Grade 6 – Lesson 4

Math Practice Sheets

Steps toward Algebra

Examples

Practice Questions

Extra Challenge Unit

Student Name

_____

Unit 4.1

Steps toward Algebra: Mental Math

Example

Mental Math means "doing math in your head". You can learn to solve some problems very quickly without paper and pencil. Many mental math strategies use number properties that you already know.

- Evaluate: 32 + 14 + 8 + 46

32 + 14 + 8 + 46	Look for the sums that are multiples of 10.
= 32 + 8 + 14 + 46	Use the commutative property.
= (32 + 8) + (14 + 46)	Use the associative property to make groups of compatible numbers.
= 40 + 60	Use mental math to add.
= 100	

- Evaluate: 5 × 39 × 2

5 × 39 × 2	Look for the products that are multiples of 10.
= 39 × 5 × 2	Use the commutative property.
= 39 × (5 × 2)	Use the associative property to group compatible number
= 39 × 10	Use mental to multiply.
= 390	

Note that you can use compensation to create compatible numbers that are easy to compute mentally.

8 × 67
8 × (70 - 3)
8 × 70 - 8 × 3
560 - 24
536

Exercise

1. Use mental math to find each sum or product.

a) 23 + 9 + 7 + 11

b) 39 + 18 + 11 + 22

c) 55 + 7 + 43 + 5

d) 5 × 13 × 4

Unit 4.1

Steps toward Algebra: Mental Math

Exercise

e) 7 × 42

f) 5 × 97

g) 85 + 17 + 3 + 5

h) 44 + 7 + 16 + 23

i) 6 + 71 + 14 + 9

j) 5 × 45 × 2

k) 2 × 41 × 10

l) 6 × 17 × 5

m) 8 × 88

n) 9 × 67

Exercise

2. The given table shows the planets and the number of moons they have. Use the data table to answer mentally.

Planet	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune
Moons	0	0	1	2	63	56	27	13

a) How many known moons do Jupiter and Uranus have together?

b) Find the numbers of moons Neptune, Saturn, and Earth have in total.

c) Which two planets have a sum of exactly 40 moons?

d) How many known moons are in our solar system?

e) What number do you multiply the number of moons Mars has, to get the number of moons that Saturn has?

Steps toward Algebra: Mental Math

Exercise

Solve the problems below.

3. Sade is writing a story for the school newspaper about the landscaping done by her class. The students planted 17 vines, 4 trees, 26 hedges, and 33 flowering plants. How many plants were used in the project?

4. Explain how you could find the product of $3^2 \times 58$ using the distributive property. Also, evaluate the expression.

5. Which expression does 'NOT' have the same value as $9 \times (5 + 24)$?

   a) 9×29 b) $(9 \times 5) + (9 \times 24)$

   c) $(9 \times 5) + 24$ d) $45 + (9 \times 24)$

6. The temperature on Sunday was 48° F. The temperature was predicted to rise 4° F on Monday, then rise 2° F more on Tuesday, and finally rise another 6° F by Saturday. What is the predicted temperature on Saturday?

Unit 4.2

Steps toward Algebra: Evaluating Expressions

Example

An algebraic expression is a combination of numbers, variables, and at least one operation. Expressions do not have equal signs.

We evaluate an expression to find its value.

Note that to evaluate an algebraic expression, we use substitution to replace the variable with a number.

Evaluate: $2x^2 - 7$ for $x = 5$

$2x^2 - 7$	
$= 2(5)^2 - 7$	Substituting $x = 5$
$= 2 \times 25 - 7$	Using order of operation i.e. $(5)^2 = 25$
$= 50 - 7$	Multiplying $(2 \times 25 = 50)$
$= 43$	Subtracting $(50 - 7 = 43)$

Evaluate each expression to find the missing values in the table.

k	$2^3 + 5k$
1	13
2	18
3	23

Substitute for k in $2^3 + 5k$.
Use the order of operations.

