# Unit 1
# Integers and Algebraic Expressions

## Lesson Outline

| **BIG PICTURE** |
| --- |
| Students will: |
| • review adding and subtracting of integers in context; |
| • develop estimation skills for solving everyday problems;- |
| • develop an understanding of multiplication and division by and of integers (making use of both manipulatives and algorithms); |
| • solve problems requiring an understanding of integers and their arithmetic manipulation; |
| • evaluate arithmetic and algebraic expressions involving integers and including brackets and exponents, emphasizing the need for knowing and following the order of operations. |

| Day | Lesson Title | Math Learning Goals | Expectations |
| --- | --- | --- | --- |
| 1 | A Positive Attitude Toward Negative Numbers | • Re-establish necessary conceptual understanding and skills required for this unit. <br> • Mastery of adding and subtracting integers and contextualizing these operations in real life. <br> • Show that addition and subtraction are inverse operations. | 8m18, 8m22 <br><br> CGE 2b, 7b |
| 2 | Living with Negatives | • Solve a variety of application questions requiring the choosing of operations and the applying of skills (adding/subtracting) with integers. | 8m18, 8m22 <br><br> CGE 3c |
| 3 | Unfamiliar Territory | • Explore and investigate multiplication of integers with opposite signs using a variety of approaches, e.g., patterns in a multiplication table; multiplication as repeated addition of sets. <br> • Investigate multiplication of integers within everyday contexts to deepen understanding. | 8m18, 8m22 <br><br> CGE 3c, 7b |
| 4 | Getting Used to the Territory | • Solve simple problems requiring the multiplication of integers with opposite signs. <br> • Explore multiplication of integers with the same sign, utilizing the approaches from the previous day. | 8m21, 8m22 <br><br> CGE 5b |
| 5 | Writing Letters in Math Class | • Review the use of algebra in real life and evaluate algebraic expressions with integers. | 8m59, 8m62 <br><br> CGE 3c, 7b |
| 6 | It's the Inverse | • Investigate division of integers. <br> • Connect the operation of division as the inverse of the operation of multiplication. Provide examples where division is either partitive or quotative, i.e., How big is one share? How many equal shares? | 8m21 <br><br> CGE 4b, 4f, 5a |
| 7 | Dividing It Up | • Solve simple problems requiring the division of integers. | 8m21, 8m22 <br><br> CGE 5b, 7b |
| 8 | But Is It Useful? | • Solve problems requiring multiplication and division of integers, utilizing estimation as well as calculation. | 8m18, 8m21, 8m22 <br><br> CGE 3c, 5b |
| 9 | Now, What Did BEDMAS Stand For? | • Operate with integers by evaluating arithmetic expressions requiring the application of Order of Operations. | 8m20, 8m23 <br><br> CGE 3c, 5b |

| Day | Lesson Title | Math Learning Goals | Expectations |
|---|---|---|---|
| 10 | Putting It Together | • Evaluate algebraic expressions requiring the multiplication and division of integers. | 8m62<br><br>CGE 4b, 4f |
| 11 | Life's Full of Numbers | • Solve problems requiring operating with integers and explaining the thinking behind the solutions. | 8m18, 8m21, 8m22, 8m23<br><br>CGE 2b, 2c |
| 12 | Summative Assessment | | |

| | | |
|---|---|---|
| | **Math Learning Goals**<br>• Students will re-establish necessary conceptual understanding and skills required for this unit.<br>• Students will gain mastery of adding and subtracting integers and contextualizing these operations in real life.<br>• Students will show that addition and subtraction are inverse operations | **Materials**<br>• BLM 1.1.1<br>• BLM 1.1.2<br>• BLM 1.1.3<br>• Decks of cards for pairs of students<br>• Paper and pencil<br>• Wall Anchor poster |
| **Minds On…** | **Whole Class → Investigation**<br>Students play Integer Football:<br><br>Have the classroom or large area (gymnasium or outdoor area) marked out as a football field. The centre line is 0, while one end is the +50 goal line and the other end is the -50 goal line. You will need to mark off 5 unit increments on each side. Any position on the field is determined by a signed number between +50 and -50.<br><br>Break students into two teams: positive and negative. The positive team moves towards the positive goal line and the negative team moves towards the negative goal line.<br><br>If the negative team starts on the -20 yard line and has a loss of 20 yards, it will be on the +5 yard line.<br><br>Use the changes on BLM 1.1.1 to move the teams around the field; have a QB come and pick a change for their team. Have a designated student from each team be the "ball" for that turn, allowing every student a turn, and have three downs. After three downs, the other team takes the field. Have the team members tell the student where to go on the field.<br><br>Play continues until a team scores a touchdown or teacher feels enough time has passed for students to have grasped the concept. | *Teacher Tip:*<br>Look for students who find patterns in the game. |
| **Action!** | **Whole Class → Connecting**<br>Lead the class into a discussion about the most important ideas/rules/patterns discovered during the game.<br>  - What happened when the negative team GAINED (added) yards?<br>  - What happened when the positive team GAINED (added) yards?<br>  - What happened when the negative team LOST (subtracted) yards?<br>  -  What happened when the positive team LOST (subtracted) yards?<br><br> In groups, have the class come up with rules or patterns for adding and subtracting integers. Go over each groups' conclusions.<br><br>As a class, create class rules for adding and subtracting integers and put them, along with illustrations, on a pre-made Wall Anchor poster. Give students BLM 1.1.2 to make notes on.<br><br>**Content Expectations/Observation/Mental Note:** Circulate to assess whether or not students can make connections to the patterns in the football game.  The recognition and understanding of these patterns is key to success in this unit. | |
| **Consolidate Debrief** | **Small Group → Integer game**<br>Students work in groups of two and play the Integer WAR game.<br><br>Students are given a deck of cards: red cards are positive integers from 1-13 and black cards are negative integers from 1-13. Decks are shuffled and two cards are turned over at the same time. Students write down an addition or subtraction expression using the numbers shown. The person to make the largest number by adding or subtracting wins a point. | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation**<br>Students complete BLM 1.1.3 | |

| | | | | |
|---|---|---|---|---|
| Gain of 10 yards | Loss of 10 yards | Gain of 2 yards | Loss of 2 yards | Gain of 20 yards |
| Loss of 20 Yards | Gain of 1 yard | Loss of 1 yard | Gain of 19 yards | Loss of 19 yards |
| Gain of 15 yards | Loss of 15 yards | Gain of 5 yards | Loss of 5 yards | Gain of 30 yards |
| Loss of 30 yards | Gain of 35 yards | Loss of 35 yards | Gain of 12 yards | Loss of 12 yards |
| Gain of 50 yards | Loss of 50 yards | Gain of 80 yards | Loss of 80 yards | Gain of 100 yards |

+50

Positive

0

Negative

-50

## 1.1.3: Inverse Operations Take Home Activity     Grade 8

How could the ball get from the +40 yard line to the -10 yard line if the negative team had the ball? What if the positive team had the ball?

If the positive team had a gain of 20 yards and a loss of 30 yards and ended up at the -20 yard line, where did they start?

| | |
|---|---|
| 10 – 20 = | 10 + -20 = |
| -30 + 40 = | -30 - -40 = |
| -40 – 10 = | -40 + -10 = |

# Unit 1: Day 2: Living with Negatives

Grade 8

| | Math Learning Goals | Materials |
|---|---|---|
| | • Students will solve a variety of application questions requiring the choosing of operations and the applying of skills (adding/subtracting) with integers. | • BLM 1.2.1, 1.2.2, 1.2.3<br>• Algebra tiles<br>• Coloured counters<br>• Number line<br>• Thermometer<br>• Calculator |
| **Minds On…** | **Whole Class → Problem Solving**<br>Have a big problem on the board for when students enter the classroom. The problem should address concerns with notation (e.g. Owed money is represented using a negative sign) and allow for incorrect notations to be discussed (representing owing money with a positive amount).<br><br>Example Problem: Emmanuelle owes her brother $20 for a CD he bought for her and is getting $10 from her grandmother for mowing the lawn. If she started out with $25, how much money will she have now? Have students share solutions and discuss any discrepancies. | |
| **Action!** | **Small Group → Connecting**<br>Set up five stations around the classroom and break students into groups around each station. See BLM 1.2.1 for activities for each station.<br><br>Recommended manipulatives:<br>Station A: algebra tiles, Station B: coloured counters/ two-colour discs, Station C: number line, Station D: thermometer, Station E: calculator.<br><br>Give students BLM 1.2.2. Allow students sufficient time at each station to discuss the problem and record their work.<br><br>**Content Expectations/Observation/Mental Note:** Circulate to assess whether or not students are understanding and using the rules discussed on Day 1. The recognition and understanding of these rules is key to success in this unit. | |
| **Consolidate Debrief** | **Whole Class → Discuss**<br>As a class, summarize and discuss their results from the 'Action!' section. Have students put samples of their answers to each station on the board and discuss other possible representations. Discuss which manipulatives worked best for what situations. | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation**<br>Students complete BLM 1.2.3 | |

## Center A:

Jim is on the golf course. He has the following results for the first three holes: +3, par and -2. What is his total score at this point? Is the answer positive or negative? How do you know this? Model your work using the manipulative provided and then record your work on your record sheet.

## Center B:

You are buying a barrel of 35 apples. As you pick up the barrel you notice there are some bad apples in the barrel. You remove the bad apples and have 20 apples left. How many bad apples were there? Is the answer positive or negative? How do you know this? Model your work using the manipulative provided and then record your work on your record sheet.

## Center C:

You and your friends live on the same street. One friend lives to the East of you and the other lives to the West. You walk the three blocks West to pick up your first friend and then walk five blocks East to visit your other friend. How far does the second friend live from you? Is the answer positive or negative? How do you know this? Model your work using the manipulative provided and then record your work on your record sheet.

## Center D:

A temperature gauge in an airplane measures the following changes in temperature after takeoff: + $2^0$ C, - 30 $^0$ C and +$20^0$ C. If the plane landed in Montreal and the temperature there was $26^0$ C, what were the changes in temperature at each stage of the flight? Are the answer positive or negative? How do you know this? Model your work using the manipulative provided and then record your work on your record sheet.

## Center E:

Benny gets paid $500 every two weeks. After his paycheck is deposited, he has to pay his cell phone bill of $30 and buy a birthday gift for his girlfriend. If Benny has $390 left in his account, how much did he spend on the gift? Is the answer positive or negative? How do you know this? Model your work using the manipulative provided and then record your work on your record sheet.

## 1.2.2: Student Work Sheet for Activity Centers     Grade 8

**Center A:**

**Center B:**

**Center C:**

**Center D:**

**Center E:**

For each problem below, please indicate
- i.        what operation(s) you will use to solve the problem and
- ii.       whether the result will be positive or negative

Choose TWO problems to solve completely.

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Brent scores a -2 on Hole 1, +4 on Hole 2 and par on Hole 3. He forgets to write his score for Hole 4 but his friend has his total score as par for the course so far. What did Brent score on Hole four?

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Marie is buying light bulbs for her Christmas decorations. She buys 12 but when she gets to the cash, she has to put back four because they are broken. How many light bulbs does Marie buy?

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You are tracking the movements of an ant as he searches for food for a science project. You notice that he travels 10 m north of the colony and then moves 60 m south. How far away from the colony is the ant when he finally finds food?

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Annie monitors the temperature in her swimming pool on a daily basis. On Monday it was $25^0$C and then it dropped two degrees before climbing five degrees by Friday. What was the temperature of the pool on Friday?

