1. Numbers & Operations

Materials: Ghetto Blaster
Cassette "NUMBERS"
Student Recording Cassette
answer sheet

On your answer sheet write the following as numbers:

Whole numbers:

a)   two billion one hundred million
b)   one million twelve
c)   sixty thousand seven hundred fifty nine
d)   eight hundred ninety million three hundred thousand seventy five
e)   one billion one million one hundred thousand one thousand one hundred
f)   one billion ten

Decimal numbers

a)   nine millionths
b) $\dfrac{73}{100\ 000}$
c)   seven hundred and seven thousandths
d)   two billion, five hundred thousand and nine hundredths
e)   ninety nine and nine hundred forty five millionths
f)   nine ten thousandths

3.   **Find the Ghetto Blaster and the cassette labelled "NUMBERS". Rewind if necessary. Listen to the cassette as you write the numbers on the answer sheet. BE KIND AND REWIND!**

4)   **Place the student recording cassette in the ghetto blaster. Find the spot where the last student ended his or her recording. You will need to record your name and then read the numbers on the other side of this card. Read clearly and slowly. After you are finished number 10 say "finished" slowly.   DO NOT REWIND!**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.

Please tidy up the station.

2. Numbers & Operations

Materials: blank cheques
recycled envelope

1 .   Mrs. Mercella Rodriguez won a lottery for $2.3 million dollars. As secretary for the lottery association you need to write her a cheque for that amount.

2 .   Mrs. Rodriguez decides this is too much for her so she gives her son Carlos $1 234 000.00. Write the cheque she made for her son.

3 .   Carlos is excited and wants to plan for his retirement. He uses half of the money to purchase RRSP's. Find the name of a company that sells RRSP's and write the cheque for Carlos.

4 .   Carlos uses half of what he has left after purchasing the RRSP's to purchase Mutual Funds. Find the name of a company that sells Mutual Funds and write the cheque for Carlos.

5 .   Mrs. Rodriguez's husband died of a heart attack last year. She donates $8 235.00 to the Heart and Stroke Foundation. Write the cheque for her.

6 .   Mrs. Rodriguez paid off her debts:

Mortgage	-	$ 23 456.00
Visa	-	823.00
Loan	-	$ 10 925.00

Write a cheque for the total amount of money she has left after all these payments, including those in numbers 1 to 6.

6 .   She places 50% of the remainder of her money in a term deposit at a bank. Choose the bank and write the cheque.

When you have completed this station,
place your cheques in a recycled envelope
and put the envelope in your portfolio

Do not forget to label your entry.
Please tidy up the station.

3. Numbers & Operations

Materials: altas
Internet
reference books
current road map Ontario and Saskatchewan

1.   **In 1991 the population of Toronto was 3 893 046. This is about how many million?**

2.   **About how much is the population of Saskatchewan?**

3.   **Find the area of the city of Toronto and the area of Saskatchewan.**

4.   **Calculate the number of people per hectare in each case. Some statistics claim that Saskatchewan is the best place to live. How might your calculations contribute to this statement.**

5.   **Choose a highly populated country in the world and compare it's number of people per hectare with the number of people per hectare in Saskatchewan.**

6.   **Find two places in the world whose number of people per hectare is less than that of Saskatchewan.**

When you have completed this station,
place your answer sheet in your portfolio.

Do not forget to label your entry.
Please tidy up the station.

4. Numbers & Operations

Materials: Kinsmen Association

1. **The day after Telemiracle 18, the radio reported that about $2.1 million was raised.**

   a)   **Explain why the value would be expressed this way.**
   b)   **What may have been the amount raised?**

2. **Research to find how much money has been raised in each of the previous Telemiracle's. Report by making a list.**

3. **Place the numbers you reported in number 2 in decreasing order.**

When you have completed this station,
place your answer sheet in your portfolio.

Do not forget to label your entry.
Please tidy up the station.