When k = 1, $2^3 + 5.1 = 8 + 5 = 13$

When k = 2, $2^3 + 5.2 = 8 + 10 = 18$

When k = 3, $2^3 + 5.3 = 8 + 15 = 23$

Exercise

1. Evaluate each expression for the given value of the variable.

a) $7h + 2$ for $h = 5$

b) $6p - 5$ for $p = 20$

c) $\frac{r}{8}$ for $r = 56$

d) $20 + 3m$ for $m = 9$

e) $8x + 27$ for $x = 11$

f) $9k$ for $k = 12$

g) $n^2 - 10$ for $n = 6$

h) $18 - 2a$ for $a = 2$

i) $20z$ for $z = 13$

j) $4e + 22$ for $e = 7$

Unit 4.2

Steps toward Algebra: Evaluating Expressions

Exercise

2. Evaluate each expression to find the missing values in the tables with simplifications.

a)

m	m + 8
48	☐
53	61
75	☐

b)

r	$12r + 3^2$
5	69
9	☐
10	☐

c)

p	5p
100	☐
120	☐
500	☐

d)

n	$15 + n^2$
3	☐
5	☐
8	☐

e)

x	100 - x
23	☐
49	☐
66	☐

f)

e	7e - 7
2	☐
7	☐
10	☐

g)

a	10a
50	☐
200	☐
350	☐

h)

d	$d^2 + 11$
2	☐
7	☐
9	☐

i)

g	$2g - 2^3$
5	☐
10	☐
30	☐

j)

i	$i^2 + 3i$
4	☐
6	☐
8	☐

Unit 4.2

Steps toward Algebra: Evaluating Expressions

Exercise

3. Evaluate each expression for the given values of k.

a)

k	5	9	18	30	45
3 + 2k					

b)

k	4	8	12	16	20
5(k - 4)					

c)

k	3	7	9	10	12
$k^2 - 1$					

d)

k	14	26	40	66	90
k ÷ 2					

e)

k	1	7	10	11	50
7k					

f)

k	2	5	8	11	20
$k^2 + 5$					

g)

k	5	12	25	40	49
50 - k					

h)

k	100	50	25	20	10
100 ÷ k					

Unit 4.2

Steps toward Algebra: Evaluating Expressions

Exercise

Solve the problems below.

4. Evaluate the expressions 2x - 5 for x = 3, 5, 7, and 9. Explain what you did to evaluate them.

5. When travelling in Europe, Nicolas converts the temperature given in degrees Celsius to a degrees Fahrenheit using the expression $9x \div 5 + 32$, where x is the Celsius temperature. Find the temperature in degrees Fahrenheit when the Celsius temperature is 0° c and then when it is 10° c.

6. Evaluate $k \div 7$ for k = 63.

a) 8 b) 7

c) 63 d) 9

7. A rectangle is 4 units wide. How many square units does the rectangle cover if it is 5, 6, 7, or 8 units long? Use table to answer.

l	w	l × w
5	4	5 × 4 = ___
6	4	_____
7	4	_____
8	4	_____

Unit 4.3

Steps toward Algebra: Using Expressions to Describe Patterns

Example

An input/output table is a table of related values where the output values are a result of the input values. For example, in the given table, the input row shows the players and the output row shows the soccer teams. i.e.

Input	22	44	66	77	99
Output	2	4	6	7	9

Write an expression for the missing value in the table.

Carlton's Age	Julia's Age
5	8
6	9
7	10
8	11
n	n + 3

Julia's age is Carlton's age plus 3.

5 + 3 = 8

6 + 3 = 9

7 + 3 = 10

8 + 3 = 11

n + 3

When Carlton's age is n, Julia's age is n + 3.

Exercise

1. Use the table below to answer the questions.

Go-carts	2	3	4	5	☐
Wheels	8	12	16	☐	28

a) How many wheels are there in 5 Go-carts?

b) If there are 28 wheels, how many Go-carts are there?

c) If there are 15 Go-carts, how many wheels will be there?