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Phil gets paid $500 every two weeks. After getting paid he had to pay $30 for repairs to his skateboard, but then received a check from his grandparents for his birthday. If his balance is $520, how much did he receive from his grandparents?

| | | Materials |
|---|---|---|
| | **Math Learning Goals**<br>• Students will explore and investigate multiplication of integers with opposite signs using a variety of approaches, e.g., patterns in a multiplication table; multiplication of repeated addition of sets<br>• Students will investigate multiplication of integers within everyday contexts to deepen understanding | • BLM 1.3.1<br>• BLM 1.3.2 |
| **Minds On…** | **Individual → Investigation**<br>Students work through BLM 1.3.1 independently.  Ideally, students will complete the chart using patterns, rather than calculators. | Students who struggle with the computations could use a standard multiplication table or calculator in order to ensure that their class time is spent on looking for the patterns, rather than calculating. |
| **Action!** | **Whole Class → Connecting**<br>Students share their findings from BLM 1.3.1, record any corrections and add ideas to their definitions/models.<br>Lead the class in a discussion about the most important ideas/rules/patterns when multiplying integers.  Add ideas to the class anchor chart from Day 1 (BLM 1.1.2).<br><br>**Content Expectations/Observation/Mental Note:** Circulate to assess whether or not students can make connections to the patterns in the multiplication table.  The recognition and understanding of these patterns is key to success in this unit. | |
| **Consolidate Debrief** | **Small Group → Frayer Model**<br>Students work together to complete BLM 1.3.2 using information from class discussion and the class anchor chart.  This Frayer Model can serve as a note on the characteristics of multiplying integers. | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation**<br>In your journal, list ten examples of situations, outside of school, when you would need to multiply integers (show a variety of situations). | |

# 1.3.1: Integer Multiplication Table          Grade 8

| X | 5 | 4 | 3 | 2 | 1 | 0 | -1 | -2 | -3 | -4 | -5 |
|---|---|---|---|---|---|---|----|----|----|----|----|
| 5 |   |   |   |   |   |   |    |    |    |    |    |
| 4 |   |   |   |   |   |   |    |    |    |    |    |
| 3 |   |   |   |   |   |   |    |    |    |    |    |
| 2 |   |   |   |   |   |   |    |    |    |    |    |
| 1 |   |   |   |   |   |   |    |    |    |    |    |
| 0 |   |   |   |   |   |   |    |    |    |    |    |
| -1 |   |   |   |   |   |   |    |    |    |    |    |
| -2 |   |   |   |   |   |   |    |    |    |    |    |
| -3 |   |   |   |   |   |   |    |    |    |    |    |
| -4 |   |   |   |   |   |   |    |    |    |    |    |
| -5 |   |   |   |   |   |   |    |    |    |    |    |

What patterns do you see on the multiplication table?

Look at the question:  *8 x 3 = 24*

   i.      What does the 'x' symbol mean to you?  Describe its meaning in your own words.

   *ii.*      Draw a picture to show what the 'x' symbol means in *8 x 3 = 24*

Now, consider the following:  *8 x (-3) =* \_\_\_\_\_

i.      Think of the way you described what the 'x' symbol means above and describe what this question means.

ii.      Try to draw a diagram to represent *8 x (-3)*.

In words, describe what the following questions mean – <u>and then</u>, try to answer them.

     *i.  6 x (-5) =*

     *ii.  2 x (-7) =*

     *iii.   5 x (-4) =*

**Write a rule and draw a model to show what happens when:**

You multiply two positive integers:

You multiply a positive and negative integer:

You multiply two negative integers:
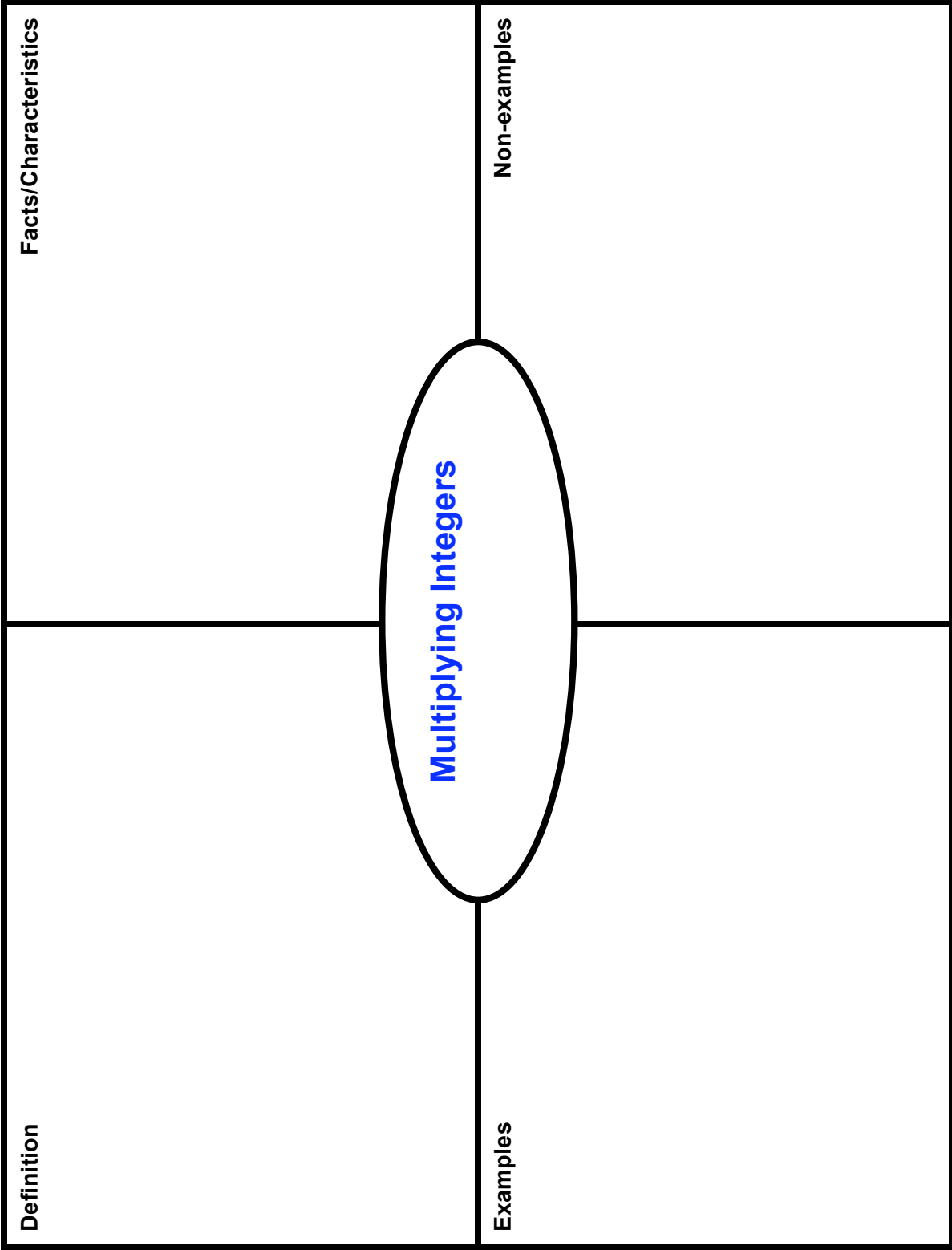
**Facts/Characteristics**

**Non-examples**

**Multiplying Integers**

**Definition**

**Examples**

| | | |
|---|---|---|
|  | **Math Learning Goals** <br> • Students will solve simple problems requiring the multiplication of integers with opposite signs. <br> • Students will explore multiplication of integers with the same sign, utilizing the approaches from the previous day. | **Materials** <br> • BLM 1.4.1 <br> • BLM 1.4.2 <br> • Sets of materials for each station: three bags, cut out tags <br> • Optional: monopoly money |
| **Minds On…** | **Whole Class → Discussion** <br> Students will discuss examples they thought of during the Day 3 homework task. Put student examples on the board, making sure to expand on the examples and having the students explain HOW you would use multiplication each situation. | |
| **Action!** | **Small Groups → Connecting** <br> Students are broken into small groups. Each group is sent to a "store". At the store they find three bags: an item bag with a cost indicated, a quantity bag and a discount/penalty bag. Each shopper picks one tag from each bag and "buys" the item (s). Students will then perform the calculations on the Receipt page (BLM 1.4.2). <br><br> Every shopper starts with the same amount of money in his or her wallet. If available, use play money and act as the cashier for the students: have students present you with their worksheet and only give them their "purchase" and change if they calculated their total correctly. <br><br> The shopper who visits all stores and has the most money left is deemed the best shopper. <u>Note</u>: Some shoppers may be unable to purchase items because they do not have enough cash on them. They must prove that they are unable to purchase anything at this store and explain why. All students must visit all five stores. | ■ Group students according to their ability level and change the money amounts (add decimals) to suit their skill level. |
| **Consolidate Debrief** | **Individual → Journal** <br> Students answer, in their journals, the questions: <br> • What was the hardest part of today's activity? <br> • What was the easiest part? Why? | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation** <br> In your journal answer the following question: <br> • How do you know whether an integer multiplication expression will give you a positive or negative product? <br> • Give five examples of each type. Show some with same and some with opposite signs. | |

# 1.4.1: Smart Shoppers' Store Information        Grade 8

## Bag 1: Item with Price

**Store A: Electronics**

| 1 pack of batteries: $3 | 1 mp3 player: $80 | 1 pair of ear buds: $20 | 1 battery charger: $10 | 1 video game: $15 |
|---|---|---|---|---|

**Store B: Clothing**

| I T-shirt $5 | 1 pair of socks: $2 | 1 pair of jeans: $20 | 1 pair of shorts: $15 | 1 pair of shoes: $50 |
|---|---|---|---|---|

**Store C: Groceries**

| 12 pack of pop: $5 | 1 bag of chips: $2 | 1 box of chocolates: $20 | 1 bag of apples: $10 | 1 carton of ice cream: $8 |
|---|---|---|---|---|

**Store D: Fast Food**

| Small Fry: $1 | Cheeseburger: $3 | Slice of Pizza: $2 | Large Pop: $4 | Salad: $7 |
|---|---|---|---|---|

**Store E: Accessories**

| 1 pair of earrings: $10 | 1 purse: $20 | Gift wrap and card: $10 | 1 wallet: $10 | 1 hat: $15 |
|---|---|---|---|---|

## Bag 2: Quantities

| 1 | 1 | 2 | 2 | 3 |
|---|---|---|---|---|

## Bag 3: Discount/Penalty

| $10 off ENTIRE purchase | $1 off each item | OOPS! Add $2 to the price of the item | $20 off your purchase | Add $20 in taxes |
|---|---|---|---|---|

| Amount | Item and Price | Discount/Penalty | Cost | Balance |
|--------|----------------|------------------|------|---------|
|        |                |                  |      |         |
|        |                |                  |      |         |
|        |                |                  |      |         |
|        |                |                  |      |         |
|        |                |                  |      |         |

| | | **Materials** |
|---|---|---|
| | ## Math Learning Goals<br>• Students will review the use of algebra in real life and evaluate algebraic expressions with integers. | • Computers with access to either www.explorelearning.net (subscription) or www.nlvm.usu.edu (free)<br>• BLM 1.5.1 |
| **Minds On…** | ### Partner → Reflection<br>Post an algebraic expression on the board.  Students will work with a partner to reflect on the following reflection questions in their math journals:<br><br>• What does the letter in the algebraic expression represent?<br><br>• Why do we use letters in algebraic expressions?<br><br>• Describe what each symbol in the expression means in everyday language<br>(e.g. = means "the same as") | Depending on student readiness, provide several examples of varying difficulty levels and allow students to choose one. |
| **Action!** | ### Individual → Technology Exploration<br>Option A: If your board has a subscription, students can login to www.exlporelearning.com, click on the 'algebra' link in the grade 6-8 box and begin with the "Modeling One-Step Equations" Gizmo.  Students can complete and print the self-check quiz.  Students will follow-up with the "Modeling two-step Equations" Gizmo and quiz.<br><br>Option B: If your board does not subscribe to ExploreLearning, or you would like further practice, students can use the applet from the National Library of Virtual Manipulatives at www.nvlm.usu.edu. Click on the grade 6-8 algebra link.  Students can explore the "Algebra Balance Scales-Negatives" applet.  Create reflection questions if further information is needed for assessment purposes.<br><br>**Content Expectations/Observation//Mental Note:** Circulate while students work on the computers and note any confusions/areas needed for remediation.  If needed, use one of the "Instructional Jazz" days to remediate | *Teacher Tip:* Before taking a class to the lab, make sure school computers will open one of the two sites and activities.  If not, your board may subscribe to a suitable substitute. |
| **Consolidate Debrief** | ### Whole Class → Discussion<br>Review the online tools and discuss how the applications are helpful. This is an ideal opportunity to address any questions and/or misconceptions that came up while working on the computers. | |
| *Exploration Reflection* | ### Home Activity or Further Classroom Consolidation<br>Complete the practice questions on BLM 1.5.1. | |

# 1.5.1: Thinking Algebraically                    Grade 8

For each of the following word problems, write an algebraic expression that represents the problem.  Choose THREE of them to solve completely.

