Real Number Stations

Station	Topic
R	Sorting Real Numbers
E	Thinking Blocks Question
A	Place Real Numbers on a Number Line
L	Repeating Decimals
#	Real Number Operations Review
***** **(done only if you finish all other stations)**	Finding the square root of a number without a calculator

Station *:

Directions: Read how to find the square root of any real number and then find the square root of 2364 ($\sqrt{2364}$)

The Algorithm:

Use this algorithm to find the square root of any real number.

Step 1: Group the number in "twos" from the decimal place. (If you have a number with an odd number of digits, the group to the far left will only be a group of 1 digit.)

Step 2: Start with the first group of two (the group on the left). This group may be a group of only one number if your number has an odd number of digits. Find the greatest square less than or equal to that group of digits and its square root will be your first approximation of the entire square root.

Step 3: Subtract the current approximation squared and bring down the next group of numbers behind it. This is your next number to work with.

Step 4: Double the current approximation of the root.

Step 5: Find the "ones" digit of the doubled number that would result in a number which divides into the number you are currently working with- with the smallest possible remainder. This is the next number in your approximation of the square root.

Step 6: Multiply the "ones" digit by the doubled number plus the "ones" digit. Subtract this number from the number you are currently working with and bring down the next group of numbers behind it. This is your next group of numbers to work with.

Step 7: Repeat steps 4 through 6 until you get an approximation with an acceptable number of significant digits.

Station *

Directions: Read the directions to finding a square root without a calculator. Then find the square root of

Example: Find √297 504 to two decimal places.

First group the numbers under the root in pairs from right to left, leaving either one or two digits on the left. For each pair of numbers you will get one digit in the square root.
To start, find a number whose square is less than or equal to the first pair (29), and write it above the square root line (5).

```
   5
√29.75.04
```

```
   5
√29.75.04
- 25
  4 75
```

Square the 5, giving 25, write that underneath the 29, and subtract. Bring down the next pair of digits.

```
   5
√29.75.04
- 25
(10_)  475
```

Then double the number above the square root symbol line (highlighted), and write it down in parenthesis with an empty line next to it as shown.

```
   5 4
√29.75.04
- 25
(104)  475
```

Next think what single digit number *something* could go on the empty line so that hundred-*something* times *something* would be less than or equal to 475.
102 x 2 = 204
104 x 4 = 416, so 4 works.
Write therefore 4 in the answer.

```
   5 4
√29.75.04
- 25
(104)  475
  - 416
    59 04
```

Calculate 4 x 104, write the product below 475, subtract, bring down the next pair of digits.

```
   5 4
√29.75.04
- 25
(104)  475
  - 416
(108_)59 04
```

Then double the number in the answer (54), and write the doubled number (108) in parenthesis with an empty line next to it as shown.

```
   5 4  5
√29.75.04
- 25
(104)  475
  - 416
(1085) 59 04
```

Think what single digit number *something* could go on the empty line so that thousand-eighty-*something* times *something* would be less than or equal to 5904.
1085 x 5 = 5425, so 5 works

and goes to the answer.

```
      5 4  5
    √29.75.04.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
         479 00
```

```
      5 4  5
    √29.75.04.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
(1090_)  479 00
```

```
      5 4  5.  4
    √29.75.04.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
(10904)  479 00
```

To continue, we need to add extra decimal zeros to our number. The steps continue in exact same manner: calculate 1085 x 5 = 5425, write that below 5904, subtract, bring down the next pair of (decimal) digits

Then double the 'number' 545 which is in the answer, and write the doubled number 1090 in parenthesis with an empty line next to it.