Unit 4.3

Steps toward Algebra: Using Expressions to Describe Patterns

Exercise

2. Write an expression for the missing value in each table.

a)

Weeks	Days
3	21
5	35
9	63
14	98
n	

b)

Players	Cricket team
33	3
66	6
77	7
99	9
n	

c)

Rooms	Chairs
1	8
3	24
6	48
9	72
n	

d)

Months	Seasons
12	4
18	6
33	11
42	14
n	

e)

Sam's age	Nina's Age
21	16
15	10
9	4
7	2
n	

f)

Length (cm)	Area (cm^2)
3	9
5	25
8	64
9	81
n	

g)

Pizza	Cost
1	$1.50
3	$4.50
4	$6.00
7	$10.50
n	

h)

Length (m)	Volume (m^3)
1	1
2	8
3	27
4	64
n	

Unit 4.3

Steps toward Algebra: Using Expressions to Describe Patterns

Exercise

3. Write an expression for the sequence in the table.

a)

Position	1	2	3	4	5	n
Value of term	7	8	9	10	11	

b)

Position	1	2	3	4	5	n
Value of term	3	5	7	9	11	

c)

Position	1	2	3	4	5	n
Value of term	6	11	16	21	26	

d)

Position	1	2	3	4	5	n
Value of term	1	4	7	10	13	

e)

Position	1	2	3	4	5	n
Value of term	0	2	4	6	8	

f)

Position	1	2	3	4	5	n
Value of term	7	11	15	19	23	

g)

Position	1	2	3	4	5	n
Value of term	1	4	9	16	25	

h)

Position	1	2	3	4	5	n
Value of term	1	6	11	16	21	

Steps toward Algebra: Using Expressions to Describe Patterns

Exercise

Solve the problems below.

4. A white ribbon is 13 inches less than 13 times as long as the green ribbon. Complete the table, finding the length in inches of the white ribbon, using the formula w = 13g - 13, where g has each of the following values.

g	w
3	
4	
5	
6	
10	

5. Solve for m when m - (16 × 2) = 61.

a) 39 b) 93

c) 61 d) 32

6. The grocery store puts 8 boxes of cereal on each shelf of a store display. Three of the boxes of cereal are sold. Complete the table below using the formula c = 8s - 3 to find the number of boxes of cereal left for each of the following numbers of shelves.

s	c
2	
7	
8	
9	
12	
15	

Unit 4.4

Problem Solving by Making a Table

Example

Tony is paid $50 a week for washing cars. He puts the money in his saving account. If he started out with $72, find out how much money he has in his account after 2 weeks, after 5 weeks, and after 7 weeks.

First identify the expression to represent the story. i.e. 72 + 50x

Make a table to solve for different values of x.

Include labels for the variable and the expression.

Enter the values of x you want to find. Then evaluate the expression for each value. i.e.

x	72 + 50x
2	172
5	322
7	422

Substitute for x in 72 + 50x.

When x = 2, 72 + 50.2 = 72 + 100 = 172

When x = 5, 72 + 50.5 = 72 + 250 = 322

When x = 7, 72 + 50.7 = 72 + 350 = 422

Exercise

1. Mark has a job delivering milk. Every month, each of his customers pays him $6. He also receives an allowance of $30 a month. Use the expression 30 + 6x to find how much money Mark receives each month if he has 7, 10, or 20 milk customers. Make a table and show your simplification.

Unit 4.4

Problem Solving by Making a Table

Exercise

2. The Rio Grande is one of the longest rivers in the United States. It forms the border between Texas and Mexico. The Red river forms a border between Texas and Oklahoma and is 1,290 miles long.

i. Which expression represents how much longer the Rio Grande is than the Red River.

a) 1,290 - x b) x - 1,290

c) 1,290x d) 1,290 ÷ x

ii. Explain how you found the expression.

iii. Write the correct expression from above and complete the table for x = 250, 500, 725, 950, and 1,075.

x	
250	
725	
1,075	

3. Jena earns 2 points for every dollar she spends at the pet store. Which value completes this table?

k	2k
16	

a) 8 b) 14

c) 18 d) 32

Unit 4.4

Problem Solving by Making a Table

Exercise

4. Steve earns $12.50 per hour working at his job. It costs $2.75 for the snacks. Write an expression that describes how much Steve has each day after x hours of work and paying for snacks.

5. Complete the table to find how much Steve earns each day if he works 4 hours, 6 hours, 8 hours, 9 hours, or 12 hours.

x	
4	
8	
12	

6. Annabelle earns $400 a week plus $60 every time she sells a mobile phone. Write an expression to show how much money Annabelle earns per week when she sells k mobile phones. Then make a table to show how much Annabelle earns in a week if she sells 5, 8, 10, 13, or 15 mobile phones.