1. You are selling drinks at the school dance.  You have a cooler, which holds 35 cups.  The canteen gets busy and you lose track of how many cups you sold.  You check and see that there are 17 cups left in the cooler. How many drinks must you have sold?

2. You are visiting a friend and their dog gets loose.  You chase the dog to try and catch it.  You chase it 2 blocks east; it turns and goes 5 blocks west, then 8 blocks east, then another 2 blocks east, 7 blocks west and 1 block east before you finally catch the dog.  Use positive numbers to represent east blocks, and negative numbers to represent west blocks.  How far are you from your friend's house when you catch the dog?

3. You buy tickets to a concert for you and your friends.  You buy ten tickets at $12 each.  Some of your friends pay you back.  You are still owed $36 in the end.  How many of your friends paid you back?

4. Your school is having an open house.  They decide to make bumper stickers with the school logo.  The school budgeted $220 for the stickers.  It costs $40 to make the design and another $2 for each sticker.  How many stickers can the school buy?

5. You go grocery shopping for fruit and spend $24. If you spent an equal amount on apples, bananas, oranges, kiwis, strawberries and pears, how much money did you spend on each type of fruit?

# Unit 1: Day 6: It's the Inverse

| | | |
|---|---|---|
| | **Math Learning Goals**<br>• Students will investigate division of integers<br>• Students will connect the operation of division as the inverse of the operation of multiplication through examples where division is either partitive or quotative, i.e., How big is one share? How many equal shares? | **Materials**<br>· BLM 1.6.1<br>· BLM 1.6.2 |
| **Minds On…** | **Individual → Reflection**<br>Post a division question on the board (5 people are sharing a 15 slice pizza). Students work on the following questions in their journals:<br><br>    • Represent this situation using multiplication.<br><br>    • Represent this situation using division.<br><br>    • How are multiplication and division related? | ■ Depending on student readiness, several examples of varying difficulty levels could be provided. Allow students to choose one or work in partners. |
| **Action!** | **Individual → Knowledge/Understanding**<br>Students complete BLM 1.6.1 individually.<br><br>After sufficient time has passed for students to attempt the work, group them with their partners and have them discuss their conclusions.<br><br>**Content Expectations/Observation//Mental Note:** Circulate while students work on the worksheet and note any confusions/areas needed for remediation. If needed, use one of the "Instructional Jazz" days to remediate. | |
| **Consolidate Debrief** | **Whole Class → Discussion**<br>Review BLM 1.6.1, discussing any patterns observed and emphasizing that division is the inverse of multiplication and vice verse. Address any questions/misconceptions that came up while working on the sheet. As a class, discuss the rules the groups came up with and then decide as a class what the rule for multiplying and dividing integers is. Add this information to the Anchor Chart from previous lessons (BLM 1.1.2). | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation**<br>Complete the following question in your journal:<br>• How many DIFFERENT ways can you show 24 as a quotient?<br>• How many DIFFERENT ways can you show -24 as a quotient?<br>• Compare your results for both numbers.<br>Complete BLM 1.6.2. | Teacher examples of Fact trees are provided at the end of BLM 1.6.2. You may want to work with students through a few examples before assigning BLM 1.6.2 |

| | |
|---|---|
| 3 x 4 =<br><br>12 ÷ 4 =<br><br>12 ÷ 3 = | - 3 x 4 =<br><br>- 12 ÷ -3 =<br><br>- 12 ÷ 4 = |
| 5 x – 3 =<br><br>-15 ÷ 5 =<br><br>-15 ÷ - 3 = | -4 x -5 =<br><br>20 ÷ -4 =<br><br>20 ÷ -5 = |
| -6 x -4 =<br><br>24 ÷ -6 =<br><br>24 ÷ -4 = | -2 x 8 =<br><br>-16 ÷ -2 =<br><br>-16 ÷ 8 = |
| -3 x -10 =<br><br>30 ÷ -3 =<br><br>30 ÷ -10 = | -4 x 8 =<br><br>-32 ÷ -4 =<br><br>-32 ÷ 8 = |

# 1.6.2: Fact Family Trees

**Grade 8**

Choose a fact family that we haven't explored yet (it should include at least one negative number), and put each number in a corner of the triangle. Write the related multiplication and division expressions that can be represented by these numbers.
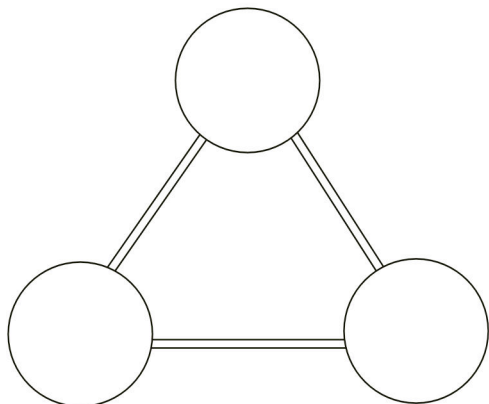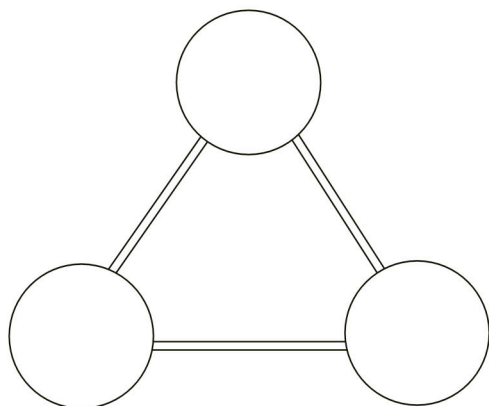
Fact Family:

1.

2.

3.
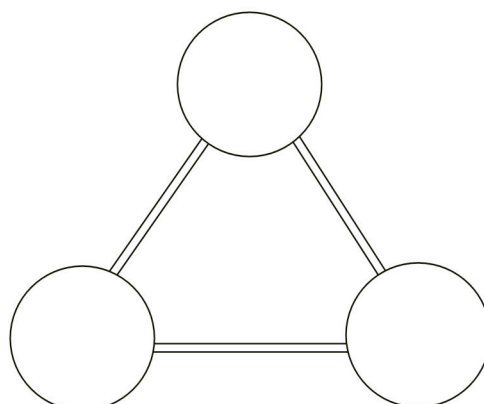
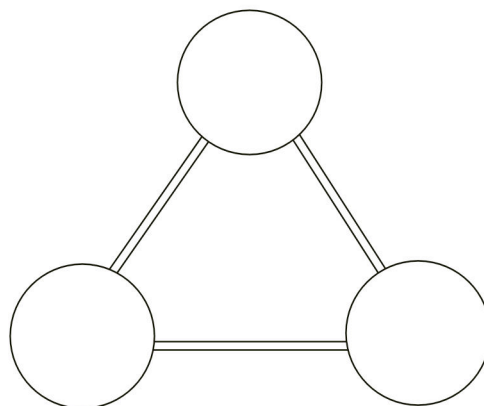Fact Family:

1.

2.

3.

Fact Family:

1.

2.

3.

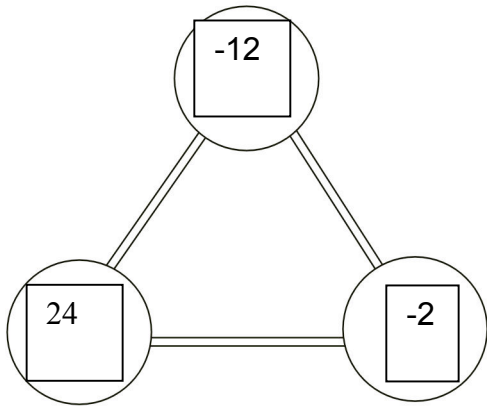Fact Family:

1.

2.

3.
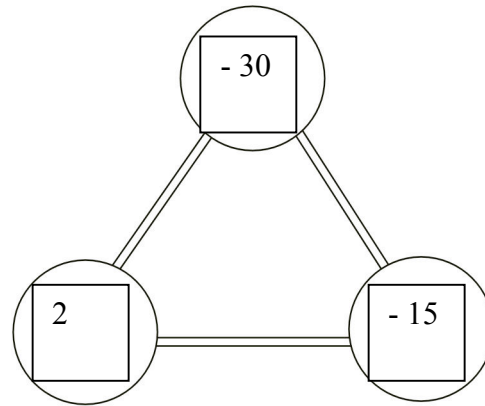
Teacher Example of Fact Family Trees from BLM 1.6.2



**Fact Family:**

1.    -12 x -2 = 24

2.    24 ÷ -12 = -2

3.    24 ÷ -2 = -12

**Fact Family:**

1.  − 30 ÷ 2 = -15

2.  − 30 ÷ -15 = 2

3.   -15 x 2 = -30

# Unit 1: Day 7: Dividing It Up

| | | |
|---|---|---|
| | **Math Learning Goals**<br>• Students will solve simple problems requiring the division of integers | **Materials**<br>• BLM 1.7.1<br>• Chart Paper<br>• Chart Markers<br>• Manipulatives |
| **Minds On…** | **Whole Class → Discussion**<br>Discuss and review the work from the *At Home Activity* assigned on Day 6, re-emphasizing the main concepts (rules for dividing and multiplying integers). | |
| **Action!** | **Small Groups → Problem Solving**<br>Students are broken into small groups of three. Each group is given a Big Problem Sheet (see BLM 1.7.1). Each group works through the problem together, using whatever manipulatives they may need and documenting their thought process on Chart Paper. When they are satisfied with their work, each group can post their chart paper in the classroom. | |
| **Consolidate Debrief** | **Whole Class → Discussion**<br>Review the chart papers as a class and group them according to similarities in problem solving technique, manipulative used, answer etc. (BANSHO) Address any questions/misconceptions that may be evident on the papers. As a class, discuss the method/manipulative that seems the most effective, the most creative, etc. Make sure students have a good understanding of the basics of operations with integers. | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation**<br>Complete the practise questions. | Provide students with appropriate practice questions showing multiple ways of representing division of integers. |

Jimmy is planning on making a new deck in his backyard this spring.

1. He must wait until the ground reaches a temperature of 6 degrees Celsius before he can begin building. Jimmy knows that, on average, the temperature increases 2 degrees Celsius per week in the spring. If the temperature is -12 now, how long must Jimmy wait before he can begin work?

2. Jimmy's deck is going to be 100 $m^2$. He has calculated that it will cost him $50/$m^2$ for all the materials needed to build his deck. Jimmy has $5500 on his credit card for this project. Does he have enough money to complete this project?

3. The Housing Depot offers Jimmy a great deal: no interest on his project, if he pays it off in a year. How much will Jimmy have to pay each month so that he is debt free in a year?

4. Jimmy has a BBQ to celebrate the completion of his deck. He needs to buy hot dogs for 20 people. Hot dogs come in packs of 8 and hot dog buns come in packs of 12. How many of each does he need? Does he have any leftovers? How much?

