Math 10

Lesson 1–4 Answers

**Lesson Questions**

**Question 1**

When we calculate the radical, radicals that are rational numbers result in a rational number while radicals that are irrational result in an irrational number.



**Question 2**

Compute the following numbers and classify them as natural, whole, integer, rational, and/or irrational:

 rational, integer, whole and natural





**Question 3**

Which numbers below belong to each set: natural, whole, integer, rational, and/or irrational?



**Question 4**

Classify each of the following numbers as rational or irrational. Provide an explanation.

|  |  |  |
| --- | --- | --- |
| **Number** | **Rational or irrational** | **Explanation** |
| 0 | rational | whole number |
| π | irrational | non-repeating number |
|  | rational | whole number |
| ̶ 4.2558… | irrational | non-repeating number |
| ̶ 4.2558 | rational | terminating decimal |
|  | rational | division of two integers |
|  | irrational | non-repeating number |
|  | rational | repeating number |
|  | rational | whole number |

**Question 5**

Which of the following numbers are irrational. Provide an explanation.

|  |  |  |
| --- | --- | --- |
| **Number** | **Irrational**  **(yes or no)** | **Explanation** |
|  | yes | non-terminating decimal |
|  | no | integer |
|  | yes | non-terminating decimal |
|  | no | integer |
|  | no | integer |
|  | no | integer |
|  | no | terminating decimal |
|  | yes | non-terminating decimal |
|  | no | integer |

**Question 6**

Use a number line to order the following numbers from least to greatest





-6 -4 -2 0 2 4

**Question 7**

 is not a real number. It is impossible to find a root value that, when multiplied by itself, results in a negative number (i.e. 2·2 = 4 and –2 · –2= 4).

(However, the idea of the square root of a negative number eventually led to a whole new branch of mathematics called Complex Numbers.)

## Nasty question of the day

For a right angle triangle, the lengths of the sides must obey Pythagorus’ equation

c2 = a2 + b2

(a) All sides have rational number lengths.

There are an infinite number of triangles like this (Google whole number right triangles):



5

13

12

3

5

4

(b) Exactly 2 sides have rational number lengths.

There are an infinite number of triangles like this:

2

3



(c) Exactly 1 side has a rational number length.

There are an infinite number of triangles like this:

2



(d) No sides have rational number lengths.

There are an infinite number of triangles like this:



**Assignment**

1. a) The square root of 8 is between the root of 4 (2) and the root of 9 (3). Since 8 is close

to 9, we try 2.9 and 2.8 and find that 2.8 is the best answer

b) The cube root of 9 is between the cube root of 8 (2) and the cube root of 27 (3). Since 9 is very close to 8 we try 2.1 and 2.2 and find that 2.1 is the best answer

c) 1.8

d) 3.6

2.

a) The calculator returns an error message; the square of a real number will always be positive.

b) Any non-zero even index

c) i) Any odd index

ii) Any even index

3. a) As written the number 12.247 448 71 is rational since it terminates.

b) The root of 150 is irrational since it results in a non-terminating and non-repeating number.

4. a), b)



5.    

The cubes roots of the numbers in parts c and d will be irrational.

6. 

7. a) i) True – Natural numbers are a subset of Integers

ii) True – Integers are a subset of Rational numbers.

iii) False – The set of Whole numbers includes 0. 0 is not a Natural number.

iv) False – Other irrational numbers are numbers like π and ζ and e.

v) True – Natural numbers are a subset of rational numbers

b) iii) 0 iv) π

8. Answers will vary. For example:

a) any fraction or decimal 0.75

b) 0

c) any non-repeating, non-terminating number like

9. Additional numbers may vary. For example:



10. a)  Irrational number

b)  Rational number

11. a) Yes. Any number that is not a perfect square like .

b) No. If the original number is irrational then the square root will be “doubly” irrational. For example 