Unit 4.4

Problem Solving by Making a Table

Exercise

Solve the problems below.

7. A diner has booths and counter seating. Each booth can seat 5 people. Another 12 people can sit at the counter. Which expression shows how many customers can be seated in the diner?

a) 12b - 5

b) 12b + 5

c) 5b - 12

d) 5b + 12

8. Explain how you found the expression.

9. Complete the table to find how many customers can be seated for b = 3, 5, 7, 9, or 11.

b	
5	
9	

10. A zoo charges $15 for each admission ticket 't'. Explain the labels you would use to make a table that would be used to find the cost of 6 tickets, 11 tickets, and 15 tickets.

Unit 4.5

Math Challenges

Exercise

1. Use the table to answer the questions.

Home center clearance sale	
Table lamp	$25
Garden hose	$26
Ceiling fan	$52

a) Felix wants to buy 3 garden hoses at the home center clearance sale. How much will they cost?

b) The girls in Felix's family are saving money to buy 4 ceiling fans at the home center sale. How much will they need to save?

2. Explain how you could find the product of $10^2 \times 512$ using the distributive property. Then evaluate the expression.

3. Using the algebraic expression 3k - 5, what is the smallest whole-number value for k that will give you a result greater than 100?

Math Challenges

Exercise

4. Can there be more than one expression that describes a set of data in a table? Explain.

5. Critical Thinking: Write two different expressions that describe the relationship in the table.

Position (n)	Value of terms
3	10

6. A health food store sells calcium powder online. A 50-lb carton of calcium powder costs $135.25. It costs $9.75 to ship the powder whether you buy one or more cartoons. Write an expression to show the cost including shipping of k cartoons of calcium powder. Also make a table to find how much it costs to have 20, 50, 70, 90, and 100 cartons of calcium powder shipped.

Congratulations!

You have finished a lesson. You should be very proud of yourself.
Now it is time to progress to the next lesson.
Your next assignment is notated by a green arrow.

Next

Grade 6 Answer Key of Lesson 4

Unit 4.1

1. a) 90 b) 90 c) 110 d) 260 e) 294 f) 485
   g) 110 h) 90 i) 100 j) 450 k) 820 l) 510
   m) 704 n) 603
2. a) 50 b) 70 c) Uranus; Neptune d) 162 e) 28
3. 60 5. c 6. 56^0F

Unit 4.2

1. a) 37 b) 115 c) 7 d) 47 e) 115 f) 108
   g) 26 h) 14 i) 260 j) 50
2. a) 56; 83 b) 117, 129 c) 500; 600; 2,500 d) 24,40,79 e) 77,51,34
   f) 7, 42, 63 g) 500; 2,000; 3,500 h) 15, 60, 92 i) 2, 12, 52 j) 28,54,88
3. a) 13,21,39,63,93 b) 0,20,40,60,80 c) 8,48,80,99,143
   d) 7,13,20,33,45 e) 7,49,70,77,350 f) 9,30,69,126,405
   g) 45,38,25,10,1 h) 1,2,4,5,10
4. 1,5,9,13 5. 32^0F and 50^0F 6. d 7. 20,24,28,32 (sq units)

Unit 4.3

1. a) 20 b) 7 c) 60 2. a) 7n b) n÷11 c) 8n
   d) n÷3 e) n-5 f) n^2 g) 1.5n h) n^3
3. a) n+6 b) 2n+1 c) 5n+1 d) 3n-2 e) 2n-2 f) 4n+3
   g) n^2 h) 5n-4 4. 26,39,52,65,91,117 5. b
6. 13,53,61,69,93,117

Unit 4.4

1. $72, $90, $150 2. i) a iii) 1,040; 790; 565; 340; 215
3. d 4. 12.50x- 2.75
5. $47.25; $72.25; $97.25; $109.75; $147.25
6. 400+60k; $700, $880, $1,000, $1,180, $1,300
7. d 9. 27,37,47,57,67
10. 15t; $90, $165, $225

Unit 4.5

1. a) $78 b) $208
2. 51,200
3. 36