10904 x 4 = 43616, so 4 is the next digit in the answer. To find the answer to two decimal places, we need to find the third decimal with the algorithm, so we will know whether the answer to two decimals would be rounded up or down. So two more rounds to go.

```
      5 4  5  4
    √29.75.04.00.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
(10904)  479 00
       - 436 16
          42 84 00
```

```
      5 4  5  4
    √29.75.04.00.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
(10904)  479 00
       - 436 16
(10908_)  42 84 00
```

```
      5 4  5  4  3
    √29.75.04.00.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
(10904)  479 00
       - 436 16
(109083)  42 84 00
```

```
      5 4  5  4  3
    √29.75.04.00.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
(10904)  479 00
       - 436 16
(109083)  42 84 00
        - 32 72 49
          10 11 51
```

```
      5 4  5  4  3
    √29.75.04.00.00.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
(10904)  479 00
       - 436 16
(109083)  42 84 00
        - 32 72 49
(109086_)  1011 51 00
```

```
      5 4  5  4  3  9
    √29.75.04.00.00.00
   - 25
(104)  475
     - 416
 (1085) 59 04
      - 54 25
(10904)  479 00
       - 436 16
(109083)  42 84 00
        - 32 72 49
(109086*9*)  1011 51 00
```

Since the last decimal we find with the algorithm is 9, it means the previous decimal will be rounded up, and thus to one decimal place, √297504 = 545.44

Station E

Directions: Use Models to answer the following questions.

Option #1:

a) The seventh grade class decorated the school gym with 15 blue and purple balloons. One-fifth of the balloons were blue. How many balloons were purple?

b) Mrs. Pillsbury prepared a variety of cookies. Two-thirds of the cookies were sugar. One-Fifth of the remaining cookies were peanut butter. There were 12 chocolate chip cookies. How many cookies did Mrs. Pillsbury prepare altogether?

Option #2

a) Justin ran $\frac{5}{6}$ mile from the basketball court to the park by way of the movie theatre. The distance from the basketball court to the movie theatre is $\frac{2}{3}$ mile. What is the distance from the movie theatre to the park?

b) I traveled from Mount Prime to Vertex Valley last week. I completed $\frac{3}{5}$ of the distance in the morning and $\frac{2}{5}$ of the remaining distance in the afternoon. I still

had 18 miles to travel. What is the distance from Mount Prime to Vertex Valley?

Station L

Write the repeating decimal as a simplified fraction.

A) 0.8888888888….

B) 0.545454545454….

C) 0.16666666…

What about this one????

D) .0123456790123456 79….

Station

Directions: Calculate.

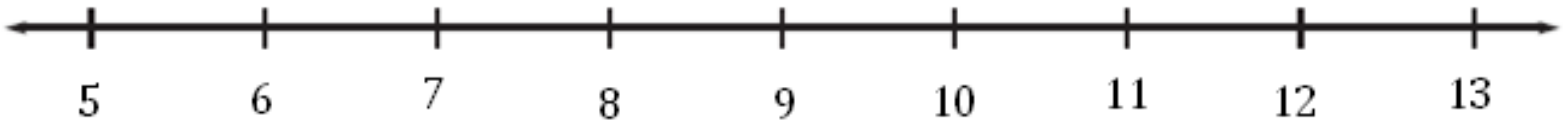
1. $\frac{4}{15}+\frac{1}{6}=$	2. $\frac{11}{12}-\frac{1}{9}=$	3. $\frac{1}{4}\cdot\frac{9}{3}=$
4. $6\frac{6}{7}\cdot 9\frac{2}{11}=$	5. $5\frac{2}{7}\div 1\frac{1}{2}=$	6. $1\frac{1}{5}\div\frac{2}{3}=$
7. $(-32)+(-8)=$	8. $(-4)-(-11)=$	9. $(-25)+(+49)=$
10. $(+11)-(-27)=$	11. $(-6)-(-13)=$	12. $(+28)-(+32)=$

Station A:

Directions: Place the square roots on their approximate location.

$\sqrt{89}$ $\sqrt{49}$ $\sqrt{71.3}$

$\sqrt{38}$ $\sqrt{101}$ $\sqrt{123}$



Station R:

Directions: Place the number placards in their correct categories. Some numbers may belong in more than one category.

57	57	57	57

$\sqrt{74}$	$\sqrt{74}$	$\sqrt{74}$	$\sqrt{74}$

6.7222…	6.7222…	6.7222…	6.7222…

$\frac{-8}{9}$	$\frac{-8}{9}$	$\frac{-8}{9}$	$\frac{-8}{9}$

Natural	Whole	Integer	Rational	Irrational