Objectives:

- Students will multiply multi-digit integers, as evidenced 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
- Homework Checker
- Readiness Checker

Student Materials for Later:

- Homework Log
- Binder Paper
- Pencils

Teacher Materials:

- "Minute Quiz 8A"
- "Multiplying Integers Homework" answer key and grading roster for TA
- "Multiplying Integers Homework #2" handout

Homework:

- Multiplying Integers Homework #2
- 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.
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** 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 BIG INTEGERS** **Notes** Follow the handwritten Cornell Notes. **Homework** Pass out the "Multiplying Integers Homework #2" 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 4's, 5's, and 6's).

Numeracy
Minute Quiz 1-8A

Name:
Date: Period:

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

7 • 1 =	3 • 1 =	8 • 2 =
10 • 2 =	12 • 2 =	9 • 1 =
9 • 3 =	8 • 2 =	9 • 1 =
8 • 1 =	2 • 1 =	5 • 1 =

Numeracy
Minute Quiz 1-8A

Name:
Date: Period:

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

7 • 1 =	3 • 1 =	8 • 2 =
10 • 2 =	12 • 2 =	9 • 1 =
9 • 3 =	8 • 2 =	9 • 1 =
8 • 1 =	2 • 1 =	5 • 1 =

Numeracy
Minute Quiz 1-8A

Name:
Date: Period:

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

7 • 1 =	3 • 1 =	8 • 2 =
10 • 2 =	12 • 2 =	9 • 1 =
9 • 3 =	8 • 2 =	9 • 1 =
8 • 1 =	2 • 1 =	5 • 1 =

Numeracy
Minute Quiz 1-8B

Name:
Date: Period:

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

4 • 2 =	3 • 3 =	8 • 3 =
6 • 1 =	8 • 1 =	9 • 2 =
8 • 3 =	12 • 1 =	2 • 2 =
5 • 2 =	11 • 2 =	12 • 1 =

Numeracy
Minute Quiz 1-8B

Name:
Date: Period:

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

4 • 2 =	3 • 3 =	8 • 3 =
6 • 1 =	8 • 1 =	9 • 2 =
8 • 3 =	12 • 1 =	2 • 2 =
5 • 2 =	11 • 2 =	12 • 1 =

Numeracy
Minute Quiz 1-8B

Name:
Date: Period:

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

4 • 2 =	3 • 3 =	8 • 3 =
6 • 1 =	8 • 1 =	9 • 2 =
8 • 3 =	12 • 1 =	2 • 2 =
5 • 2 =	11 • 2 =	12 • 1 =

Numeracy
Minute Quiz 1-8C

Name:
Date: Period:

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

3 • 2 =	10 • 1 =	9 • 2 =
2 • 1 =	7 • 2 =	5 • 2 =
2 • 2 =	11 • 2 =	9 • 2 =
9 • 2 =	2 • 1 =	12 • 1 =

Numeracy
Minute Quiz 1-8C

Name:
Date: Period:

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

3 • 2 =	10 • 1 =	9 • 2 =
2 • 1 =	7 • 2 =	5 • 2 =
2 • 2 =	11 • 2 =	9 • 2 =
9 • 2 =	2 • 1 =	12 • 1 =

Numeracy
Minute Quiz 1-8C

Name:
Date: Period:

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

3 • 2 =	10 • 1 =	9 • 2 =
2 • 1 =	7 • 2 =	5 • 2 =
2 • 2 =	11 • 2 =	9 • 2 =
9 • 2 =	2 • 1 =	12 • 1 =

Multiplying Big Integers, Part 1

Section → Intro

~~We multiply small integers by adding (ex: 2·3 = 2+2+2=6)~~
~~or memorizing the mult table.~~

We usually mult big ints like:
~~For big integers, we usually use long~~ ~~this~~ ~~the~~ ~~following~~ ~~method:~~

Ex: $\overset{1}{1}23$ ← carry
$\times\ 8$
984

This has 2 problems:

1) must remember to carry

2) hard to see why it works

Instead, we will learn the method of partial products (also known as long mult'n).

Section → Distributive Property (D.P.)

※ The D.P. lets us multiply across parenthesis.

Ex: $2(3+4) = 2\cdot3 + 2\cdot4$

Let's show it's true.

Left: $2(3+4) = 2\cdot7 = 14$

Right: $2\cdot3 + 2\cdot4 = 6+8 = 14$

Ex: $2(3+4+5) = 2\cdot3 + 2\cdot4 + 2\cdot5$

Ex: $(7+8)\cdot 9 = 7\cdot 9 + 8\cdot 9$

Section → Partial Product Mult

Idea: We multiply smaller pieces and then add them together.

Ex: $123 \cdot 8 = ?$

Why this works:

Then $123 \cdot 8 = (100+20+3)\cdot 8$

$= 100\cdot 8 + 20\cdot 8 + 3\cdot 8$

these are much easier pieces

$= 800 + 160 + 24$ add the results together

$= 984$

$$\begin{array}{r} 123 \\ \times\ 8 \\ \hline 24 \\ 160 \\ +800 \\ \hline 984 \end{array} \quad \begin{array}{l} \leftarrow 8\cdot 3 \\ \leftarrow 8\cdot 20 \\ \leftarrow 8\cdot 100 \end{array}$$

Ex: $123 \cdot 9 = ?$

$$\begin{array}{r} 123 \\ \times\ 9 \\ \hline 27 \\ 180 \\ +900 \\ \hline 1107 \end{array} \quad \begin{array}{l} \leftarrow (3\cdot 9) \\ \leftarrow (20\cdot 9) \\ \leftarrow (100\cdot 9) \end{array}$$

Ex: $7{,}248 \cdot 3 = ?$

$$\begin{array}{r} 7{,}248 \\ \times\ 3 \\ \hline 24 \\ 120 \\ 600 \\ +21{,}000 \\ \hline 21{,}744 \end{array} \quad \begin{array}{l} \leftarrow 8\cdot 3 \\ \leftarrow 40\cdot 3 \\ \leftarrow 200\cdot 3 \\ \leftarrow 7000\cdot 3 \end{array}$$

Numeracy Name:
Multiplying Integers Homework #2 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 • 4 =	1 • 5 =	1 • 6 =
2 • 4 =	2 • 5 = 10	2 • 6 =
3 • 4 =	3 • 5 =	3 • 6 =
4 • 4 =	4 • 5 =	4 • 6 =
5 • 4 =	5 • 5 =	5 • 6 =
6 • 4 =	6 • 5 =	6 • 6 =
7 • 4 = 28	7 • 5 =	7 • 6 =
8 • 4 =	8 • 5 =	8 • 6 =
9 • 4 =	9 • 5 =	9 • 6 =
10 • 4 = 40	10 • 5 = 50	10 • 6 = 60
11 • 4 =	11 • 5 =	11 • 6 =
12 • 4 =	12 • 5 =	12 • 6 =

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				7	8	9	10	11	12
2	2	4	6		10		14	16	18	20	22	24
3	3	6	9				21	24	27	30	33	36
4							28			40		
5		10								50		
6										60		
7	7	14	21	28								
8	8	16	24									
9	9	18	27									
10	10	20	30	40	50	60						
11	11	22	33									
12	12	24	36									