Concept 13: Rational & Irrational Numbers

**DUE DATE:** Friday, January 31st  
*initial score in the gradebook*

**DEADLINE:** Friday, February 7th  
*on THE LIST if note completed*

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<table>
<thead>
<tr>
<th>(C) Level 2</th>
</tr>
</thead>
</table>
| **1.** Watch the video (Level 2: Rational & Irrational #s)  
Complete the Notes & Basic Practice  
Check the Key and Correct Mistakes |
| **2.** Complete 2 of the following tasks |
| **IXL Practice** | **Worksheets** | **Creating** |
| D1 (8th)  
All the way to 100 | Level 2 Worksheet  
Rational & Irrational #s | Vocabulary Poster for the term  
Rational or Irrational # |
| Score = __________ |
| **3.** Take the Schoology Quiz (Level 2: Rational & Irrational #s)  
Score of 4 or higher move to level 3  
Score of 3 or less, complete 1 of the following tasks |
| **BrainGenie** | **Create** | **Alternate Option** |
| Ask Mr. Sieling for Log in information | Vocabulary Poster for the term  
Rational or Irrational # | Choose the option for Step 2 that you haven’t completed yet |

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**Pre-Quiz Score = _____/5**  
*Score 5 = Level 4*  
*Score 3,4 = Level 3*  
*Score 0,1,2 = Level 2*
(B) Level 3

1. Watch the video (Level 3: Irrational & Rational #s)
   Complete the Notes & Basic Practice, Check the Key and Correct Mistakes
2. Complete 2 of the following tasks

<table>
<thead>
<tr>
<th>IXL Practice</th>
<th>Worksheets</th>
<th>Creating</th>
</tr>
</thead>
<tbody>
<tr>
<td>A8 (8th)</td>
<td>Level 3: Rational &amp; Irrational #s</td>
<td>Vocab Poster for whole #, natural #, integer, rational #, irrational # or real #</td>
</tr>
<tr>
<td>All the way to 100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Score = __________

3. Take the Schoology Quiz (Level 3: Irrational & Rational #s)
   Score of 4 or higher move to level 4
   Score of 3 or less, complete 1 of the following tasks

<table>
<thead>
<tr>
<th>BrainGenie</th>
<th>Creating</th>
<th>Alternate Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ask Mr. Sieling For login info</td>
<td>Vocab Poster for whole #, natural #, integer, rational #, irrational # or real #</td>
<td>Choose the option for Step 2 that you haven’t completed yet</td>
</tr>
</tbody>
</table>

Mr. Sieling’s Signature: ____________________________

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(A) Level 4

1. Watch the video (Level 4: Irrational & Rational #s)
   Complete the Notes & Basic Practice, Check the Key and Correct Mistakes
2. Complete 2 of the following tasks

<table>
<thead>
<tr>
<th>IXL Practice</th>
<th>Worksheets</th>
<th>Creating</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1 (Alg2)</td>
<td>Level 4: Irrational &amp; Rational #s</td>
<td>Vocab Poster for Irrational #, rational #, real #, or imaginary #</td>
</tr>
<tr>
<td>All the way to 100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Score = __________

3. Take the Schoology Quiz (Level 4: Irrational & Rational #s)
   Score of 4 or higher, Congratulations Math Master!
   Score of 3 or less, complete 1 of the following tasks

<table>
<thead>
<tr>
<th>BuzzMath</th>
<th>Fix Mistakes</th>
<th>Alternate Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete the following task in BuzzMath</td>
<td>Write up the questions you got wrong and hand it in. All work and steps must be shown.</td>
<td>Choose the option for Step 2 that you haven’t completed yet</td>
</tr>
</tbody>
</table>

Mr. Sieling’s Signature: ____________________________
**Goals:**

Identify Rational & Irrational #'s

**Notes:**

<table>
<thead>
<tr>
<th>Big Ideas</th>
<th>Examples/Details</th>
</tr>
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</table>

