Objectives:
- Students will multiply positive and negative integers, as demonstrated by their completion of ALEKS skills where they do so
- Students will memorize the multiplication table, as evidenced by them passing "minute quizzes."

Student Materials on Desk Corner:
- Multiplying Integers Homework #2
- Homework Checker
- Readiness Checker

Student Materials for Later:
- Homework Log
- Binder Paper
- Pencils

Teacher Materials:
- "Minute Quiz 9A"
- ALEKS Student Hours Transparency
- "Multiplying Integers Homework #2" answer key and grading roster for TA
- "Multiplying Integers Homework #3" handout

Homework:
- Multiplying Integers Homework #3
- Study for Minute Quiz

Time	Activity
Before Bell	**DO NOW** As students enter the classroom, shake hands and remind them that there is a minute quiz and they need to be seated quietly with a pencil when the bell rings. Write the following "Do Now" on the board: • Take out a pencil and *quietly* wait for the minute quiz. • Talking = zero on quiz.
5 min	**MINUTE QUIZ** When the bell rings, quickly go around and put the **minute quiz** on each student's desk, facedown. Then, start the quiz and give everyone one minute. While students are working on the quiz, quickly stamp the **readiness checkers** of students who are ready when the bell rings and have their readiness checkers out.
30 min	**ALEKS** Put up the transparency with the number of **hours** each student currently has on ALEKS. Students should continue with **ALEKS**. While they work, have the TA go around and collect **homework** and stamp **homework checkers**. Take **attendance** and **return graded homework**.
1 min	**STRETCH BREAK** Before transitioning to the lecture, lead the students through some exercises to refresh them.
44 min	**LESSON: MULTIPLYING POSITIVE AND NEGATIVE INTEGERS** **Notes** Follow the handwritten Cornell Notes. **Homework** Pass out the "Multiplying Integers Homework #3" handout and have students write down the assignment on their homework logs. Also remind students that there will be a minute quiz again the next time we meet on the new homework assignment (multiplying 7's, 8's, and 9's).

Numeracy
Minute Quiz 1-9A

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

5 • 6 =	10 • 5 =	12 • 6 =
6 • 6 =	2 • 5 =	1 • 4 =
12 • 5 =	9 • 6 =	11 • 6 =
4 • 4 =	1 • 5 =	2 • 5 =

Numeracy
Minute Quiz 1-9A

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

5 • 6 =	10 • 5 =	12 • 6 =
6 • 6 =	2 • 5 =	1 • 4 =
12 • 5 =	9 • 6 =	11 • 6 =
4 • 4 =	1 • 5 =	2 • 5 =

Numeracy
Minute Quiz 1-9A

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

5 • 6 =	10 • 5 =	12 • 6 =
6 • 6 =	2 • 5 =	1 • 4 =
12 • 5 =	9 • 6 =	11 • 6 =
4 • 4 =	1 • 5 =	2 • 5 =

Numeracy
Minute Quiz 1-9B

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

10 • 5 =	11 • 6 =	12 • 6 =
9 • 6 =	3 • 5 =	4 • 4 =
2 • 4 =	6 • 6 =	6 • 4 =
3 • 5 =	1 • 4 =	4 • 5 =

Numeracy
Minute Quiz 1-9B

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

10 • 5 =	11 • 6 =	12 • 6 =
9 • 6 =	3 • 5 =	4 • 4 =
2 • 4 =	6 • 6 =	6 • 4 =
3 • 5 =	1 • 4 =	4 • 5 =

Numeracy
Minute Quiz 1-9B

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

10 • 5 =	11 • 6 =	12 • 6 =
9 • 6 =	3 • 5 =	4 • 4 =
2 • 4 =	6 • 6 =	6 • 4 =
3 • 5 =	1 • 4 =	4 • 5 =

Numeracy
Minute Quiz 1-9C

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

7 • 5 =	4 • 5 =	8 • 4 =
10 • 6 =	3 • 6 =	7 • 4 =
12 • 5 =	10 • 5 =	6 • 4 =
3 • 6 =	6 • 5 =	4 • 6 =

Numeracy
Minute Quiz 1-9C

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

7 • 5 =	4 • 5 =	8 • 4 =
10 • 6 =	3 • 6 =	7 • 4 =
12 • 5 =	10 • 5 =	6 • 4 =
3 • 6 =	6 • 5 =	4 • 6 =

Numeracy
Minute Quiz 1-9C

Name:
Date: Period:

Solve the following multiplication problems. You have exactly one minute!

