

## Section 2.2

### Exercises

- Write using roster notation:  
 $\{x \mid x \text{ is an even natural number less than } 10\}$
- Write using roster notation:  
 $\{x \mid x \text{ is a UH school color}\}$

**Suppose  $A = \{1, 3, 5, 7, 9\}$ . Which of these statements is/are true?**

- $4 \in A$
- $10 \notin A$
- $A = B$  if  
 $B = \{x \mid x \text{ is an odd natural number less than } 10\}$
- $C \subset A$  if  $C = \{1, 3, 5, 7, 9\}$ .
- $D \subseteq A$  if  $D = \{1, 3, 9\}$
- $D \subset A$  if  $D = \{1, 3, 9\}$
- $E \subseteq A$  if  $E = \{0, 1, 2, 3, 4, 5\}$
- $\mathbb{N} \subset W$

**Suppose  $A = \{2, 4, 5, 7, 9\}$  and  $B = \{1, 3, 4, 5, 9\}$ .**

- Find  $A \cup B$ .
- Find  $A \cap B$

**Suppose  $C = \{a, e, i, o, u\}$  and  $D = \{a, b, c, d, e\}$ .**

- Find  $C \cap D$ .
- Find  $C \cup D$ .

**Suppose  $X = \{1, 2, 3, \dots, 10\}$ ,**

**$A = \{x \mid x \text{ is an even number less than } 20\}$  and**

**$B = \{x \mid x \text{ is less than } 10 \text{ and a multiple of } 3\}$**

- Find  $A \cap X$ .
- Find  $B \cap X$ .
- Find  $A \cup X$ .
- Find  $B \cup X$ .

- Find  $A \cap B$ .
- Find  $A \cup B$ .

**Identify the Natural Numbers in exercises 21 – 26.**

- 23
- 11
- 0
- $\frac{2}{3}$
- $\pi$
- 15

**Identify the Whole Numbers in exercises 27 – 32.**

- 3
- 1000
- $\sqrt{7}$
- 0
- $\frac{-11}{3}$
- 32

**Identify the Integers in exercises 33 – 38.**

- 2.5
- 9
- $\frac{3}{8}$
- $-\sqrt{9}$
- 5
- 0

**Identify the Rational Numbers in exercises 39 – 44.**

- 2.8
- $\frac{13}{2}$
- $\sqrt{3}$
- $\sqrt{25}$
- $\frac{-2}{5}$
- 0

**Identify the Irrational Numbers in exercises 45 – 50.**

- 45.  $\sqrt{11}$
- 46.  $\sqrt{36}$
- 47.  $\frac{7}{9}$
- 48.  $\pi$
- 49. 0
- 50. 2.45455455545555...

51. Plot this set of points on the real number line:  $\left\{-5, 4.1, \frac{2}{3}, 3, \sqrt{36}\right\}$

52. Plot this set of points on the real number line:  
 $\{x \mid x \text{ is an even natural number less than } 14\}$

**Write an equivalent fraction for each given rational number which has the stated denominator.**

- 53.  $\frac{3}{8}$ , denominator is 40
- 54.  $\frac{1}{5}$ , denominator is 250
- 55. 7, denominator is 15
- 56. -12, denominator is 18
- 57.  $\frac{-2}{9}$ , denominator is 243
- 58.  $\frac{-5}{12}$ , denominator is 156

**Write each fraction as a decimal number.**

- 59.  $\frac{4}{5}$
- 60.  $\frac{3}{16}$
- 61.  $\frac{7}{9}$

- 62.  $\frac{5}{9}$
- 63.  $\frac{5}{11}$
- 64.  $\frac{7}{11}$
- 65.  $\frac{41}{33}$
- 66.  $\frac{32}{33}$
- 67.  $\frac{1}{7}$
- 68.  $\frac{3}{7}$

**Write each decimal number as a fraction reduced to lowest terms.**

- 69. 0.222...
- 70. 0.777...
- 71. 0.4848...
- 72. 0.5757...
- 73. 1.0555...
- 74. 3.7222...
- 75. 6.245959...
- 76. 7.381515...

**For problems 77 – 81, classify each statement as true or false. If the statement is false, give an example that shows that the statement is false.**

- 77. All rational numbers are integers.
- 78. All whole numbers are rational numbers
- 79. Some integers are whole numbers
- 80. All real numbers are rational numbers.
- 81. All natural numbers are integers.

**For problems 82 – 20==86, classify each statement as true or false. If the statement is false, write a statement that shows the correct relationship between the two sets.**

82. The intersection of  $\mathbb{Q}$  and  $I_r$  is the empty set.
83. The intersection of  $\mathbb{Z}$  and  $\mathbb{N}$  is  $W$ .
84. None of the integers are natural numbers.
85. If a number is a whole number, then it is also an integer.
86.  $\mathbb{Q} \cup I_r = \mathbb{Z}$

**Determine which sets of numbers,  $\mathbb{N}, W, \mathbb{Z}, \mathbb{Q}, I_r$  and  $\mathbb{R}$ , each of the numbers belongs to. (Note: each number may belong to more than one set.)**

87.  $3/5$
88.  $-7/3$
89. 8
90. 11
91. 0
92.  $\sqrt{29}$
93.  $\sqrt{36}$
94.  $-\sqrt{100}$
95.  $-\sqrt{17}$
96. -14