

Section 8 – Algebra, Elimination, and Logic

This book belongs to: _____ 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 |
|-----------------|---|------|
| 8 – 1 | <ul style="list-style-type: none"> • Understand the concept of balance and the equal sign | |
| 8 – 2 | <ul style="list-style-type: none"> • Using addition and multiplication principle to isolate unknowns | |

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. Did you struggle with anything in our unit on integers (adding, subtracting, multiplying, or dividing positive and negative numbers)? If so, what did you struggle with?

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

3. What is your learning goal this unit?

4. How do you plan on accomplishing your 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 are struggling and would like additional support, ask!

Section 8 – Basic Algebra

What is algebra anyway?

- It comes from the word “al-jabr” in Arabic, which was part of the title used in the historic book written by mathematician Mohammed ibn Mûsâ al-Khowârizmî in approximately 830 CE to introduce this form of math
- Algebra is the “reduction” and “balancing” of equations that use symbols as terms

Examples

$$3z = 6$$

or

$$15 - t = 9$$

- If we have the equation above, the goal is to **solve for the unknowns z and t** .
- When we are **working with algebra**, we are trying to **solve puzzles**.
- Don't let the **unknowns phase** you!

Solving for Unknowns

- Think of unknowns as numbers that are hiding their value... it's a puzzle for you find out and reveal the number they represent.

If $15 - t = 9$, then how do we find t ? (Try it on your own)

The trick to Basic Algebra

- In the case of equations, the **right side** of the **equals sign** is always **equal to the left side**.
- In order to find out what number our symbol represents, we have to manipulate, or move, the numbers from side to side to solve.
- Whatever we were doing on the original side, we have to do the opposite on the other side of the equals sign.
 - If we were **adding** a number, now we are **subtracting**
 - If we were **subtracting** a number, now we are **adding**
 - If we were **multiplying** a number, now we are **dividing**
 - If we were **dividing** a number, now we are **multiplying**

- So if $15 - t = 9$, we do the following: and then check our work by trying out the formula:

Then we can check our answer but plugging our answer back into our equation instead of our unknown

Let's practice! Try solving for the symbols in the following equations and checking our work

1. $x + 5 = 12$

3. $2b = 14$

2. $y - 4 = 6$

4. $\frac{m}{3} = 1$

- We can also manipulate these equation when we only have letters, we just solve for one of the letters, with respect to the rest

Example: Solve the following for the letter a

$$ab + c = d$$

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Solve the Equatlons

1) $\frac{z}{3} = 4$

6) $h + 3 = 12$

2) $5f = -55$

7) $-49 = 7b$

3) $5 = x - 6$

8) $-10 = \frac{r}{3}$

4) $-8 = 2n$

9) $-2y = -16$

5) $13 = -5 + d$

10) $-11 = 5 + v$



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Solve the Equations

1) $5 = \frac{k}{5}$

6) $z + 3 = -7$

2) $-40 = 5d$

7) $54 = -6r$

3) $-4 = n - 3$

8) $3f = -27$

4) $10 = -2 + x$

9) $\frac{c}{4} = -4$

5) $-7b = 63$

10) $-11 = 4 + s$



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Solve the Equations

1) $y + 3 = -5$

6) $\frac{c}{4} = 8$

2) $-12 = -3x$

7) $-25 = 5r$

3) $7 = -4 + a$

8) $-2d = 16$

4) $5s = 30$

9) $-13 = -7 + h$

5) $9 = \frac{k}{6}$

10) $-12 = n - 2$



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Solve the Equations

Round your answers to the nearest hundredth if needed.

1) $\frac{s + 22}{17} = -21$

6) $\frac{6 - c}{4} = -19$

2) $\frac{8 + v}{14} = -4$

7) $\frac{2}{5}y + 12 = -22$

3) $5 + \frac{1}{6}r = -3$

8) $23 - 5k = 12$

4) $\frac{9 + b}{-11} = -28$

9) $\frac{x - 26}{-2} = 17$

5) $22a + 5 = -15$

10) $\frac{18 - d}{-26} = -4$



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Simplifying Algebraic Expressions

1) $3 + \frac{w}{4} - 7s$ use $w = 12$ and $s = 7$

6) $2b - n$ use $b = 9$ and $n = 4$

2) $7f - 8(-5 - 3s)$ use $s = 5$ and $f = 9$

7) $\frac{d}{9} + 7x$ use $d = 18$ and $x = 2$

3) $-5s - 2 + 4 + 3z$ use $s = 8$ and $z = 9$

8) $3d + 8 - 6s$ use $d = 2$ and $s = 8$

4) $9 - \frac{18}{s} + 7h$ use $s = 9$ and $h = 4$

9) $\frac{10}{w} - 4r$ use $w = 5$ and $r = 8$

5) $-5 + 9n - 2k - 4$ use $n = 4$ and $k = 5$

10) $6k + 8c$ use $k = 3$ and $c = 5$



Section Reflection

How did this section on basic algebra 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 is one studying technique that you think would help you with algebra on our final exam?
