

# EXTRA PRACTICE - Exercises

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## Unit I – The Structure of Mathematics Part B – Further Investigation of Number Symbols Lesson 1– The Development of Our Number System

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Tell if:

- a. addition   b. subtraction   c. multiplication   d. division

are well defined operations in each of the following sets. If yes, explain why. If not, give an example to show why not.

1.  $\{\dots -9, -6, -3, 0, 3, 6, 9\dots\}$

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2.  $\{\dots -8, -6, -4, -2, 0\}$

\_\_\_\_\_

3.  $\{\dots \frac{-4}{3}, \frac{-3}{3}, \frac{-2}{3}, \frac{-1}{3}, \frac{0}{3}, \frac{1}{3}, \frac{2}{3}, \frac{3}{3}, \frac{4}{3}, \frac{5}{3} \dots\}$

\_\_\_\_\_

4.  $\{\dots -3, -2, -1, 0, 1, 2, 3\dots\}$

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5. In the following set, find:

- a. the Integers
- b. the Natural Numbers
- c. the Rational Numbers
- d. the Whole Numbers
- e. the Irrational Numbers

$$-\frac{2}{3}, 4.121221222\dots, -7, 0.38, \pi, -300, \frac{5}{8}, \sqrt{3}, \frac{-19}{7}, 57, \frac{41}{41}, 6.\overline{31}$$

# EXTRA PRACTICE — Answer Key

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Tell if:

- a. addition   b. subtraction   c. multiplication   d. division

are well defined operations in each of the following sets. If yes, explain why. If not, give an example to show why not.

- Yes - (Answers will vary) Adding Multiples of three gives an integral multiple of three
  - Yes - (Answers will vary) Subtracting Multiples of three gives an integral multiple of three
  - Yes - (Answers will vary) Multiplying Multiples of three gives an integral multiple of three
  - No - (Answers will vary)  $9 \div 6 = 3/2$  and  $3/2$  is not an integral multiple of three
- Yes - (Answers will vary) Adding Negative integral multiples of two gives negative integral multiples of two
  - No - (Answers will vary)  $0 - 8 = -8$ , not a negative integral multiple of two
  - No - (Answers will vary)  $(-4) \cdot (-6) = 24$ , not a negative integral multiple of two
  - No - (Answers will vary)  $(-6) \div (-2) = 3$ , not a negative integral multiple of two
- Yes - (Answers will vary) Adding thirds gives thirds
  - Yes - (Answers will vary) Subtracting thirds gives thirds
  - No - (Answers will vary)  $-2/3 \cdot 4/3 = -8/9$  and  $-8/9$  is not in the set of whole thirds
  - No - (Answers will vary)  $-4/3 \div 0/3 = 4/3 \cdot 3/0 = 4/0$  This will not give an answer.  
A second example is  $2/3 \div 4/3 = 2/3 \cdot 3/4 = 1/2$  and  $1/2$  is not in the set of whole thirds.
- Yes - (Answers will vary) Adding Integers gives Integers
  - Yes - (Answers will vary) Subtracting Integers gives Integers
  - Yes - (Answers will vary) Multiplying Integers gives Integers
  - No - (Answers will vary)  $3 \div -2 = -3/2$  or  $-1.5$  and these answers are not integers.
- $\{-7, 0, 38, -300, 57, 41/41\}$
  - $\{38, 57, 41/41\}$
  - $\{-2/3, -7, 0, 38, -300, 5/8, -19/7, 57, 41/41\}$
  - $\{0, 38, 57, 41/41\}$
  - $\{4.121221222\dots, \pi, \sqrt{3}\}$