5. Numbers & Operations

Materials: Internet
atlases
encyclopedia
reference materials on SPACE

1.   **a)**   **Look through the materials that are provided or do some research in your library to find:**

        i.   **10 situations in which large whole numbers are used.**

        ii.   **5 situations in which very small numbers are used.**

    b)   **Write the numbers you have found and write a few sentences to explain the context in which they were used.**

    c)   **Write each of the numbers using scientific notation.**

    d)   **Write the numbers as an expanded numeral using exponential notation.**

    e)   **List (vertically) each set of numbers that you found from the smallest to the largest. Explain your strategy.**

    f)   **Round each number from the list of large whole numbers to the nearest thousand.**

    g)   **Round each number from the list of decimal numbers to the nearest tenth and to the nearest hundredth and to the nearest thousandth when possible.   .**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.

Please tidy up the station.

6. Numbers & Operations

Materials:

1. Explain how to write 1 253 273 000 in scientific notation.

2. Why do we use scientific notation.

3. a) What is the maximum power of 3 that can be displayed on your calculator?

   b) Explain why your calculator cannot display beyond that power.

   c) What does your calculator display when is reaches it maximum number of digits.

   d) Why do we use scientific notation?

4. Find a scientific calculator. It should have one of the following keys: | Exp | | E | | EE |

   a) Write the keystrokes to display 2 371 259 in scientific notation. Draw a diagram of the display on the screen.

   b) Use the calculator to do the following operations and give the keystrokes that you used.

   a) 3.584×10^{13} x 2.3784×10^{6}

   b)   4 502 364 142 ÷ 1 299 134 300 (in scientific notation)

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.

Please tidy up the station.

7. Numbers & Operations

Materials: calculator

1. The earth is 1 496 000 000 000 km from the sun.
   Write this number in scientific notation.

2. The diameter of a human hair is 0.000 07 m.
   Write this number in scientific notation.
   What is the diameter in centimetres?

3. The moon is 3.84×10^5 away. The circumference of the earth
   is 4.0×10^4. Explain, step by step, how you would calculate
   how many times around the earth at the equator would be the
   same as the distance to the moon?

4. If light from a body in the solar system takes 1.5×104
   seconds to travel to the earth and light travels at 3.0×10^5
   km/s, how far is the body from the earth?

5. a) Regina has a population of about 1.9×10^5 and an area
      of about 1.1×10^2 km^2. How many square kilometres
      are there per person in Regina?

   b) Find this information about Saskatoon and compare their
      population per square kilometre.

   c) Calculate the number of people per square kilometre for
      the town or city (or the nearest one to which you live) in
      which you live.

6. Tyler claims that 23.584×10^{23} is written in scientific
   notation. Do you agree with him? Explain your answer.

7. If 5.03×10^{-5} was incorrectly written as 5.03×10^5, how
   many times larger is this?

When you have completed this station,
place your answer sheet in your portfolio.
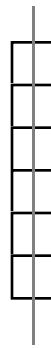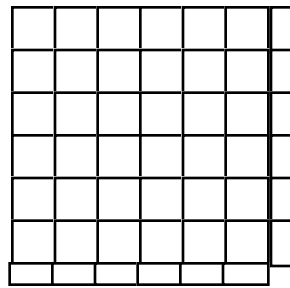Do not forget to label your entry.

Please tidy up the station.

8. Numbers & Operations

Materials: grid paper
                    calculator

1 .   a)   Use square tiles to form larger squares as a way to
                find the square roots of 25 and 16. Record on grid
                paper.

        b)   Use the grid paper to show the square roots of 36,
                49, 64 and 100.

2 .   Hannah used square tiles and grid paper to show that the
        square root of 42 is not a whole number. She made the largest
        square possible, using 36 of the 42 tiles, and traced a 6 x 6
        square on grid paper. She then cut a strip of six squares to
        represent the six leftover tiles. She cut it and placed it on the
        grid as shown below

        a)   Estimate $\sqrt{42}$ from the diagram.

        b)   Compare your estimate with the calculator result.

        c)   Use Hannah's method to estimate the square roots of 56
                and 103, and explain your solution.

