Section 4 – Exponents Continued

This book belongs to: KEY **Block:** ____

Section	Due Date	Questions I Find Difficult	Marked	Corrections Made and Understood

Self-Assessment Rubric

Category	Sub-Category	Description	
Expert	6	Work meets the objectives; is clear, error free, and demonstrates a mastery of the Learning Targets	"You could teach this!"
	5	Work meets the objectives; is clear, with some minor errors, and demonstrates a clear understanding of the Learning Targets	"Almost Perfect, one little error."
Apprentice	4	Work almost meets the objectives; contains errors, and demonstrates sound reasoning and thought concerning the Learning Targets	"Good understanding with a few errors."
	3	Work is in progress; contains errors, and demonstrates a partial understanding of the Learning Targets	"You are on the right track, but key concepts are missing."
Novice	2	Work does not meet the objectives; frequent errors, and minimal understanding of the Learning Targets is demonstrated	"You have achieved the bare minimum to meet the learning outcome."
	1	Work does not meet the objectives; there is no or minimal effort, and no understanding of the Learning Targets	"Learning Outcomes not met at this time."

Learning Targets and Self-Evaluation

Learning Target	Description	Mark
$4-1$	• Writing exponents as repeated multiplication • Exponents larger than 3	
$4-2$	• Operations with exponents with positive and negative bases • Understand how brackets and exponents affect each other	

Competency Self-Evaluation

A valuable aspect to the learning process involves self-reflection and efficacy. Research has shown that authentic self-reflection helps improve performance and effort, and can have a direct impact on the growth mindset of the individual. In order to grow and be a life-long learner we need to develop the capacity to monitor, evaluate, and know what and where we need to focus on improvement. Read the following list of Core Competency Outcomes and reflect on your behaviour, attitude, effort, and actions throughout this unit.

Rank yourself with a check mark: E (Excellent), G (Good), S (Satisfactory), N (Needs Improvement)

		E	G	S	N
Personal Responsibility	• I **listen** during instruction period and come to class ready to ask questions				
	• I am **fully prepared** for the class, with all the required supplies				
	• I am **fully prepared** for Quizzes				
	• I **follow** instructions and **assist** peers • I am **on task** during work blocks • I **complete** assignments **on time**				
Self-Regulation	• I keep track of my **Learning Targets**				
	• I take **ownership** over my goals, learning, and behaviour • I can **solve problems** myself and know when to ask for help • I can **persevere** in challenging tasks • I **take responsibility** to be actively engaged in the lesson and discussions				
	• I only use my phone for school tasks				
Classroom Responsibility and Communication	• I am **focused** on the discussion and lessons • I **ask questions** during the lesson and class • I give **my best effort** and **encourage** others to work well • I am polite and communicate questions and concerns with my peers and teacher				
Collaborative Actions	• I can **work with others** to achieve a common goal • I make **contributions** to my group • I **am kind** to others, can work collaboratively and **build relationships** with my peers • I **can identify** when others need support and provide it				
Communication Skills	• I present informative **clearly**, in an organized way • I **ask and respond** to simple direct questions • I am an **active listener**, I support and encourage the speaker • I **recognize** that there are different points of view and can disagree respectfully				
	Overall				
Goal for next Unit – refer to the above criteria. **Please select** (underline/highlight) **two areas** you want to focus on					

Pre-Unit Questions

1. Do you struggle with squares and square roots? Why or why not?

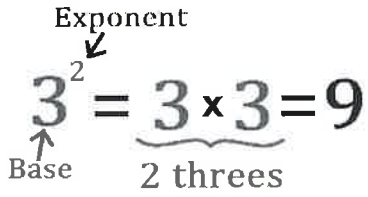
2. What skills do I have going into this unit?

3. How do I plan on accomplishing my learning goals this unit?

Try every question in this booklet. Show your steps (thinking process) and keep trying until you get the right answer. If you cannot figure it out, ask!

Section 4.1 – Exponents a recap!

- The **base** is the number that you are multiplying
- The **exponent** is telling you how many times you should multiply the number **by itself**



- BUT we need to take this a step beyond just squares and square roots

So let's see what happens when the exponent is a 3.