Concept # ________
**Level 2 Practice:**

Fill in the charts below. Each word should have:

- **Definition:** in your own words describe the term
- **Picture:** draw a picture that represents the meaning of the word
- **Examples:** List out examples of the term
- **Non-Examples:** List out non-examples of the term

<table>
<thead>
<tr>
<th>Definition</th>
<th>Rational Number</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td></td>
<td>Non-Examples</td>
</tr>
</tbody>
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<tr>
<th>Definition</th>
<th>Irrational Number</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Example</td>
<td></td>
<td>Non-Examples</td>
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</table>

Concept 13 | Irrational & Rational #s
Worksheet Level 2:

Goals:
Identify Rational & Irrational #s

Practice #1

Classify each number as RATIONAL (Q) or IRRATIONAL (I)

1) \(\sqrt{47}\)  
2) \(\frac{11}{9}\)

3) \(\frac{19}{4}\)  
4) \(\sqrt{96}\)

5) \(\frac{19}{14}\)  
6) \(\frac{15}{4}\)

7) \(\sqrt{84}\)  
8) \(-9\)

9) \(\sqrt{72}\)  
10) \(0\)

11) \(\frac{8}{9}\)  
12) \(3\)

13) \(7\)  
14) \((-7)\)

15) \((-4)\)  
16) \(5\)

17) \((-11)\)  
18) \((-14)\)

19) \(\sqrt{59}\)  
20) \(9\)

Practice #2

Tell whether each expression is rational or irrational.

1. \(-\sqrt{64}\)  
2. \(\sqrt{1600}\)  
3. \(\pm\sqrt{160}\)  
4. \(\sqrt{144}\)

5. \(\sqrt{125}\)  
6. \(-\sqrt{340}\)  
7. \(\sqrt{1.96}\)  
8. \(-\sqrt{0.09}\)
1. Which set below includes only irrational numbers?
   A. \(\{-\sqrt{12}, -3.76, \sqrt{36}, 4.3858\ldots\}\)
   B. \(\{-7.2322\ldots, \sqrt{5}, \sqrt{15}, 8.27451\ldots\}\)
   C. \(\{-5.6, \sqrt{14}, 6.3245, \sqrt{81}\}\)
   D. \(\{-\sqrt{8}, .37, 3.265165065\ldots, \sqrt{90}\}\)

2. Which set contains only irrational numbers
   A. \(\{-8, -\sqrt{4}, \sqrt{3}, \sqrt{16}\}\)
   B. \(\{-\sqrt{64}, \sqrt{0}, \sqrt{19}, \sqrt{13}\}\)
   C. \(\{-\sqrt{26}, -\sqrt{16}, \sqrt{2}, \sqrt{8}\}\)
   D. \(\{-\sqrt{50}, -\sqrt{13}, \sqrt{10}, \sqrt{54}\}\)

3. Which set contains an irrational number?
   A. \(\{2300, 0.48, \frac{13}{7}\}\)
   B. \(\{18, 0.1, \frac{12}{5}\}\)
   C. \(\{\frac{3}{8}, 4, \sqrt{52}\}\)
   D. \(\{0.333\ldots, \sqrt{4}, 10\}\)

4. Which of the following is an irrational number?
   A. \(\sqrt{16}\)  B. \(\sqrt{144}\)  C. \(\sqrt{4}\)  D. \(\sqrt{3}\)

5. Which of the following is an irrational number?
   A. \(\frac{4}{3}\)  B. \(\sqrt{24}\)  C. \(\sqrt{81}\)  D. \(-4.07\)

6. Which list contains only rational numbers?
   A. \(-4, 0, \frac{1}{4}, \sqrt{2}\)  B. \(0, \frac{1}{2}, 1.5, \sqrt{8}\)
   C. \(-2, 1, 2\frac{1}{2}, \sqrt{2}\)  D. \(0, 0.36, 4, \sqrt{24}\)