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.

Please tidy up the station.

9. Numbers & Operations

Materials: grid paper
                  calculator

1.   **The area of a square is 225 cm^2.**

    a)   **What is the length of each side? Explain your strategy.**
    b)   **Is your answer actually the square root or 225?**

2.   **Tom says that you can use prime factoring to calculate the square root of 625. Explain what he means by this.**

3.   **Explain why some numbers are perfect squares and why some are not.**

4.   **Kyle says that you can find the square of a perfect square using subtraction:**

        36
                36 - 1 = 35
                35 - 3 = 32
                32 - 5 = 27
                27 - 7 = 20
                20 - 9 = 11
                11 - 11 = 0

You subtracted 6 times so the square root of 36 is 6.

    a)   **Use this method to find the square of three other perfect squares.**

    b)   **Explain the strategy. Does it always work?**

10. Numbers & Operations

Materials: calculator

1.   **Explain how you can tell if a number is divisible by 3?**

2.   **Explain how you can tell if a number is divisible by 6?**

3.   **Make a Venn diagram and place 5 numbers that belong in each space.**

divisible by 2 ⟶ ⟵ divisible by 3
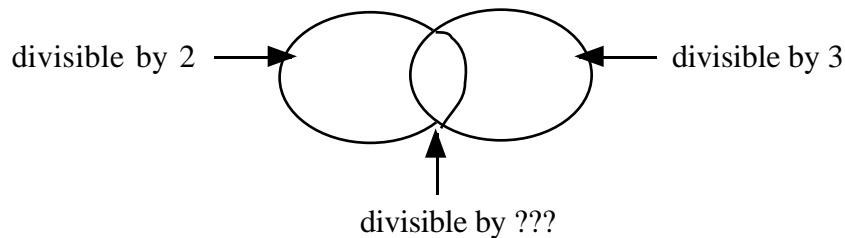
divisible by ???

4.   **Explain how you can tell if a number is divisible by 9?**

5.   a)   **Write ten 3 to 4 digit numbers at random.**

     b)   **Identify those that are divisible by 3, 6 or 9.**

6.   **Explain how you can tell if a number is divisible by 4?**

7.   **Explain how you can tell if a number is divisible by 8?**

8.   **Write ten 3 to 4 digit numbers that are divisible by 4 and ten 3 to 4 digit numbers that are divisible by 8?**

9.   **There are 9 members on a baseball team. If 365 people showed up for a tournament, and teams were made up, would there be anyone left over? Use the divisibility rule without dividing.**

10.   **A bag of marbles can be divided into equal parts among 2, 3, 4, 5 or 6 friends with none leftover. What is the smallest number of marbles that the bag can hold?**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.

Please tidy up the station.