- When we multiply a base by an **exponent of 3**, we say it is **cubed**

Example: $5^3 = 5 \times 5 \times 5 = 125$

Write the rest out as repeated multiplication

1. $2^3 = 2 \times 2 \times 2 = 8$
2. $4^3 = 4 \times 4 \times 4 = 64$
3. $6^3 = 6 \times 6 \times 6 = 216$
4. $7^3 = 7 \times 7 \times 7 = 343$
5. $10^3 = 10 \times 10 \times 10 = 1{,}000$

If the exponent increases, so does the number of times you multiply the base!

Section 4.2 – Operations with positive and negative bases

- We can now take this even another step further!

Exponent Form	Repeated Multiplication	Value
3^4	$3 \times 3 \times 3 \times 3$	81
$(-2)^4$	$(-2) \times (-2) \times (-2) \times (-2)$	16
-2^4	$(-1) \times 2 \times 2 \times 2 \times 2$	-16
m^5	$m * m * m * m * m$	m^5
27^0	*Any number raised to zero* $= 1$	1

Let's practice! Write the following out as repeated multiplication and then calculate the answer.

1. $2^4 = 2 \times 2 \times 2 \times 2 = 16$

2. $-10^4 = (-1) \times 10 \times 10 \times 10 \times 10 = -10,000$

3. $(-4)^3 = (-4) \times (-4) \times (-4) = -64$

4. $5^4 = 5 \times 5 \times 5 \times 5 = 625$

5. $z^6 = z \times z \times z \times z \times z \times z = z^6$

6. $-1^7 = (-1) \times 1 \times 1 \times 1 \times 1 \times 1 \times 1 = -1$

7. $-r^6 = (-1) \times r \times r \times r \times r \times r \times r = -r^6$

Name : _____ Score : _____

Teacher : _____ Date : _____

Evaluate the Exponents

1) $(6)^2$ = 36

2) $(7)^3$ = 343

3) $(4)^2$ = 16

4) $(-2)^2$ = 4

5) $(12)^2$ = 144

6) $(-3)^3$ = -27

7) $(9)^3$ = 729

8) $(3)^3$ = 27

9) $(-3)^2$ = 9

10) $(-5)^2$ = 25

11) $(-4)^3$ = -64

12) $(-8)^3$ = -512

13) $(8)^2$ = 64

14) $(-9)^3$ = -729

15) $(-7)^3$ = -343

16) $(-12)^2$ = 144

17) $(-10)^2$ = 100

18) $(10)^3$ = 1000

19) $(3)^2$ = 9

20) $(-6)^3$ = -216

Name : _____ Score : _____

Teacher : _____ Date : _____

Evaluate the Exponents

1) $(-6)^{2}$ = 36

2) $(-12)^{3}$ = -1728

3) $(3)^{0}$ = 1

4) $(4)^{4}$ = 256

5) $(-5)^{3}$ = -125

6) $(10)^{3}$ = 1000

7) $(7)^{3}$ = 343

8) $(6)^{1}$ = 6

9) $(-8)^{1}$ = -8

10) $(-7)^{4}$ = 2401

11) $(12)^{0}$ = 1

12) $(-3)^{2}$ = 9

13) $(5)^{4}$ = 625

14) $(2)^{0}$ = 1

15) $(-2)^{1}$ = -2

16) $(-10)^{2}$ = 100

17) $(8)^{0}$ = 1

18) $(9)^{4}$ = 6561

19) $(3)^{1}$ = 3

20) $(-9)^{2}$ = 81

Name : _____ Score : _____

Teacher : _____ Date : _____

Evaluate the Exponents

1) $(4)^{3}$ = 64

2) $(-9)^{4}$ = 6561

3) $(5)^{1}$ = 5

4) $(9)^{0}$ = 1

5) $(-7)^{2}$ = 49

6) $(3)^{3}$ = 27

7) $(3)^{4}$ = 81

8) $(8)^{4}$ = 4096

9) $(7)^{3}$ = 343

10) $(10)^{2}$ = 100

11) $(-3)^{0}$ = 1

12) $(2)^{2}$ = 4

13) $(12)^{1}$ = 12