# Unit 1: Day 8: But Is it Useful?

| | | |
|---|---|---|
| | **Math Learning Goals**<br>• Students will solve problems requiring multiplication and division of integers, utilizing estimation as well as calculations | **Materials**<br>• BLM 1.8.1 |
| **Minds On…** | **Whole Class → Brainstorming**<br>Brainstorm the possible real life examples of multiplication and division of integers as a group, listing them on the board.<br>Review the process of estimation. E.g. Measure the length of your hand and then use that to estimate the width of your desk. | |
| **Action!** | **Small Groups → Problem Solving**<br>Students are broken to teams of two. The teams will move around to workstations set up around the classroom. At each station, each partner will complete a question: one involving estimation and the other involving calculation (BLM 1.8.1). The students switch the question they answer at every station; if they answered by estimating at Station 1, they will answer by calculation at Station 2. After all stations have been completed, partners compare answers and discuss the results. | |
| **Consolidate Debrief** | **Whole Class → Discussion**<br>Review the results and discuss the processes used to solve the problems at each station. Discuss when estimation was a good tool to use and when it was not. Why did different people get different answers when they estimated? | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation**<br>Answer the following in your journal:<br>• When would estimation be a good tool to use?<br>• When would it not be a good tool to use? Why? | |

| | |
|---|---|
| Find the width of your baby finger and use that measurement to estimate the length of this line: <br><br> _____ | Use a ruler to measure the length of this line: <br><br> _____ |
| If potatoes cost $2.99/kg, estimate how much it costs to buy a 5 kg bag of potatoes. | How much does a 5 kg bag of potatoes cost if the price is $2.99/kg? |
| You want to paint the wall behind your bed. It has an area of 120m$^2$. If one can of paint covers 35 m$^2$, estimate how many cans you will need. | You know the area of the wall behind your bed is 120 m$^2$. If one can of paint covers 35 m$^2$, how much paint will you need? |
| If Andy pays $10 a month to his parents for a bicycle they bought him, estimate how long it will take him to pay them back if the bicycle cost $126. | A bicycle cost $126. If Andy pays $10 a month, how long will it take for him to pay off the bicycle? |
| Your American cousin wants to know how cold Canada gets in the winter. Our coldest temperature this past winter was -40 degrees Celsius. Your mother tells you to double it and add thirty to convert to Fahrenheit. What temperature do you tell your cousin? | Convert – 40 degree Celsius to Fahrenheit by doing the following: <br> - add 32 <br> - multiply by 9 <br> - divide by 5 |

| | **Math Learning Goals** | **Materials** |
|---|---|---|
| | • Students will operate with integers by evaluating arithmetic expressions requiring the application of Order of Operations | • BLM 1.9.1<br>• BLM 1.9.2<br>• BLM 1.9.3<br>• Calculators |
| **Minds On…** | **Individual → Reflection**<br>Hand out BLM 1.9.1 to each student. Have them complete it individually.<br><br>When enough time has passed, have students' volunteer to present their problems. Have the class evaluate the process, making sure that everyone understands and uses the correct Order of Operations. Ask why the Order of Operations is important. | |
| **Action!** | **Partners → Problem Solving**<br>Students are broken into teams of two and given BLM 1.9.2. Each person in the team will create five problems similar to the one just completed as a class. Then they will pass their problems to their partner and attempt to complete the partner's problems. | |
| **Consolidate Debrief** | **Individual → Reflection**<br>Students complete BLM 1.9.3 individually. | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation**<br>Complete BLM 1.9.3 if it not completed by the end of class. | Possible Answers<br>1. $3 + 2 \times (6^2 - 4)$<br>2. $(3 + 2) \times (6^2 - 4)$<br>3. $(3 + 2) \times 6^2 - 4$<br>4. $3 + 2 \times 6^2 - 4$<br>Other possibilities may come up |

Fill in the blanks with a mathematical operation (addition, subtraction, multiplication and division) to make the integer equation true. Don't forget to use brackets if you need to!

1.    3 __ 2 ___ $6^2$ ___ 4  = 67

2.    3 __ 2 ___ $6^2$ ___ 4  = 160

3.    3 __ 2 ___ $6^2$ ___ 4  =  176

4.    3 __ 2 ___ $6^2$ ___ 4  = 71

How is it possible that the SAME four numbers can give such DIFFERENT results?

Using the numbers provided, create an integer expression with one of the numbers as an answer. Remember to follow the rules of BEDMAS!

**Group 1**: -1, 2, -3, 4, -5

**Group 2:** 0, -2, 3, 9, 1

**Group 3:** -10, -2, 5, 2, 20

**Group 4:** -20, 20, 2, 1

**Group 5:** 1, 2, 3, 4

Fill in the blanks to make the following Integer Equations true statements.

$3 \times$ ___ $= -12$                                              $-48$ ____ $-12 = 4$

$4$ ___ $-7 = -3$                                                   $12$ ____ $-4 = 16$

$12 +$ ____ $= -4$                                                  $-4$ ____ $5 = -20$

$25 \div$ ____ $= -5$                                               $14 -$ ____ $= 18$

$12 \times 2 -$ ____ $= 21$                                         $20 \div$ ____ $+ 5 = 0$

$14 + -5 \times$ ____ $= 4$                                         $14 +$ ____ $\times -2 = 24$

____ $- (-5) \times 3 = 5$                                          $20 + -2 \times -3 \div -6 =$ ____

$(-3)^2 + -3 \times$ ___ $= -18$                                    $(\text{___})^2 - 4 \times 2 = 17$

Now make up an equation of your own:

| | Math Learning Goals | Materials |
|---|---|---|
| | • Students will evaluate algebraic expressions requiring the multiplication and division of integers | • Chart paper<br>• BLM 1.10.1<br>• BLM 1.10.2<br>• Playing cards |

| | | |
|---|---|---|
| **Minds On…** | **Whole Class → Four Corners**<br>Cut up BLM 1.10.1 before class. Give each student a card. Students travel to the chart paper with the matching solution to their equation written in the middle of their card (the four sheets of chart paper should be labelled 24, 12, -24, -12). Once students are at their chart paper, they work together to create as many different algebraic expressions as possible with the same answer as the number on their sheet. If time permits, students could rotate to each sheet of chart paper and add their own expressions. | Observe students as they solve their card and create their expressions. Intervene and provide support, as needed. Make note of students who may need further assistance.<br><br>Content of cards can be differentiated based on student readiness in order to ensure students are working in their zone of proximal development. |
| **Action!** | **Partner → Building Algorithmic Skills**<br>Have students work in homogeneous pairings. Each group needs a stack of playing cards (not necessarily a whole deck, not face cards or jokers). Students take the top three cards and place them face up on the table. They record the three cards on BLM 1.10.2 and work together to create an algebraic expression using the cards (red cards are positive, black cards are negative). Each expression must include either division or multiplication and the steps to solving the expression. | Specific decks can be modified to include smaller numbers, or students could be allowed to reshuffle or trade in cards if they struggle to create their expression. Students who are stronger could flip four or five cards instead of three for a greater challenge. |
| **Consolidate Debrief** | **Whole Class → Discussion**<br>Share examples and challenge students to create different expressions using the same cards as the examples provided.<br>Discussion Questions:<br>• *What was most difficult about this task?*<br>• *What was easiest about this task?*<br>• *Did you make any new discoveries about multiplying and dividing integers that would make you more successful if you repeated this task?* | |
| *Exploration Reflection* | **Home Activity or Further Classroom Consolidation**<br>Write several algebraic equations on the board. Ask the students to write a word problem for each algebraic equation (thinking about the real life situations that are represented by integers). | |

| | | | |
|---|---|---|---|
| a = 2 x 12 | -2 x a = -24 | a = -2 x 12 | 2 x a = -24 |
| -12 = a ÷ -2 | 36 ÷ 3 = a | 12 = a ÷ -2 | -36 ÷ 3 = a |
| a ÷ -2 = -12 | a ÷ 2 = 6 | a ÷ 2 = -12 | a ÷ -2 = 6 |
| 48 = a x 2 | -24 ÷ a = -2 | -48 = a x 2 | 24 ÷ a = -2 |
| a = -48 ÷ -2 | -3 x a = -36 | a = 48 ÷ -2 | -3 x a = 36 |
| 6 x 4 = a | -24 ÷ -2 = a | 6 x -4 = a | 24 ÷ -2 = a |

Work with your partner to create algebraic expressions using your playing cards.  Turn up three cards and use them to create your expression.  Red cards are positive and black cards are negative.  Record your expression and solution for each expression.  *The first example has been done for you.*

| A♥ | 7♣ | 4♠ |
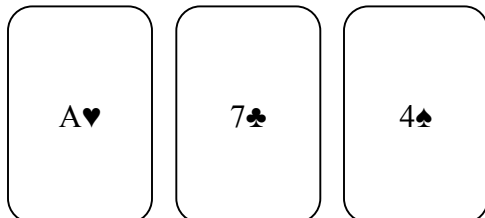
Numbers:     1,   -7,   -4

Expression:   (-4)a + 1 = -7
            (-4)a + 1 -1 = -7 -1
                (-4)a = -8
            (-4)a ÷ -4 = -8 ÷ -4
                    a = 2
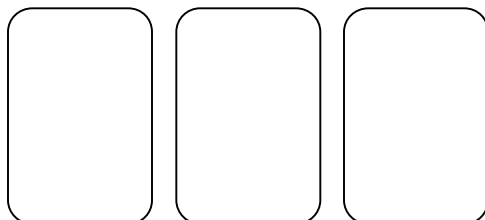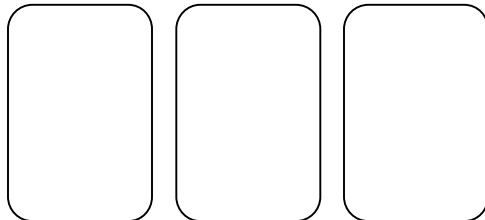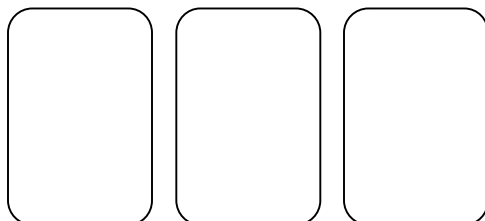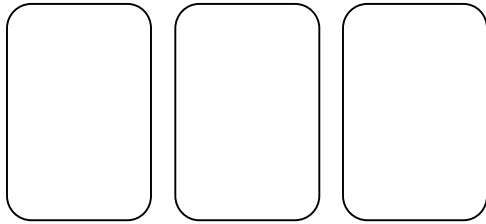
Numbers:

Expression:

Numbers:

Expression:

Numbers:

Expression:

Numbers:

Expression:

Numbers:

Expression:

Numbers:

Expression:

Numbers:

Expression:

Which number combination was the most difficult to make an expression for?  Why?

Which number combination was the easiest to make an expression for?  Why?

# Unit 1: Day 11 &12: Life's Full of Numbers

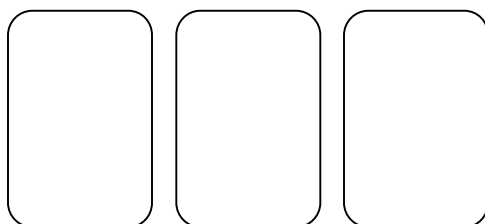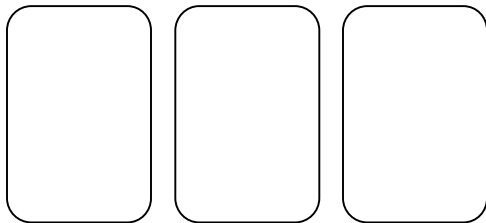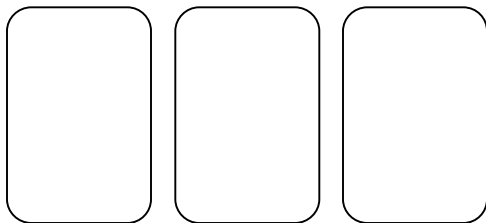| | | |
|---|---|---|
| | **Math Learning Goals**<br>• Students will solve problems requiring operating with integers and explaining the thinking behind the solutions. | **Materials**<br>• Chart paper<br>• Computers<br>• BLM 1.11.1<br>• BLM 1.11.2<br>• BLM 1.11.3<br>• BLM 1.11.4<br>• BLM 1.11.5 |
| **Minds On…** | **Small Groups → Placement**<br>Students work on a sheet of chart paper with "Integers on the Internet" written in the middle. They work together to think of as many different places they can find integers on the net. | This piece could be used as a final assessment task for the unit. More data may be needed for the individual summative assessment piece (1.12.1) |
| **Action!** | **Individual → Research/Practice (Day 11)**<br>Distribute copies of BLM 1.11.1, BLM 1.11.2, and BLM 1.11.3 evenly amongst students in the class (next day groups will be formed with a student who completed each of the different BLMs). If you have the ability to distribute the file digitally, students can use the hyperlinks in the document, rather than type in the addresses for the sites, and type their responses into the documents.<br>Students complete the research necessary to solve the problems on their BLMs using the websites provided on their BLM.<br>Collect work at the end of Day 11. Make copies in order to assess individual student work to prevent the Day 12 groups from making mistakes. | If needed, BLMs can be modified according to student readiness. For example, BLM 1.11.1 could have simpler numbers than the other BLMs (if one of the Day 11 activities is changed, it will alter the responses for Day 12). In their current form, 1.11.2 has the smallest numbers and 1.11.3 has the largest numbers. |
| **Consolidate Debrief** | **Small Groups → Practice/Consolidation (Day 12)**<br>Students gather in small groups such that each group member completed a different BLM on Day 11. Groups work together to use their data to solve the problems in BLM 1.11.4. Once they have solved the first clue, they can obtain BLM 1.11.5. | |
| *Concept practice* | **Home Activity or Further Classroom Consolidation**<br>Complete the practice questions. | Provide students with appropriate practice questions showing multiple ways of representing linear patterns. |

# 1.11.1: The Amazing Math Race – Europe        Grade 8



Welcome to the Amazing Math Race!  You and your team will be travelling around the world, gathering data you will need to win the competition.
You will be visiting Europe to gather data for your group.