Materials: calculator

1.   **Explain what each of the following mean**

        a) 10^4 b) 4^2 c) $\dfrac{3}{4}{}^2$ d) $(1.5)^3$

2.   **a)**   **Give the base and the exponent for each of the above powers.**

       b)   **What does the exponent tell us?**

       c)   **Express each of the above (in #1) in standard form.**

3.   **Express each diagram as a power.**

a)   **b)**   **c)**

d)   e)
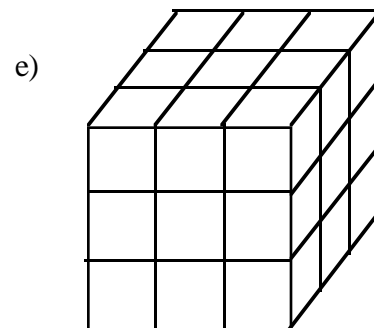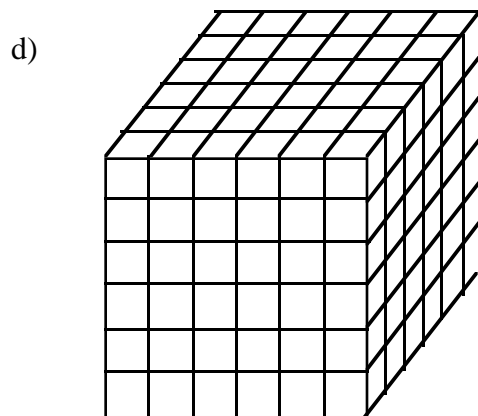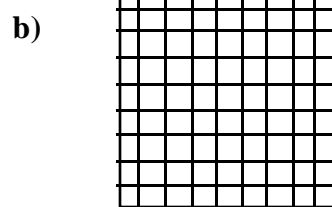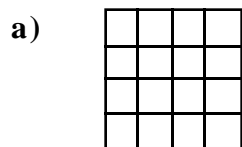
4.   **The above drawings demonstrate the second and third dimension.**
        Is it possible to draw something in the fourth or fifth dimension?

Please turn over the card.

4. **Sketch a cube and a rectangular prism using only a paper and pencil.**

5. **On the triangulation paper**

    a) **Draw to show which is the greatest.** 2^3 or 3^2

    b) **Draw a rectangular prism that measures**

        i)   2 x 3 x 4   ii) 2^2x3

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.

Please tidy up the station.

12. Numbers & Operations

Materials: paper

1.   **a)**   **Take a sheet of paper and fold it in two. How many layers do you now have?.**

    b)   **Fold the paper in half again. How many layers do you have this time?**

    c)   **Make a chart to record your results.**

number of folds	number of layers

2.   **Continue this process until you can no longer fold the paper. If it becomes difficult to count the layers you can open the paper and count the sections.**

3.   **Explain how your results relate to exponents?**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.

Please tidy up the station.

13. Numbers & Operations

Materials: calculator

1. **Find the powers of each of the following numbers using the repetitive function on your calculator and continuing until the display on your calculator cannot handle the large number of digits. Record in a chart.**

2 4 8 etc	3	4	5	6	7	8	9

2. **Describe the pattern that you observe for each of the above numbers.**

3. **Experiment to find if the rules apply for**

    12, 22, 32 ...
    13, 23, 33 ...
    14, 24, 34 ... and so on.

4. **Using the above information, how can you quickly tell that**

    a)   **6561 is a power of 1, 3 or 9?**

    b)   **15625 is a power of 5?**

    c)   **100 000 is a power of 10?**

5. **Jan says that she can use this information to determine the square root of 3969. She says that the last the last digit must be a 3 or a 7 and that the first digit must be a 6.**

    a)   **How does she know this?**

    b)   **Use a calculator to check her idea. What is the square root of 3969?**

6. **How can you determine the missing digits of this perfect square?   6 _ _ 1**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

14. Numbers & Operations

Materials: calculator

1.   **a)**   **Continue the following pattern:**

$$4^5 = 1024$$
$$4^4 = 256$$
$$4^3 =$$
$$4^2 =$$
$$4^1 =$$
$$4^0 =$$
$$4^{-1} =$$
$$4^{-2} =$$
$$4^{-3} =$$
$$4^{-4} =$$
$$4^{-5} =$$

b)   **Explain the pattern. What is the calculator doing to go from 1024 to 256 to 64 etc?**

c)   **Does this apply to the negative exponents as well?**

d)   **What is the meaning of the negative exponent?**

2.   **Explain why** $\left(\dfrac{1}{3}\right)^3 = 3^{-3}$.