7. What type of number is \(\sqrt{26}\)?
   A. Whole number  B. Integer
   C. Rational number  D. Irrational number

8. Which number below is an element in the set of irrational numbers?
   \(\sqrt{4}, 3.45, -8.7, \sqrt{2}\)
   A. \(\sqrt{4}\)  B. 3.45  C. -8.7  D. \(\sqrt{2}\)

9. Which set of real numbers contains only rational numbers?
   A. \(\{\sqrt{121}, \sqrt{196}, \sqrt{24}, 12\}\)
   B. \(\{\sqrt{144}, \frac{13}{7}, \frac{5}{3}, \sqrt{3}\}\)
   C. \(\{\sqrt{169}, \frac{5}{2}, \sqrt{121}, \frac{14}{3}\}\)
   D. \(\{\sqrt{169}, \frac{58}{3}, \frac{13}{2}, \sqrt{31}\}\)
**Notes Level 3:**

**Goals:**
- Classify Rational numbers as natural, whole, integers or just rational.
- Classify Real numbers as rational or irrational.

**Notes:**

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Concept 13 | Irrational & Rational #s
Level 3 Practice:

Fill in the charts below. Each word should have:

**Definition**: in your own words describe the term

**Example**: List out examples of the term

**Non-Examples**: List out non-examples of the term

**Picture**: draw a picture that represents the meaning of the word

---

**Irrational Number**

**Definition**: in your own words describe the term

**Example**: List out examples of the term

**Non-Examples**: List out non-examples of the term

**Picture**: draw a picture that represents the meaning of the word

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**Rational Number**

**Definition**: in your own words describe the term

**Example**: List out examples of the term

**Non-Examples**: List out non-examples of the term

**Picture**: draw a picture that represents the meaning of the word

---

**Integer**

**Definition**: in your own words describe the term

**Example**: List out examples of the term

**Non-Examples**: List out non-examples of the term

**Picture**: draw a picture that represents the meaning of the word
Worksheet Level 3:

Goals:
Classify Rational numbers as natural, whole, integers or just rational.
Classify Real numbers as rational or irrational.

Practice #1
Answer each multiple choice question and explain your answer.

Which number represents a rational number?

a. $\sqrt{2}$  
b. $\sqrt{5}$  
c. $\sqrt{10}$  
d. $\sqrt{25}$  
e. $\sqrt{50}$

Which number represents an integer?

a. $\sqrt{2}$  
b. $\frac{10}{21}$  
c. $\sqrt{21}$  
d. 10  
e. $\sqrt{10}$

Which number represents an irrational number?

a. 40  
b. $\sqrt{40}$  
c. 0  
d. $\sqrt{9}$  
e. 9

Which number represents a rational number?

a. $\sqrt{2}$  
b. $\frac{2}{3}$  
c. $\sqrt{3}$  
d. $\frac{2}{\sqrt{3}}$  
e. $\sqrt{15}$

Practice #2
Use the following list of numbers to answer each question below.

$\sqrt{30}, \frac{7}{8}, \sqrt{16}, \sqrt{\frac{1}{4}}, 8i, -\sqrt{42}, 3.692692, 4\pi, \sqrt{-20}$

1. Identify an integer from the list of numbers.

2. Identify two rational numbers from the list of numbers.

3. Identify three irrational numbers form the list of numbers.
1. Cross out the one number which does not belong in the set.