You have been asked to keep track of the distances between the cities you visit.  Please use **http://goeurope.about.com/library/bl-europe-distance-maps.htm** to find the distance of each trip.

| Trip | Distance travelled (in kilometres) |
|------|------------------------------------|
| 1. London to Paris | |
| 2. Paris to Hamburg | |
| 3. Hamburg to Berlin | |
| 4. Berlin to Munich | |
| 5. Munich to Rome | |
| 6. Rome to Madrid | |

Use the above data to solve the following questions.  For each one, write out the equation needed and the solution to the equation.

7.  What is the difference between the distance from London to Paris and the distance from Berlin to Munich?


8.  What is half of the difference found in #7?


9.  You need to take four trips the length of Hamburg to Berlin off of your itinerary.


10. You need to take away a trip a fifth the length of your trip from Paris to Hamburg.

Start at **http://unstats.un.org** to answer the following questions:
*On the right-hand side of the page there is a search box you can use to find your information, once the next page comes up, you can filter by country and year.*

**Population 2005**

| Country | Female population | Male population | Total population | Difference between male and female populations |
|---|---|---|---|---|
| France | | | | |
| | | | | |
| Germany | | | | |
| | | | | |
| Switzerland | | | | |
| | | | | |
| Norway | | | | |

Use the date you gathered above to complete the following calculations.  Make sure to write out the equation needed to solve the equation:

11. Divide the total population of France by -2.


12. What would the population of females in Germany be if it tripled?


13.  Divide the population difference between males and females in Switzerland by 5.


14. Multiply the male population of Norway by -3.

Since you use the Internet so much in your travels, you are curious about Internet usage in the countries you are visiting.  Use the following website to help you gather information about Internet usage in Europe **www.internetworldstats.com**.  *Click on the link for your continent to pull up your Internet statistics.  Scroll down on the page to find the numbers for Internet usage.*

| Country | Number of Internet Users |
|---|---|
| Poland | |
| | |
| Slovakia | |
| | |
| Austria | |
| | |
| Denmark | |

Use the data you gathered above to complete the following calculations.  Make sure to write out the equation needed to solve to equation:

15. What is the difference between the number of Internet users in Slovakia and Austria?

16.  Divide the total number of Internet users in Denmark by -50.

17. What would you need to multiply the number of Internet users in Poland by for a sum of -40 040 724?

You need to keep a budget of your trip and show your calculations.  Along the way you have the opportunity to earn money, but will also need to spend some.

You and your partner have $1000 to start with. Keep track of your work carefully, as each calculation relies on the previous calculation being accurate. ***Remember that spending should be represented by a negative number.***

| Spending | Calculations | Balance |
|---|---|---|
| 18. You spend ¼ of your money on your tickets from London to Paris. | 1000 ÷ 4 = 250<br><br>1000 – 250 = 750 | $750 |
| 19. You meet friends for lunch and buy 3 meals for $14.00 each. | | |
| 20. You visit the Louvre for a clue for your trip. You and your partner each pay $14 for admission, but you complete a filling task for the museum and each earn $45. | | |
| 21. You have supper with your partner and another pair from the show. Your total bill is $88. | | |
| 22. Your hotel room costs $172 for the night, but they give you a 50% refund for being part of the show. | | |
| 23. You spend $7 each on breakfast. | | |
| 24. You take the train to Hamburg. The tickets are $103 each, but you each pay an extra $50 to take the express. | | |
| 25. You need to get back on the train right away and stop at your last 4 cities. Each trip costs you and your partner $36, and at each stop you need to buy a $9 souvenir to prove you were there. Will you have enough money? | | |

## 1.11.1: The Amazing Math Race – Europe          Grade 8
## Teacher Copy



Welcome to the Amazing Math Race!  You and your team will be travelling around the world, gathering data you will need to win the competition.

You will be visiting Europe to gather data for your group.

You have been asked to keep track of the distances between the cities you visit.  Please use **http://goeurope.about.com/library/bl-europe-distance-maps.htm** to find the distance of each trip.

| Trip | Distance travelled (in kilometres) |
|------|-----------------------------------|
| | |
| 1. London to Paris | 414 km |
| | |
| 2. Paris to Hamburg | 880 km |
| | |
| 3. Hamburg to Berlin | 291 km |
| | |
| 4. Berlin to Munich | 604 km |
| | |
| 5. Munich to Rome | 969 km |
| | |
| 6. Rome to Madrid | 2099 km |

Use the above data to solve the following questions.  For each one, write out the equation needed and the solution to the equation.

11. What is the difference between the distance from London to Paris and the distance from Berlin to Munich?
    414-604= -190

12. What is half of the difference found in #7?
    -190 ÷ 2 = -80

13. You need to take four trips the length of Hamburg to Berlin off of your itinerary.
    -291 x 4 = -1164

14. You need to take away a trip a fifth the length of your trip from Paris to Hamburg.
    -880 ÷ 5 = -176

Start at **http://unstats.un.org** to answer the following questions:
*On the right-hand side of the page there is a search box you can use to find your information, once the next page comes up, you can filter by country and year.*

**Population 2005**

| Country | Female population | Male population | Total population | Difference between male and female populations |
|---|---|---|---|---|
| France | 31 272 664 | 29 717 880 | 60 990 544 | -1 554 784 |
| | | | | |
| Germany | 42 263 757 | 40 388 612 | 82 652 369 | -1 875 145 |
| | | | | |
| Switzerland | 3 804 652 | 3 619 737 | 7 424 389 | -184 915 |
| | | | | |
| Norway | 2 337 083 | 2 301 753 | 4 638 836 | -35 330 |

Use the date you gathered above to complete the following calculations. Make sure to write out the equation needed to solve the equation:

11. Divide the total population of France by -2.
60 990 544 ÷ -2 = -30 495 272

12. What would the population of females in Germany be if it tripled?
42 263 757 x 3 = 126 791 271

13. Divide the population difference between males and females in Switzerland by 5.
-184 915 ÷ 5 = -36 983

14. Multiply the male population of Norway by -3.   2 301 753 x -3 = -6 905 259

Since you use the Internet so much in your travels, you are curious about Internet usage in the countries you are visiting. Use the following website to help you gather information about Internet usage in Europe **www.internetworldstats.com**. *Click on the link for your continent to pull up your Internet statistics. Scroll down on the page to find the numbers for Internet usage.*

| Country | Number of Internet Users |
|---|---|
| Poland | 20,020,362 |
| | |
| Slovakia | 3,018,400 |
| | |
| Austria | 5,601,700 |
| | |
| Denmark | 4,408,100 |

Use the data you gathered above to complete the following calculations. Make sure to write out the equation needed to solve to equation:

15. What is the difference between the number of Internet users in Slovakia and Austria?
3 018 400 – 5 601 700 = -2 583 300
16. Divide the total number of Internet users in Denmark by -50.
4 408 100 ÷ (-50) = -88 162
17. What would you need to multiply the number of Internet users in Poland by for a sum of -40 040 724?  -40 040 724 ÷ 20 020 362 = -2

You need to keep a budget of your trip and show your calculations. Along the way you have the opportunity to earn money, but will also need to spend some.

You and your partner have $1000 to start with. Keep track of your work carefully, as each calculation relies on the last being accurate. ***Remember that spending should be represented by a negative number.***

| Spending | Calculations | Balance |
|---|---|---|
| 18. You spend ¼ of your money on your tickets from London to Paris. | 1000 ÷ 4 = 250<br><br>1000 – 250 = 750 | $750 |
| 19. You meet friends for lunch and buy 3 meals for $14.00 each. | -14 x 3 = -42<br><br>750 – 42 = 708 | $708 |
| 20. You visit the Louvre for a clue for your trip. You and your partner each pay $14 for admission, but you complete a filling task for the museum and each earn $45. | 2 (-14) + 2 (45) = 62<br><br>708 + 62 = 770 | $770 |
| 21. You have supper with your partner and another pair from the show. Your total bill is $88. | -88 ÷ 2 = -44<br><br>770 – 44 = 726 | $726 |
| 22. Your hotel room costs $172 for the night, but they give you a 50% refund for being part of the show. | 172 ÷ 2 = 86<br><br>726 – 86 = 640 | $640 |
| 23. You spend $7 each on breakfast. | -7 x 2 = -14<br><br>640 – 14 = 626 | $626 |
| 24. You take the train to Hamburg. The tickets are $103 each, but you each pay an extra $50 to take the express. | 2 (-103) + 2 (-50)<br>-206 + (-100) = -306<br><br>626 – 306 = 320 | $320 |
| 25. You need to get back on the train right away and stop at your last 4 cities. Each trip costs you and your partner $36, and at each stop you need to buy a $9 souvenir to prove you were there. Will you have enough money? | 8 (-36) + 4 (-9)<br>-288 + (-36) = -324<br><br>320 – 324 = -4 | $-4 |

## 1.11.2: The Amazing Math Race – Central America

**Grade 8**



Welcome to the Amazing Math Race!  You and your team will be travelling around the world, gathering data you will need to win the competition.
You will be visiting Central America to gather data for your group.

You have been asked to keep track of the distances between the cities you visit.  Please use **http://www.indo.com/cgi-bin/dist** to find the distance of each trip.

| Trip | Distance travelled (in kilometres) |
|------|-----------------------------------|
| | |
| 1. Guatemala City to San Salvador | |
| | |
| 2. San Salvador to Tegucigalpa | |
| | |
| 3. Tegucigalpa to Managua | |
| | |
| 4. Managua to San Jose | |
| | |
| 5. San Jose to Panama City | |

Use the above data to solve the following questions.  For each one, write out the equation needed and the solution to the equation.

6. What is the difference between the distance from San Salvador to Tegucigalpa and the distance from Tegucigalpa to Managua?

7. What is half of the difference found in #6?

8. You need to take four trips the length of Guatemala City to San Salvador off of your itinerary.

9. You need to take away a trip a fifth the length of your trip from San Jose to Panama City.

Start at **http://unstats.un.org** to answer the following questions:
*On the right-hand side of the page there is a search box you can use to find your information, once the next page comes up, you can filter by country and year.*

**Population 2005**

| Country | Female population | Male population | Total population | Difference between male and female populations |
|---|---|---|---|---|
| Costa Rica | | | | |
| | | | | |
| Guatemala | | | | |
| | | | | |
| Panama | | | | |
| | | | | |
| Honduras | | | | |

Use the date you gathered above to complete the following calculations.  Make sure to write out the equation needed to solve the equation:

10. Divide the total population of Panama by -2.

11. What would the population of females in Honduras be if it tripled?

12.  Divide the population difference between males and females in Guatemala by 5.

13. Multiply the male population of Costa Rica by -3.

Since you use the Internet so much in your travels, you are curious about Internet usage in the countries you are visiting.  Use the following website to help you gather information about Internet usage in the Americas **www.internetworldstats.com**.  *Click on the link for your continent to pull up your Internet statistics.  Scroll down on the page to find the numbers for Internet usage.*

| Area | Number of Internet Users |
|---|---|
| North America | |
| | |
| Central America | |
| | |
| South America | |
| | |
| The Caribbean | |

Use the data you gathered above to complete the following calculations.  Make sure to write out the equation needed to solve to equation:

14. What is the difference between the number of Internet users in South and North America?
15.  Divide the total number of Internet users in Central America by -50.
16. What would you need to multiply the number of Internet users in the Caribbean by for a sum of -17 788 600?