3.   **Angela claims that any number with an exponent of 1 is actually that number itself. Explain what she means and tell why you agree or disagree with her.**

4.   **Timothy says that all numbers with 0 as an exponent are equal. Explain his reasoning.**

5.   **In any power, if the exponent is positive the result will be >0. Explain why you agree or disagree.**

6.   **Scott says that the value of a power whose base is negative will always be negative. Several students disagree with him. Who do you agree with? Explain your reasoning.**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

15. Numbers & Operations

Materials:

1. a)   Explain what 3^4 means.

   b)   What is the 3 called?

   c)   What is the 4 called?

2. Explain why $(-3)^2 \neq -(3)^2$

3. Which is the greatest in each case. Explain your reasoning.

   a) 5^2 or 2^5?

   b) $\dfrac{1}{3}^2$ or 4^{-2} ?

   c) 0 or 100^0

   d) $(-2)^3$ or $-(2)^3$

4. Write the following using expanded numerals using exponential notation:

   56 734   and   34.519

5. If the price of a hamburger doubles every two years, what would it cost in 100 years? Find a way of solving this using a calculator.

6. Using each of the digits of 1 to 5 only once, write the largest and smallest power possible.

7. What are the last two digits of 11^{100}? Explain how you arrived at your answer.

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

Materials: poster board

1.   **Design a poster for to explain the rules for multiplying and
          dividing powers with both numeric and variable bases.
          Give examples.**

          Remember a poster is clear, concise, creative and attractive.

                                    or

2.   **Prepare a short picture book to explain the rules in #1.**

          Be as creative as you like!

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

17. Numbers & Operations

Materials: cardboard
hangers
dowels
string or wool
etc.

1.   **Use a variety of materials to create a mobile to explain the rules for adding, multiplying, subtracting and dividing integers.**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

18. Numbers & Operations

Materials: double-sided counters
integer tiles
checkers

1.   **Use one of the above manipulatives to explain each of the following.   Use diagrams in your explanation.**

   a)   +3 + (+7) =

   b)   +3 + (-7) =

   c)   -3 + (-7) =

   d)   -3 + (+7) =

2.   **Develop the rules...**

   a)   **When the signs are the same, you**

   b)   **When the signs are different, you**

3.   a)   **Continue the following pattern:**

      +3 - (+2) =

      +3 - (+3) =

      +3 - (+4) =

      +3 - (+5) =

   b)   **Describe the pattern.**

   c)   **Use this example and others to explain why we need negative numbers.**

4.   **Lisa says that a good short rule to remember is that when you subtract integers, all you have to do is add the opposite.**

   a)   **What does she mean?**

   b)   **Does the rule work for   4 - 3?**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

19. Numbers & Operations

Materials:

1.   **Find at least different real-life situations in which
negative numbers are used. Give a short
   explanation in each case.**

2.   **The word negative is used in photography.
What does it mean in this case?**

**Find other meanings for the word negative as a noun and as a
adjective.**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

20. Numbers & Operations

Materials: **calculator**

1 .   **Explain how the acronym BEDMAS can help you remember the correct order of operations. Use a good example in your answer.**

2 .   **Do the following calculation with as few keystrokes as possible.**

$$\frac{21.6}{12.3 \text{ x } (14.5 - 7.9)} \text{ , which has an answer of 0.2660754}$$

a)   **Write down the keystrokes that you needed, both digit and operation keys, and record the number of strokes.**

b)   **Now devise another method. Record.**

c)   **Which method uses the fewest keystrokes?**

d)   **Explain each keying sequence, and explain why one of the sequences uses fewer keystrokes.**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

21. Numbers & Operations

Materials: calculator

1. Explain how you could use the memory keys for the following calculation:

      a) $(21.3 - 14.7) \times (14.7 + 3.6)$

2. Explain the keystrokes you could use to do the following on your calculator.

      $(5.1) \times 10^6) \times (2.34 \times 10^{-2})$

3. Lorie uses the following to find out if a calculator is scientific or not. Explain why this works.

      $2 + 3 \times 6 \div 2 - 2$

4. a) Show the two meanings of *"a negative number multiplied by 3 decreased by 6"* by using symbols.

      b) Calculate the value in each case.

      c) How could you state the written statement so that the meaning is clear?