7 • 5 =	4 • 5 =	8 • 4 =
10 • 6 =	3 • 6 =	7 • 4 =
12 • 5 =	10 • 5 =	6 • 4 =
3 • 6 =	6 • 5 =	4 • 6 =

Lesson 9

Multiplying Positive and Negative Integers

Section → Positive · Positive

Recall multiplication tells us how many times to add a number to itself.

Ex: $2 \cdot 3 = 2 + 2 + 2 = 6$.

We added a positive number to itself a positive number of times. So, our answer is positive.

$(+) \cdot (+) = (+)$ Positive · Positive = Positive

Section → Negative · Positive

Ex: $(-2) \cdot 3 = (-2) + (-2) + (-2) = -6$

We added a negative number to itself a positive number of times. So, our answer is negative.

$(-) \cdot (+) = (-)$ Negative · Positive = Negative

Section → Positive · Negative

Ex: $2 \cdot (-3) = (-3) \cdot 2 = (-3) + (-3) = -6$

multiplication is commutative

We turned this into a problem where we added a negative number to itself a positive number of times. So, our answer is negative.

$(+)\cdot(-)=(-)$ Positive · Negative = Negative

Section → Negative · Negative

Ex: $(-2)\cdot(-3) = (-1)\cdot(2)\cdot(-1)\cdot(3) = (-1)(-1)(2)(3)$

commutativity

So, whether the ~~sign~~ answer is positive or negative depends on whether $(-1)(-1)$ is positive or negative.

$$(-1)(-1) = (-1)\cdot(-1) + 0$$
$$= (-1)\cdot(-1) + (-2) + 2$$
$$= (-1)\cdot(-1) + (-1)\cdot 2 + 2$$

Distributive Property

$$= (-1)[(-1) + 2] + 2$$
$$= (-1)[1] + 2$$
$$= -1 + 2$$
$$= 1$$

So, $(-1)\cdot(-1) = 1$.

Then, $(-2)\cdot(-3) = (2)\cdot(3)$.

$(-)\cdot(-)=(+)$ Negative · Negative = Positive

~~Let $a, b \in \mathbb{R}$.~~

~~Then $a^{-1} \in \mathbb{R}$ & $b^{-1} \in \mathbb{R}$, where $aa^{-1} = 1 = a^{-1}a$ & $bb^{-1} = 1 = b^{-1}b$.~~

~~Then ab~~

~~$= a, b \in \mathbb{R}$.~~

Let $a, b \in \mathbb{R}$.

Let $x = ab + (-a)b + (-a)(-b)$.

Then

$$x = ab + (-a)\left[b + (-b)\right]$$
$$= ab + (-a)(0)$$
$$= ab + 0$$
$$= ab$$

Also

$$x = \left[a + (-a)\right]b + (-a)(-b)$$
$$= 0b + (-a)(-b)$$
$$= (-a)(-b)$$

So, $ab = (-a)(-b)$.

Numeracy Name:
Multiplying Integers Homework #3 Date: Period:

Part 1: Evaluate the following multiplication problems. Some of them have been done for you. Use the back of this paper (or a separate sheet of paper) for scratch work.

1 • 7 =	1 • 8 =	1 • 9 =
2 • 7 =	2 • 8 = 16	2 • 9 =
3 • 7 =	3 • 8 =	3 • 9 =
4 • 7 = 28	4 • 8 =	4 • 9 =
5 • 7 =	5 • 8 =	5 • 9 =
6 • 7 =	6 • 8 =	6 • 9 =
7 • 7 =	7 • 8 =	7 • 9 =
8 • 7 =	8 • 8 =	8 • 9 = 72
9 • 7 =	9 • 8 = 72	9 • 9 =
10 • 7 =	10 • 8 =	10 • 9 =
11 • 7 =	11 • 8 =	11 • 9 =
12 • 7 =	12 • 8 =	12 • 9 =

Part 2: Using your answers from above and the fact that multiplication is commutative (for example, 2 • 3 = 3 • 2), fill in the following multiplication table:

•	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
1	1	2	3	4	5	6				10	11	12
2	2	4	6	8	10	12		16		20	22	24
3	3	6	9	12	15	18				30	33	36
4	4	8	12	16	18	24	28			40	44	48
5	5	10	15	18	25	30				50	55	60
6	6	12	18	24	30	36				60	66	72
7				28								
8		16							72			
9								72				
10	10	20	30	40	50	60						
11	11	22	33	44	55	66						
12	12	24	36	48	60	72						