You need to keep a budget of your trip and show your calculations.  Along the way you have the opportunity to earn money, but will also need to spend some.
You and your partner have $1000 to start with.  Keep track of your work carefully, as each calculation relies on the previous calculation being accurate.  ***Remember that spending should be represented by a negative number.***

| Spending | Calculations | Balance |
|---|---|---|
| 17. You spend ¼ of your money on your tickets from Guatemala City to San Salvador. | 1000 ÷ 4 = 250<br><br>1000 – 250 = 750 | $750 |
| 18. You meet friends for lunch and buy 3 meals for $13.00 each. | | |
| 19.  You visit the Museo David J Guzman for a clue for your trip.  You and your partner each pay $15 for admission, but you complete a filling task for the museum and each earn $40. | | |
| 20. You have supper with your partner and another pair from the show.  Your total bill is $96. | | |
| 21. Your hotel room costs $162 for the night, but they give you a 50% refund for being part of the show. | | |
| 22. You spend $7 each on breakfast. | | |
| 23. You take the train to Tegucigalpa.  The tickets are $103 each, but you each pay an extra $50 to take the express. | | |
| 24.  You need to get back on the train right away and stop at your last 4 cities.  Each trip costs you and your partner $36, and at each stop you need to buy a $9 souvenir to prove you were there.  Will you have enough money? | | |

Welcome to the Amazing Math Race!  You and your team will be travelling around the world, gathering data you will need to win the competition.
You will be visiting Central America to gather data for your group.

You have been asked to keep track of the distances between the cities you visit.  Please use **http://www.indo.com/cgi-bin/dist** to find the distance of each trip.

| Trip | Distance travelled (in kilometres) |
|---|---|
|  |  |
| 1. Guatemala City to San Salvador | 181 km |
|  |  |
| 2. San Salvador to Tegucigalpa | 209 km |
|  |  |
| 3. Tegucigalpa to Managua | 234 km |
|  |  |
| 4. Managua to San Jose | 324 km |
|  |  |
| 5. San Jose to Panama City | 525 km |

Use the above data to solve the following questions.  For each one, write out the equation needed and the solution to the equation.

10. What is the difference between the distance from San Salvador to Tegucigalpa and the distance from Tegucigalpa to Managua?

209 – 234 = -25

11. What is half of the difference found in #6?

-25 ÷ 2 = -12.5

12. You need to take four trips the length of Guatemala City to San Salvador off of your itinerary.

-181 x 4 = -724

13. You need to take away a trip a fifth the length of your trip from San Jose to Panama City.
-525 ÷ 5 = -105

Start at **http://unstats.un.org** to answer the following questions:
*On the right-hand side of the page there is a search box you can use to find your information, once the next page comes up, you can filter by country and year.*

**Population 2005**

| Country | Female population | Male population | Total population | Difference between male and female populations |
|---|---|---|---|---|
| Costa Rica | 2 127 444 | 2 199 784 | 4 327 228 | -2 055 104 |
| | | | | |
| Guatemala | 6 507 932 | 6 201 632 | 12 709 564 | -306 300 |
| | | | | |
| Panama | 1 601 395 | 1 630 107 | 3 231 502 | 28 712 |
| | | | | |
| Honduras | 3 441 247 | 3 392 863 | 6 834 110 | -48 384 |

Use the data you gathered above to complete the following calculations.  Make sure to write out the equation needed to solve to equation:

10. Divide the total population of Panama by -2.
3 231 502 ÷ -2 = -1 615 751

11. What would the population of females in Honduras be if it tripled?
 3 441 247 x 3 = 10 323 741

12.  Divide the population difference between males and females in Guatemala by 5.
-306 300 ÷ 5 = -61 260

13. Multiply the male population of Costa Rica by -3.   2 199 784 x -3 = -6 905 259

Since you use the Internet so much in your travels, you are curious about Internet usage in the countries you are visiting.  Use the following website to help you gather information about Internet usage in the Americas **www.internetworldstats.com**.  *Click on the link for your continent to pull up your Internet statistics.  Scroll down on the page to find the numbers for Internet usage.*

| Area | Number of Internet Users |
|---|---|
| North America | 251,290,489 |
| | |
| Central America | 32,339,500 |
| | |
| South America | 132,385,340 |
| | |
| The Caribbean | 8,894,300 |

Use the data you gathered above to complete the following calculations.  Make sure to write out the equation needed to solve the equation:

14. What is the difference between the number of Internet users in South and North America?
132 385 340 - 251 290 489 = -118 905 149
15.  Divide the total number of Internet users in Central America by -50.
32 339 500 ÷ (-50) = -646 790
16. What would you need to multiply the number of Internet users in the Caribbean by for a sum of -17 788 600?  -17 788 600 ÷ 8 894 300 = -2

You need to keep a budget of your trip and show your calculations. Along the way you have the opportunity to earn money, but will also need to spend some.

You and your partner have $1000 to start with. Keep track of your work carefully, as each calculation relies on the last being accurate. *Remember that spending should be represented by a negative number.*

| Spending | Calculations | Balance |
|---|---|---|
| 17. You spend ¼ of your money on your tickets from Guatemala City to San Salvador. | 1000 ÷ 4 = 250<br><br>1000 – 250 = 750 | $750 |
| 18. You meet friends for lunch and buy 3 meals for $13.00 each. | -13 x 3 = -39<br><br>750 – 39 = 705 | $705 |
| 19. You visit the Museo David J Guzman for a clue for your trip. You and your partner each pay $15 for admission, but you complete a filling task for the museum and each earn $40. | 2 (-15) + 2 (40) = 50<br><br>705 + 50 = 770 | $755 |
| 20. You have supper with your partner and another pair from the show. Your total bill is $96. | -96 ÷ 2 = -48<br><br>755 – 48 = 722 | $707 |
| 21. Your hotel room costs $162 for the night, but they give you a 50% refund for being part of the show. | 162 ÷ 2 = 81<br>707– 81 = 626 | $626 |
| 22. You spend $7 each on breakfast. | -7 x 2 = -14<br><br>626 – 14 = 612 | $612 |
| 23. You take the train to Tegucigalpa. The tickets are $103 each, but you each pay an extra $50 to take the express. | 2 (-103) + 2 (-50)<br>-206 + (-100) = -306<br><br>612 – 306 = 306 | $306 |
| 24. You need to get back on the train right away and stop at your last 4 cities. Each trip costs you and your partner $36, and at each stop you need to buy a $9 souvenir to prove you were there. Will you have enough money? | 8 (-35) + 4 (-10)<br>-280 + (-40) = -320<br><br>306 – 304 = -2 | $-2 |

# 1.11.3 The Amazing Math Race – Asia          Grade 8



Welcome to the Amazing Math Race!  You and your team will be travelling around the world, gathering data you will need to win the competition.
You will be visiting Asia to gather data for your group.

You have been asked to keep track of the distances between the cities you visit.  Please use **http://www.mapcrow.info/asian_travel_distance.html** to find the distance of each trip. *Round to the nearest km.*

| Trip | Distance travelled (in kilometres) |
|---|---|
| | |
| 1. Shanghai to Seoul | |
| | |
| 2. Seoul to Jakarta | |
| | |
| 3. Jakarta to Tokyo | |
| | |
| 4. Tokyo to Baghdad | |
| | |
| 5. Baghdad to Delhi | |

Use the above data to solve the following questions.  For each one, write out the equation needed and the solution to the equation.

6.  What is the difference between the distance from Tokyo to Baghdad and the distance from Jakarta to Tokyo?

7.  What is half of the difference found in #6?

8.  You need to take four trips the length of Shanghai to Seoul off of your itinerary.

9.  You need to take away a trip a fifth the length of your trip from Seol to Jakarta City.

Start at **http://unstats.un.org** to answer the following questions:
*On the right-hand side of the page there is a search box you can use to find your information, once the next page comes up, you can filter by country and year.*

**Population 2005**

| Country | Female population | Male population | Total population | Difference between female and male populations |
|---|---|---|---|---|
| Japan | | | | |
| | | | | |
| China | | | | |
| | | | | |
| India | | | | |
| | | | | |
| Malaysia | | | | |

Use the data you gathered above to complete the following calculations.  Make sure to write out the equation needed to solve the equation:

10. Divide the total population of Japan by -2.

11. What would the population of females in Malaysia be if it tripled?

12.  Divide the population difference between males and females in India by 5.

13. Multiply the male population of China by -3.

Since you use the Internet so much in your travels, you are curious about Internet usage in the countries you are visiting.  Use the following website to help you gather information about Internet usage in the Americas **www.internetworldstats.com**.  *Click on the link for your continent to pull up your Internet statistics.  Scroll down on the page to find the numbers for Internet usage.*

| Area | Number of Internet Users |
|---|---|
| South Korea | |
| | |
| Philippines | |
| | |
| Vietnam | |
| | |
| Azerbaijan | |

Use the date you gathered above to complete the following calculations.  Make sure to write out the equation needed to solve to equation:

14. What is the difference between the number of Internet users in Azerbaijan and the Philippines?
15.  Divide the total number of Internet users in South Korea by -50.
16. What would you need to multiply the number of Internet users in Vietnam by for a sum of -17 788 600?

You need to keep a budget of your trip and show your calculations.  Along the way you have the opportunity to earn money, but will also need to spend some.

You and your partner have $1000 to start with.  Keep track of your work carefully, as each calculation relies on the last being accurate.  ***Remember that spending should be represented by a negative number.***

| Spending | Calculations | Balance |
|---|---|---|
| 17. You spend ¼ of your money on your tickets from Shanghai to Seoul. | 1000 ÷ 4 = 250<br><br>1000 – 250 = 750 | $750 |
| 18. You meet friends for lunch and buy 3 meals for $11.00 each. | | |
| 19.  You visit the Seoul Museum of Art for a clue for your trip.  You and your partner each pay $13 for admission, but you complete a filling task for the museum and each earn $47. | | |
| 20. You have supper with your partner and another pair from the show.  Your total bill is $38. | | |
| 21. Your hotel room costs $86 for the night, but they give you a 50% refund for being part of the show. | | |
| 22. You spend $5.50 each on breakfast. | | |
| 23. You take a flight to Jakarta.  The tickets are $96 each, but you each pay an extra $47 to charter a plane to leave sooner. | | |
| 24.  You need to get back on the plane right away and stop at your last 4 cities.  Each stop costs you and your partner $57, and at each stop you need to buy a $2 souvenir to prove you were there.  Will you have enough money? | | |

Welcome to the Amazing Math Race!  You and your team will be travelling around the world, gathering data you will need to win the competition.
You will be visiting Asia to gather data for your group.

You have been asked to keep track of the distances between the cities you visit.  Please use **http://www.mapcrow.info/asian_travel_distance.html** to find the distance of each trip. *Round to the nearest km.*

| Trip | Distance travelled (in kilometres) |
|------|-----------------------------------|
| | |
| 1. Shanghai to Seoul | 868 km |
| | |
| 2. Seoul to Jakarta | 5 290 km |
| | |
| 3. Jakarta to Tokyo | 5 782 km |
| | |
| 4. Tokyo to Baghdad | 8 344 km |
| | |
| 5. Baghdad to Delhi | 3 155 km |

Use the above data to solve the following questions.  For each one, write out the equation needed and the solution to the equation.

> 10. What is the difference between the distance from Tokyo to Baghdad and the distance from Jakarta to Tokyo?

8 344 – 5 782 = -2 562

> 11. What is half of the difference found in #6?

-2 562 ÷ 2 = -1 281

> 12. You need to take four trips the length of Shanghai to Seoul off of your itinerary.