5) Place parentheses in the following equation to make it true.

      $4 + 5 \times 3 - 8 = 9$

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

Materials: paper
                   markers

1 .   Make a concept map of everything that you know about fractions.

A concept map usually contains the concept in the middle and has lines to "bubbles" around it to show all the different characteristics, meanings or connections that you can make about that concept.

Here is a simple concept map about integers (one could add more details):

Temperature   Bank balances

Uses

Sports

football
hockey
tennis

Chemistry

+   -

Operations – x

÷

INTEGERS

Order of operations

BEDMAS

Absolute value

number line   operations

Symbols

x   -

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
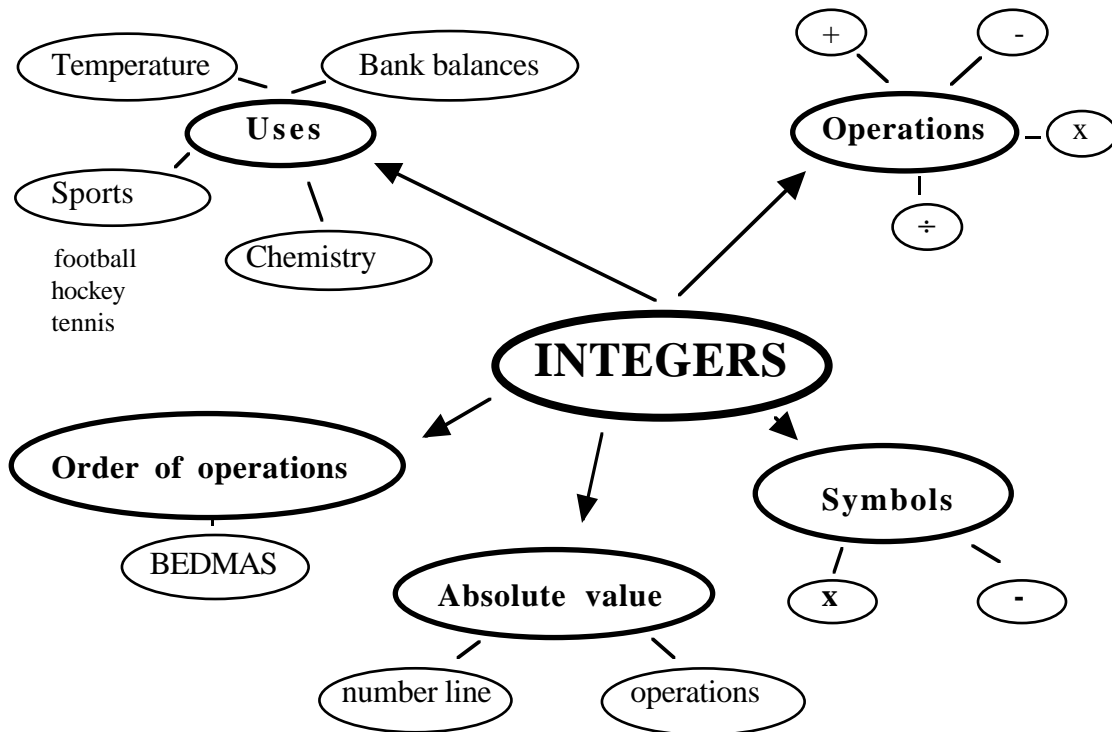*Please tidy up the station.*

23. Numbers & Operations

Materials: pattern blocks
Cuisenaire rods
paper strips 2 1/2 m (use adding machine rolls)

1.   **Explain, using the fraction blocks, how to divide a fraction by a fraction.**

2.   **Use the fraction blocks to explain why multiplying a proper fraction by a proper fraction results in a the product that is less than either of the two factors. Yet, we have always known that when we multiply whole numbers the product is always greater than either of the factors.**

