tables.

Your Notes

VOCABULARY

Function

Domain

Range

Independent variable

Dependent variable

Example 1 ***Identify the domain and range of a function***

The input-output table shows temperatures over various increments of time. Identify the domain and range of the function.

Input (hours)	0	2	4	6
Output (°C)	24	27	30	33

Solution

Domain: _____

Range: _____

Your Notes

Checkpoint **Identify the domain and range of the function.**

1.

Input	4	7	11	13
Output	10	20	35	45

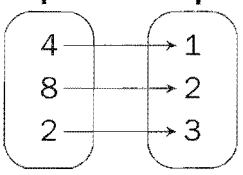
Example 2 *Identify a function*

Tell whether the pairing is a function. Explain your reasoning.

Solution

Mapping diagrams are often used to represent functions. Take note of the pairings to make your decision.

a.



b.

Input	Output
2	2
2	4
3	6
4	8

Checkpoint **Tell whether the pairing is a function.**

2.

Input	5	5	10	15
Output	3	4	6	8

3.

Input	0	4	12	20
Output	3	5	9	13

Your Notes

A function may be represented using a rule that relates one variable to another.

FUNCTIONS

Verbal Rule

The output is 2 less than the input.

Equation

_____

Table

Input	2	4	6	8	10
Output					

Example 3 *Make a table for a function*

The domain of the function $y = 3x$ is 0, 1, 2, and 3. Make a table for the function, then identify the range of the function.

Solution

x				
$y = 3x$				

The range of the function is _____.

Example 4 *Write a function rule*

Write a rule for the function.

Input	3	5	7	9	11
Output	6	10	14	18	22

Solution

Let x be the input and let y be the output. Notice that each output is _____ the corresponding input. So, a rule for the function is _____.

Checkpoint **Write a rule for the function. Identify the domain and the range.**

Homework

4.

Yarn (yd)	1	2	3	4
Total Cost ($)	1.5	3	4.5	6

1.7 Represent Functions as Graphs

Goal • Represent functions as graphs.

Your Notes

GRAPHING A FUNCTION

- You can use a graph to represent a _____.
- In a given table, each corresponding pair of input and output values forms an _____.
- An ordered pair of numbers can be plotted as a _____.
- The x-coordinate is the _____.
- The y-coordinate is the _____.
- The horizontal axis of the graph is labeled with the _____.
- The vertical axis is labeled with the the _____ _____.

Example 1 ***Graph a function***

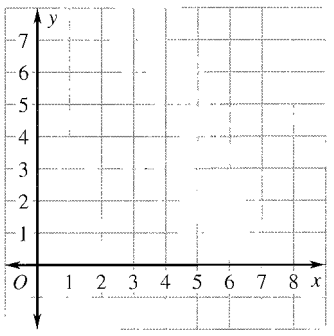
Graph the function $y = x + 1$ with domain 1, 2, 3, 4, and 5.

Solution

Step 1 Make an _____ table.

x					
y					

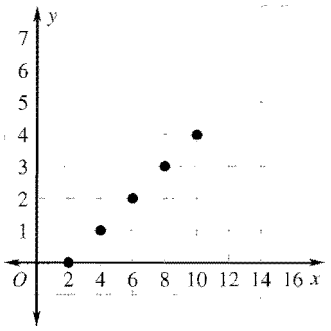
Step 2 Plot a point for each _____ (x, y).



Your Notes

Example 2 *Write a function rule for a graph*

Write a function rule for the function represented by the graph. Identify the domain and the range of the funtion.



Solution

Step 1 Make a _____ for the graph.

x					
y					

Step 2 Find a _____ between the input and output values.

Step 3 Write a _____ that describes the relationship.

$y =$ _____

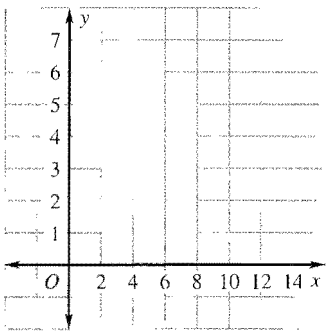
A rule for the function is $y =$ _____. The domain of the function is _____.

The range is _____.

Your Notes

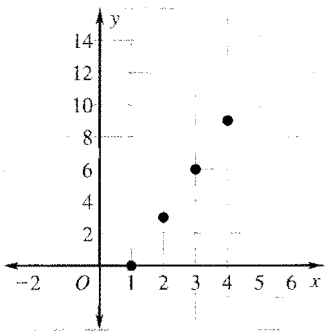
Checkpoint **Complete the following exercise.**

1. Graph the function $y = \frac{1}{3}x + 1$ with domain 0, 3, 6, 9, and 12.

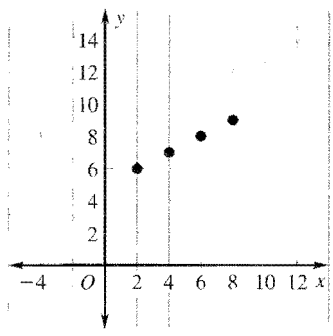


Checkpoint **Write a rule for the function represented by the graph. Identify the domain and the range of the function.**

2.



3.



Homework