-868 x 4 = -3 472

> 13. You need to take away a trip a fifth the length of your trip from Seol to Jakarta City.
-5 290 ÷ 5 = -1 058

Start at **http://unstats.un.org** to answer the following questions:
*On the right-hand side of the page there is a search box you can use to find your information,
once the next page comes up, you can filter by country and year.*

**Population 2005**

| Country | Female population | Male population | Total population | Difference between female and male populations |
|---|---|---|---|---|
| Japan | 65 410 837 | 62 485 903 | 127 896 740 | 2 924 934 |
| | | | | |
| China | 634 803 326 | 678 175 529 | 1 312 978 855 | -43 372 203 |
| | | | | |
| India | 546 785 113 | 587 618 028 | 1 134 403 141 | -40 832 915 |
| | | | | |
| Malaysia | 12 616 745 | 13 036 240 | 25 652 985 | -419 495 |

Use the data you gathered above to complete the following calculations.  Make sure to write out
the equation needed to solve the equation:

10. Divide the total population of Japan by -2.
127 896 740 ÷ -2 = -- 63 948 370

11. What would the population of females in Malaysia be if it tripled?
 12 616 745 x 3 = 37 850 235

12.  Divide the population difference between males and females in India by 5.
-40 832 915 ÷ 5 = -8 166 583

13. Multiply the male population of China by -3.   678 175 529 x -3 = -2 034 526 587

Since you use the Internet so much in your travels, you are curious about Internet usage in the
countries you are visiting.  Use the following website to help you gather information about
Internet usage in the Americas **www.internetworldstats.com**.  *Click on the link for your
continent to pull up your Internet statistics.  Scroll down on the page to find the numbers for
Internet usage.*

| Area | Number of Internet Users |
|---|---|
| South Korea | 36,794,800 |
| | |
| Philippines | 20,650,000 |
| | |
| Vietnam | 20,993,374 |
| | |
| Azerbaijan | 1,500,000 |

Use the date you gathered above to complete the following calculations.  Make sure to write out
the equation needed to solve to equation:

14. What is the difference between the number of Internet users in Azerbaijan and the
Philippines?
1 500 000 – 20 650 000 = -19 150 000
15.  Divide the total number of Internet users in South Korea by -50.
36 794 800 ÷ (-50) = - 735 896
16. What would you need to multiply the number of Internet users in Vietnam by for a sum of -17
788 600?  - 41 986 748÷ 20 993 374 = - 2

You need to keep a budget of your trip and show your calculations.  Along the way you have the opportunity to earn money, but will also need to spend some.

You and your partner have $1000 to start with.  Keep track of your work carefully, as each calculation relies on the last being accurate.  ***Remember that spending should be represented by a negative number.***

| Spending | Calculations | Balance |
|---|---|---|
| 17. You spend ¼ of your money on your tickets from Shanghai to Seoul. | 1000 ÷ 4 = 250<br><br>1000 – 250 = 750 | $750 |
| 18. You meet friends for lunch and buy 3 meals for $11.00 each. | -11 x 3 = -33<br><br>750 – 33 = 717 | $717 |
| 19.  You visit the Seoul Museum of Art for a clue for your trip.  You and your partner each pay $13 for admission, but you complete a filling task for the museum and each earn $47. | 2 (-13) + 2 (47)<br>-26 + 94 = 68<br><br>717 + 68 = 785 | $785 |
| 20. You have supper with your partner and another pair from the show.  Your total bill is $38. | -38 ÷ 2 = -19<br><br>775 – 19 = 756 | $756 |
| 21. Your hotel room costs $86 for the night, but they give you a 50% refund for being part of the show. | 86 ÷ 2 = 43<br>756 – 43 = 713 | $713 |
| 22. You spend $5.50 each on breakfast. | -5.50 x 2 = -11<br><br>713 – 11 = 702 | $702 |
| 23. You take a flight to Jakarta.  The tickets are $96 each, but you each pay an extra $47 to charter a plane to leave sooner. | 2 (-96)+ 2 (-47)<br>-192 + (-94) = -286<br><br>702 – 286 = 416 | $416 |
| 24.  You need to get back on the plane right away and stop at your last 4 cities.  Each stop costs you and your partner $57, and at each stop you need to buy a $2 souvenir to prove you were there.  Will you have enough money? | 8 (-57) + 4 (-2)<br>-456 + (-8) = -320<br><br>416 – 320 = -48 | $-48 |

Welcome back!  Yesterday, your group worked hard to gather data as you travelled around the world.  Today, you will use your data to help figure out where the final stop on your trip will be. *If you have problems, you may want to double-check your work.*

Start by solving the puzzle below.

| a | b | c | d | e | f | g | h | i | j | k | l | m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -5 x 2 | -8÷2 | 3x2 | -1x5 | -4÷-2 | -6x2 | -1x-1 | -8÷-2 | -7x-4 | -6÷3 | -4x6 | -9x2 | 8x-4 |

| n | o | p | q | r | s | t | u | v | w | x | y | z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -7x5 | -5x5 | -3x2 | -7x4 | -5÷5 | -3x-8 | -5x-2 | -9x-2 | -6x-2 | -8x-4 | -7x-5 | -6÷2 | -5x-5 |

Fill letters in the chart below to find your next clue.

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -10 | 24 | -24 | | -3 | -25 | 18 | -1 | | 10 | 2 | -10 | 6 | 4 | 2 | -1 | | -12 |
| -25 | -1 | | -10 | | -32 | -10 | -6 | | -25 | -12 | | 6 | -10 | -35 | -10 | -5 | -10 |
| | 24 | -25 | -18 | 12 | 2 | | 10 | 4 | 2 | | -6 | -1 | -25 | -4 | -18 | 2 | -32 |
| 24 | | -25 | -35 | | 10 | 4 | 2 | | -4 | -10 | 6 | -24 | | 10 | -25 | | 2 |
| -18 | 28 | -32 | 28 | -35 | -10 | 10 | 2 | | -6 | -1 | -25 | 12 | 28 | -35 | 6 | 2 | 24 |
| | -3 | -25 | 18 | -1 | | -12 | 28 | -35 | -10 | -18 | | -5 | 2 | 24 | 10 | 28 | -35 |
| -10 | 10 | 28 | -25 | -35 | | 28 | 24 | | 10 | 4 | 2 | | 6 | -10 | -6 | 28 | 10 |
| -10 | -18 | | 6 | 28 | 10 | -3 | | -25 | -12 | | 10 | 4 | 2 | | -18 | -10 | 24 |
| 10 | | -6 | -1 | -25 | 12 | 28 | -35 | 6 | 2 | | | | | | | | |

# 1.11.5: The Amazing Math Race – Day 12          Grade 8
          Group Clue #2

Use the problems on the back to help eliminate provinces and find the location of your final clue.
Be the first group to find the location to win *The Amazing Math Race*!



| Province/Territory | Value | Province/Territory | Value |
|---|---|---|---|
| Yukon Territory | 42 320 | Ontario | -703 |
| Northwest Territories | -54 | Quebec | -37 106 593 |
| Nunavut | 834 787 | Newfoundland | 1 479 |
| British Columbia | -107 | New Brunswick | -112 |
| Alberta | 15 747 500 | Nova Scotia | -787 051 032 |
| Saskatchewan | -177 | P.E.I. | -123 |
| Manitoba | -59 760 310 | | |

Show the steps to your work!  *Take turns calculating, recording and checking.*

1.  (distance from Berlin to Munich)(-2) + (distance from Tegucigalpa to Managua)(-2) + (distance from Baghdad to Delhi)

2. (difference between male and female population of Norway)(2) + (difference between male and female population of Honduras)(2) + (difference between male and female population of Malaysia) ÷ -2

3.  final products for (#10 Asia) + (#12 Central America)(-100) + (#14 Europe)(-3)

4. (number of internet users in the Philippines) ÷ (-5) + (number of internet users in Poland)(-5) + (number of internet users in Caribbean)(-5) ÷ (-5)

5. Total plane ticket cost (Asia #24) + (Europe #25) + (Central America #24)

6. Sum of money left for all three groups.

7. (total #18 Asia) - (total #23 Central America)(-2) + (total #21 Europe)(-2)

8. (distance between San Jose and Panama city) – (distance from Rome to Madrid) + (distance from Shanghai to Seoul)

9. (number of internet users Central America) (number of internet users in Slovakia) (number of internet users in Azerbaijan)

10. Male population of (Panama) (India) (Germany)

11. Final products for (Europe #9) ÷ 4 +(Central America #6)(10) + (Asia #8) ÷ 8

12. Final products for (Asia #7) (Europe #7) (Central America #8)

# 1.11.4: The Amazing Math Race – Day 12      Grade 8
## Group Clue #1 – Teacher Copy

Welcome back!  Yesterday, your group worked hard to gather data as you travelled around the world.  Today, you will use your data to help figure out where the final stop on your trip will be. *If you have problems, you may want to double-check your.*

Start by solving the puzzle below.

| a | b | c | d | e | f | g | h | i | j | k | l | m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -5 x 2 | -8÷2 | 3x2 | -1x5 | -4÷-2 | -6x2 | -1x-1 | -8÷-2 | -7x-4 | -6÷3 | -4x6 | -9x2 | 8x-4 |

| n | o | p | q | r | s | t | u | v | w | x | y | z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -7x5 | -5x5 | -3x2 | -7x4 | -5÷5 | -3x-8 | -5x-2 | -9x-2 | -6x-2 | -8x-4 | -7x-5 | -6÷2 | -5x-5 |

Fill letters in the chart below to find your next clue.

| a | s | k | | y | o | u | r | | t | e | a | c | h | e | r | | f |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -10 | 24 | -24 | | -3 | -25 | 18 | -1 | | 10 | 2 | -10 | 6 | 4 | 2 | -1 | | -12 |
| o | R | | a | | m | a | p | | o | f | | C | a | n | a | d | a |
| -25 | -1 | | -10 | | -32 | -10 | -6 | | -25 | -12 | | 6 | -10 | -35 | -10 | -5 | -10 |
| | s | o | l | v | e | | t | h | e | | p | r | o | b | l | e | m |
| | 24 | -25 | -18 | 12 | 2 | | 10 | 4 | 2 | | -6 | -1 | -25 | -4 | -18 | 2 | -32 |
| s | | o | n | | t | h | e | | b | a | c | k | | t | o | | e |
| 24 | | -25 | -35 | | 10 | 4 | 2 | | -4 | -10 | 6 | -24 | | 10 | -25 | | 2 |
| l | l | m | i | n | a | t | e | | p | r | o | v | i | n | c | e | s |
| -18 | 28 | -32 | 28 | -35 | -10 | 10 | 2 | | -6 | -1 | -25 | 12 | 28 | -35 | 6 | 2 | 24 |
| | y | o | u | r | | f | i | n | a | l | | d | e | s | t | i | n |
| | -3 | -25 | 18 | -1 | | -12 | 28 | -35 | -10 | -18 | | -5 | 2 | 24 | 10 | 28 | -35 |
| a | T | i | o | n | | i | s | | t | h | e | | c | a | p | i | t |
| -10 | 10 | 28 | -25 | -35 | | 28 | 24 | | 10 | 4 | 2 | | 6 | -10 | -6 | 28 | 10 |
| a | L | | c | i | t | y | | o | f | | t | h | e | | l | a | s |
| -10 | -18 | | 6 | 28 | 10 | -3 | | -25 | -12 | | 10 | 4 | 2 | | -18 | -10 | 24 |
| t | | p | r | o | v | i | n | c | e | | | | | | | | |
| 10 | | -6 | -1 | -25 | 12 | 28 | -35 | 6 | 2 | | | | | | | | |

# 1.11.5: The Amazing Math Race – Day 12          Grade 8
## Group Clue #2 – Teacher Copy

Use the problems on the back to help eliminate provinces and find the location of your final clue. Be the first group to find the location to win *The Amazing Math Race*!



| Province/Territory | Value | Province/Territory | Value |
|---|---|---|---|
| Yukon Territory | 42 320 | Ontario | -703 |
| Northwest Territories | -54 | Quebec | -37 106 593 |
| Nunavut | 834 787 | Newfoundland | 1 479 |
| British Columbia | -107 | New Brunswick | -112 |
| Alberta | 15 747 500 | Nova Scotia | -787 051 032 |
| Saskatchewan | -177 | P.E.I. | -123 |
| Manitoba | -59 760 310 | | |

Show the steps to your work! *Take turns calculation, recording and checking.*

1.  (distance from Berlin to Munich)(-2) + (distance from Tegucigalpa to Managua)(-2) + (distance from Baghdad to Delhi)