3.   **Use the fraction blocks to explain why dividing a proper fraction by a proper fraction results in a the quotient that is greater than either of the dividend or the divisor. Yet, we have always known that when we divide whole numbers the quotient is always less than either the dividend or the divisor.**

4   **How do you know that $6 \div 2\frac{3}{4}$ is closer to 2 than to 3?**

5.   **Lisa had $\frac{3}{4}$ of a piece of chocolate bar. She gave $\frac{1}{3}$ to Sheila. Fold a piece of paper to demonstrate that Sheila received less than $\frac{1}{3}$ of the total chocolate bar.**

6.   **Mike has $2\frac{1}{2}$ m of blue cloth. How many pieces $\frac{1}{3}$ m long can he cut from the piece of cloth? Use one of the manipulatives to demonstrate your answer. Include drawings in your explanation.**

7.   **A teacher is buying doughnuts for the students in her class. She brings 5 1/2 boxes. Each student gets 1/6 of a doughnut. How many students are there in her class if there are no doughnuts left over? Use pattern blocks to demonstrate your answer and include sketches in your written response.**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

24. Numbers & Operations

Decimals   Gr. 9
N-61, N-71
N-78, N-79

Materials: calculator
fraction calculator

1.   **Explain how to use a calculator to convert a proper or improper fraction to a decimal?**

2.   **Explain how to use a calculator to convert a proper or improper fraction to a decimal?**

3.   **Use the fraction calculator to convert an improper fraction into a decimal and then convert it back to the fraction. In your answer include all the keystrokes (both numeric and operation).**

4.   **a)   Randomly list 5 decimal numbers.**
b)   Arrange your decimal numbers in decreasing order and explain your strategy.

5.   **Melanie worked for 2.5 hours and was paid $17.50.**

a)   Estimate the amount she makes per hour and explain your strategy.

b)   Show how you could use mental calculation to determine the answer. Explain your strategy.

c)   Show your work and use the standard algorithm to find your answer.

d)   Record all the keystrokes required to calculate the answer using a calculator.

e)   In this case, do we need an exact answer or an estimate? Discuss how the situation might affect your answer.

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

25. Numbers & Operations

Rational Numbers Gr. 9
N-80, N-81, N-83, N-87

Materials: calculator

1. **Place the following numbers on a number line. Use a new number line for each set.**

a) $\frac{1}{4}$ 2 $-\frac{1}{2}$ $-\frac{1}{8}$ 2 $\frac{1}{4}$ -2.125

b)   -1.45   0.8 $-1\frac{4}{5}$ -0.8   2.25

2. **Explain, step by step, how you would evaluate the following:**

a) **219.05 + (-121.758)**   b) **-23.24 - (-272.123)**

3. a)   **Will the following answers be negative or positive. How do you know?**

      i.   **(-142.9134) ÷ 4**

      ii.   **(0.126) ÷ (-8)**

b)   **Use a number line to evaluate each of the above.**

4. **Explain, step by step, how to evaluate** $5/6 - 1/2(-1/3)^2$

5. **Your mother is baking cookies for a bake sale. She estimates that she will have about 5 1/2 hours to make them. It takes her 1/3 of an hour to make each dozen. How many dozens can she make?**

6. **Co-op dividends had the following changes over the last 5 years:**

+3 1/2,   -2 1/2   -1 3/4   +3 3/4   -1 1/4

What was the average change?

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.

26. Numbers & Operations

Materials: calculator
newspaper with stock market reports

1.   **Suppose you have been given $40 000. You wish to invest it in the stock market.**

a)   **Look at the stock market report and choose the shares you wish to purchase. Carefully record in a chart.**

b)   **Follow the stock market activity for a month and calculate your daily balance. Did you make money in a month or did you lose. Write a report of your investment.**

When you have completed this station,
place your answer sheet in your portfolio.
Do not forget to label your entry.
Please tidy up the station.