14) $(-6)^{4}$ = 1296

15) $(2)^{1}$ = 2

16) $(-2)^{1}$ = -2

17) $(-2)^{2}$ = 4

18) $(6)^{0}$ = 1

19) $(-4)^{0}$ = 1

20) $(-10)^{3}$ = -1000

Name : _____ Score : _____

Teacher : _____ Date : _____

Evaluate the Exponents

1) $(-3)^{4}$ = 81

2) $(4)^{3}$ = 64

3) $(5)^{3}$ = 125

4) $(-7)^{3}$ = -343

5) $(3)^{4}$ = 81

6) $(-6)^{3}$ = -216

7) $(-2)^{3}$ = -8

8) $(-4)^{2}$ = 16

9) $(-3)^{3}$ = -27

10) $(9)^{2}$ = 81

11) $(-5)^{3}$ = -125

12) $(-8)^{2}$ = 64

13) $(8)^{2}$ = 64

14) $(-10)^{2}$ = 100

15) $(12)^{2}$ = 144

16) $(7)^{3}$ = 343

17) $(-2)^{4}$ = 16

18) $(6)^{4}$ = 1296

19) $(2)^{5}$ = 32

20) $(3)^{4}$ = 81

Name : _____ Score : _____

Teacher : _____ Date : _____

Evaluate the Exponents

1) $(10)^{2}$ = 100

2) $(-12)^{2}$ = 144

3) $(-10)^{2}$ = 100

4) $(12)^{2}$ = 144

5) $(8)^{3}$ = 512

6) $(3)^{5}$ = 243

7) $(-4)^{4}$ = 256

8) $(-3)^{5}$ = -243

9) $(4)^{4}$ = 256

10) $(-6)^{3}$ = -216

11) $(2)^{3}$ = 8

12) $(-9)^{3}$ = -729

13) $(-8)^{3}$ = -512

14) $(5)^{4}$ = 625

15) $(-2)^{5}$ = -32

16) $(6)^{3}$ = 216

17) $(3)^{3}$ = 27

18) $(9)^{2}$ = 81

19) $(-7)^{3}$ = -343

20) $(-2)^{6}$ = 64

Name : _____ Score : _____

Teacher : _____ Date : _____

Evaluate the Exponents

1) $(-12)^{2}$ = 144

2) $(2)^{8}$ = 256

3) $(-3)^{5}$ = -243

4) $(3)^{5}$ = 243

5) $(10)^{2}$ = 100

6) $(12)^{2}$ = 144

7) $(5)^{3}$ = 125

8) $(4)^{3}$ = 64

9) $(-4)^{3}$ = -64

10) $(-10)^{2}$ = 100

11) $(3)^{5}$ = 243

12) $(8)^{3}$ = 512

13) $(2)^{3}$ = 8

14) $(-7)^{3}$ = -343

15) $(6)^{2}$ = 36

16) $(-2)^{7}$ = -128

17) $(-2)^{3}$ = -8

18) $(-9)^{2}$ = 81

19) $(9)^{3}$ = 729

20) $(-8)^{3}$ = -512

Name : _____ Score : _____

Teacher : _____ Date : _____

Evaluate the Exponents

1) $(-3)^{5}$ = -243

2) $(-10)^{2}$ = 100

3) $(2)^{6}$ = 64

4) $(12)^{2}$ = 144

5) $(6)^{4}$ = 1296

6) $(5)^{2}$ = 25

7) $(-12)^{2}$ = 144

8) $(-2)^{8}$ = 256

9) $(3)^{4}$ = 81

10) $(-9)^{3}$ = -729

11) $(-7)^{3}$ = -343

12) $(2)^{4}$ = 16

13) $(8)^{3}$ = 512

14) $(-2)^{5}$ = -32

15) $(-5)^{2}$ = 25

16) $(-3)^{5}$ = -243

17) $(7)^{3}$ = 343

18) $(9)^{2}$ = 81

19) $(3)^{4}$ = 81

20) $(4)^{3}$ = 64

Section Reflection

How did this section on squares and square roots go? Please circle the number that you think best describes how this section went:

1	2	3	4	5	6	7	8	9	10
(Not well at all)				(OK)					(Awesome!)

Please explain why you think it went the way it did:

_____
_____
_____
_____

What was one process you struggled with in this section?

_____
_____
_____
_____

What do you plan to do differently in the next section?

_____
_____
_____
_____