(604)(-2) + (234)(-2) – 3155 = -1208 + (-468) + 3155 = 1479

2. (difference between male and female population of Norway)(2) + (difference between male and female population of Honduras)(2) + (difference between male and female population of Malaysia) ÷ -2

(-35 330)(2) + (-48 384)(2) + (-419 496) ÷ -2 = (-70 660) + (-96 768) + (209 748) =42 320

3.  final products for (#10 Asia) + (#12 Central America)(-100) + (#14 Europe)(-3)

(-63 948 370) + (-61 260)(-100) + (-6 905 259)(-3) = -37 106 593

4. (number of internet users in the Philippines) ÷ (-5) + (number of internet users in Poland)(-5) + (number of internet users in Caribbean)(-5) ÷ (-5)

(20 650 000) ÷ (-5) + (20 020 362)(-5) + (8 894 300)(5) ÷ (-5) = (-4 130 000) +          (-100 101 810) + (44 471 500) = -59 760 310

5. Total plane ticket cost (Asia #24) + (Europe #25) + (Central America #24)

(-456)(-1) + (-280) + (-288) = -112

6. Sum of money left for all three groups.

(-48) + (-2) + (-4) = -54

7. (total #18 Asia) - (total #23 Central America)(-2) + (total #21 Europe)(-2)

(717) - (306)(-2) + (726)(-2)= (717) – (-612) + (-1 452) = -123

8. (distance between San Jose and Panama city) – (distance from Rome to Madrid) + (distance from Shanghai to Seoul)

(525) – (2099) + (868) = -703

9. (number of internet users Central America) (number of internet users in Slovakia) (number of internet users in Azerbaijan)

(32 339 500)  + (3 018 400)(-5) - (1 500 000) = 15 747 500


10.  Male population of (Panama) (India) (Germany)

(1 630 107)(-100) + (587 618 028) + (40 388 612)(-30) = (-163 010 700) + (587 618 028) + (-1 211 658 360) = -787 051 032


11. Final products for (Europe #9) ÷ 4 +(Central America #6)(10) + (Asia #8) ÷ 8

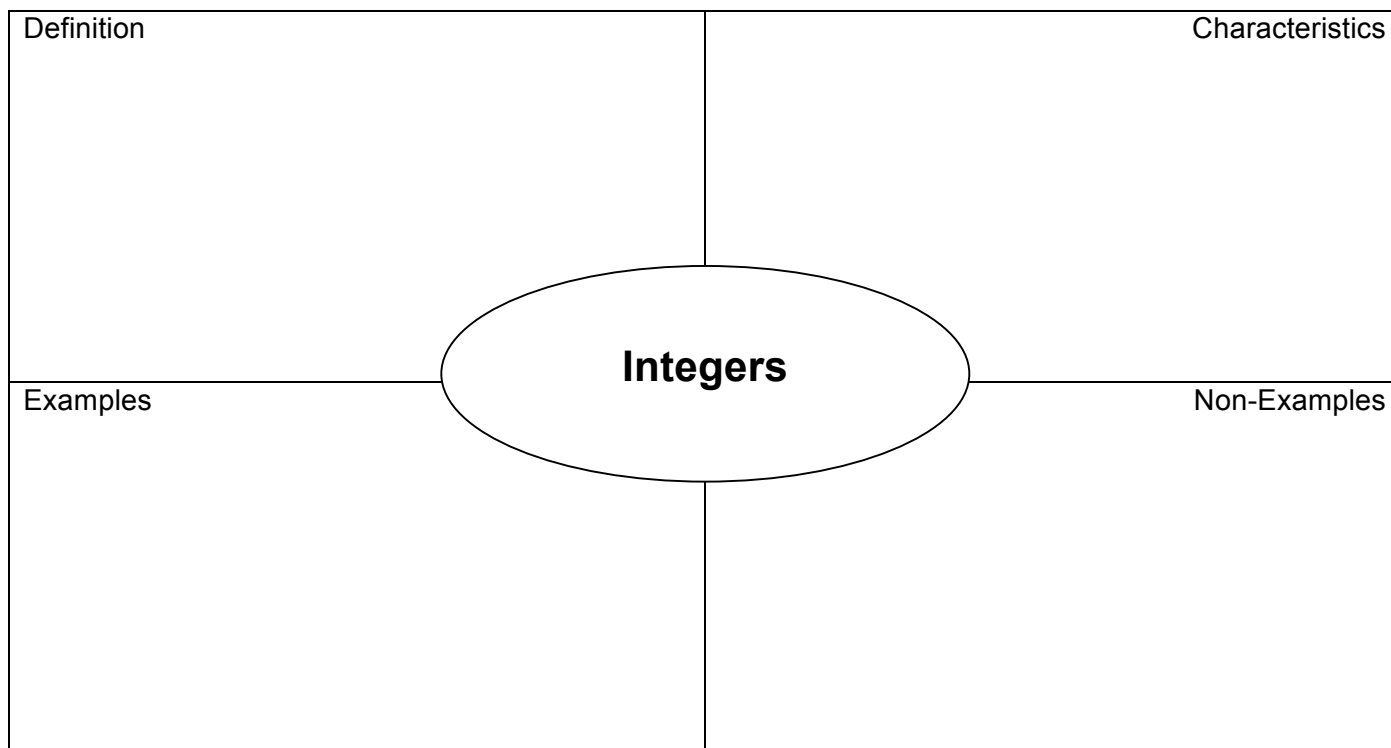(-1164) ÷ 4 + (-25)(10) + (-3472) ÷ (-8) = (-291) + (-250) + (434) = -107



12. Final products for (Asia #7) (Europe #7) (Central America #8)

(-1 281) + (-190)(-2) - (-724) = -177

# 1.12.1 Summative Assessment

Summative Assessment – Integers

Name : _____

| Definition | Characteristics |
|---|---|
| | |
| **Integers** | |
| Examples | Non-Examples |
| | |

Match each term with an example:

1. zero principal

2. opposite integers

3. positive integer

4. negative integer

a. answer to (-5) x (-4)

b. 15 + (-15) = 0

c. -20 and 20

d. -2 and 4

e. answer to (-15) ÷ 3

5. Solve

a. 5 + 7 =                                              b. -13 + 13 =

c. -5 + (-12) =                                      d. 8 + (-15) =

e. -17 + 9 =                                          f. -3 + (-6) =

6. The table shows the change in the population of Jonestown at each census since 1971.

| Year | Change |
|------|--------|
| 1971 | -30 000 |
| 1976 | -71 000 |
| 1981 | +31 000 |
| 1986 | -9 000 |
| 1991 | +22 000 |
| 1996 | +18 000 |
| 2001 | -43 000 |

What was the overall change in population?  Show your work.

What does it mean to have a change in population that is negative?

7. Evaluate each expression.

a.10 – 15 =                                          b. -5 -7 =

c. -14 – (-22) =                                     d. -53 – 42 – (-25) =

8. The table shows each city's time zone relative to GMT, or Greenwich Mean Time.

a)  How many hours behind Hong Kong is Hawaii?

| City | Time Zone |
|------|-----------|
| Hawaii | GMT -10 |
| Abu Dhabi | GMT +4 |
| Hong Kong | GMT +8 |
| Las Vegas | GMT -7 |

b)  How many hours ahead of Las Vegas is Abu Dhabi?

9. Multiply

a. 7 x (-2)                                        b. -3 x (-6)

c. -10 x 7                                        d. 15 x (-4)

10.  What happens when you . . . *(show your work using pictures, numbers and words)*

a) . . . multiply a positive number by a positive number?  Why?

b) . . . multiply a positive number by a negative number?  Why?

c) . . . multiply a negative number by a negative number?  Why?

11. Explain how you can tell the sign of a product of more than two integers.

12. The average change in the sea turtle population over the past 60 years is -800 nests per year.

    a) What was the total change in the number of sea turtle nests?

    b) What was the change in the number of nests between 1960 and 1990?

13. Create a triangle to illustrate the following multiplication sentences, and write the related multiplication and division statements.

| -4 x (-3) = 12 | -5 x (-7) = 35 |
|---|---|
|  |  |

14. Divide (think opposite of multiplication)

a) 35 ÷ (-5) =                          b) -64 ÷ (-4) =

c) -72 ÷ 9 =                            e) -56 ÷ (-8) =

15. Write an expression involving integer division for each situation.

| Situation | Expression |
|---|---|
| a) While scuba diving, Alex dove 32m in 8 stages.  What was the mean depth of her dive per stage? |  |
| b) The temperature dropped 18°C over 6h.  What was the mean hourly temperature drop? |  |
| c) A parachutist descended a total of 100m in 5 s.  What was the unit rate of descent (metres per second)? |  |

# 1.12.2 Integer Summative Assessment Rubric    Grade 8

Name: _____ Overall Level: ____

| | Level One | Level Two | Level Three | Level Four |
|---|---|---|---|---|
| **Frayer Model** | -provides a definition of Integers that needs much clarification | -provides a definition of Integers that needs some clarification | -provides clear definition of Integers | -provides clear, concise definition of Integers |
| | -provides few logical examples of Integers | -provides some logical examples of Integers | -provides several logical examples of Integers | -provides many logical, clear examples of Integers |
| | -provides few logical non-examples of Integers | -provides some logical non-examples of Integers | -provides several logical non-examples of Integers | -provides many logical, clear non-examples of Integers |
| | -provides few logical features of Integers | -provides some logical features of Integers | -provides several logical features of Integers | -provides many logical, clear features of Integers |
| **#1 -4** | -defines few key terms correctly | -defines some key terms correctly | -defines most key terms correctly | -defines all key terms correctly |
| **#5** | -adds integers with major errors/omissions | -adds integers with some minor errors/omissions | -adds integers with minor errors/omissions | -adds integers with no major errors/omissions |
| **#6** | -solution uses few logical computations | -solution uses some logical computations | -solution uses logical computations | -solution uses clear, logical computations |
| | -few computations are correct | -some computations are correct | -most computations are correct | - all computations are correct |
| **#7** | -subtracts integers with major errors/omissions | -subtracts integers with some minor errors/omissions | -subtracts integers with minor errors/omissions | -subtracts integers with no major errors/omissions |
| **#8** | -solution uses few logical computations | -solution uses some logical computations | -solution uses logical computations | -solution uses clear, logical computations |
| | -few computations are correct | -some computations are correct | -most computations are correct | - all computations are correct |
| **#9** | -multiplies integers with major errors/omissions | - multiplies integers with some minor errors/omissions | - multiplies integers with minor errors/omissions | - multiplies integers with no major errors/omissions |
| **#10a** | -provides an explanation of + times + that needs much clarification | -provides an explanation of + times + that needs some clarification | -provides clear explanation of + times + | -provides clear, concise explanation of + times + |
| **#10b** | -provides an explanation of + times - that needs much clarification | -provides an explanation of + times - that needs some clarification | -provides clear explanation of + times - | -provides clear, concise explanation of + times - |
| **#10c** | -provides an explanation of - times - that needs much clarification | -provides an explanation of - times - that needs some clarification | -provides clear explanation of - times - | -provides clear, concise explanation of - times - |
| **#11** | -provides an explanation of how to determine the product of two integers that needs much clarification | -provides an explanation of how to determine the product of two integers that needs some clarification | -provides clear explanation of how to determine the product of two integers | -provides clear, concise explanation how to determine the product of two integers |
| **#12** | -solution uses few logical computations | -solution uses some logical computations | -solution uses logical computations | -solution uses clear, logical computations |
| | -few computations are correct | -some computations are correct | - most computations are correct | - all computations are correct |
| **#13** | -triangles show limited understanding of multiplication/division relationships with major errors/omissions | -triangles show some understanding of multiplication/division relationships with some errors/omissions | -triangles show clear understanding of multiplication/division relationships with minor errors/omissions | -triangles show clear understanding of multiplication/division relationships without errors/omissions |
| **#14** | -divides integers with major errors/omissions | -divides integers with some minor errors/omissions | -divides integers with minor errors/omissions | -divides integers with no major errors/omissions |
| **#15** | -integer expressions are illogical logical and use few logical computations | -integer expressions are somewhat logical and use some logical computations | -integer expressions are logical and uses logical computations | -integer expressions are clear, logical and uses logical computations |