   **Whole Numbers**  \{ 0, 1, 3, 7, 8.5, 9, 14, ...\}

   **Integers**  \{ -8, 0, 5, 3/4, 24, -9, -57, ...\}

   **Rational numbers**  \{ 14, 3/5, -2.4, \sqrt{81}, 0.333, \sqrt{40}, 100, ...\}

   **Irrational numbers**  \{ \sqrt{3}, \pi, \sqrt{49}, \sqrt{8}, 5\pi, \sqrt{91}, 5\sqrt{33}, ...\}

2. List all 9 integers between -3.5 and 5.5.

3. List all 6 whole numbers between -3.5 and 5.5.

4. List 3 rational numbers between 3 and 3.9.

5. Use a calculator to write the decimal expansion. *If the number is irrational*, then estimate to the thousandths place.
   
   a. \(\frac{5}{12}\)  
   d. \(\frac{7}{11}\)  
   g. \(\frac{3}{8}\)
   
   b. \(\sqrt{12}\)  
   e. \(\sqrt{\frac{4}{9}}\)  
   h. \(\frac{11}{20}\)
   
   c. \(\frac{1}{3}\)  
   f. \(\sqrt{78}\)  
   i. \(\frac{11}{18}\)

   **True or False:**

   6. \(\sqrt{40}\) has an infinite non-repeating decimal expansion.

   7. The number 0.5\overline{6} is a rational number

   8. -200 and 500 are integers.

   9. All numbers with infinite decimal expansions are irrational.

   10. the numbers -8, -3, 5, 17 are all whole numbers.
**Goals:**
- Classify Real numbers as rational or irrational numbers
- Classify numbers as Real or Imaginary numbers

**Notes:**

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**Concept 13 | Irrational & Rational #s**
Level 4 Practice:
Fill in the charts below. Each word should have:
Definition: in your own words describe the term  
Example: List out examples of the term  
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Picture: draw a picture that represents the meaning of the word

Irrational Number

Real Number

Imaginary Number
Worksheet Level 4:

Goals:
Classify Real numbers as rational or irrational numbers
Classify numbers as Real or Imaginary numbers

Practice #1

1. Multiple choice: Which irrational number is between 4 and 5.
   a. \( \sqrt{12} \)       b. \( \sqrt{20} \)       c. \( \sqrt{34} \)       d. \( \sqrt{80} \)

2. Multiple choice: Which number is an integer?
   a. \(-11/5\)       b. \(-7\)       c. \(\sqrt{15}\)       d. \(1/2\)

3. Multiple choice: Which number is a whole number?
   a. \(5/6\)       b. \(-4\)       c. \(\sqrt{36}\)       d. \(\sqrt{500}\)

4. Multiple choice: Which number is irrational?
   a. \(9.2727\)       b. \(\sqrt{2}\)       c. \(5\sqrt{9}\)       d. \(-37/71\)

5. Multiple choice: Any number with a finite decimal expansion must be....
   a. rational       b. irrational

6. Multiple choice: The number 3 is....
   a. whole       b. rational       c. integer       d. all of the above

7. Multiple choice: All integers are....
   a. whole       b. rational numbers       c. irrational

Practice #2
Identify each as Real (R) or Imaginary (C). Then simplify.

\[ \sqrt{49} \]
\[ \sqrt{-49} \]
\[ \sqrt{16} \]
\[ \sqrt{-25} \]
\[ \sqrt{-81} \]
Practice #3

Simplify.

1) \((-3 + 4i) + (-4 + 7i)\)  
2) \((3 - 6i) + (7 + 3i)\)

3) \((3 + 8i) + (1 - i)\)  
4) \((4 - 4i) + (-4 + 6i)\)

5) \((-6i) + (3i) - (-7 - 8i)\)  
6) \((-5 - 3i) - (8 + i)\)

7) \((8 - 5i) - (-4 - 3i)\)  
8) \(-4 + (7i) - (1 - 5i)\)

9) \((-6 - 6i) - (2 - 2i)\)  
10) \((-3i) - (-5 + 7i) + (i)\)

11) \((8i)(-6i)(-3i)\)  
12) \((2i)(3i)(-6i)\)

13) \((-6i)(8i)\)  
14) \((-4i)(-5 + 6i)\)

15) \(2(4 + 6i)\)  
16) \((-7i)(i)\)