Practice 1-2

Exploring Irrational Numbers

1. Find the square root $\sqrt{9}$.

2. Which numbers are irrational? Check all that apply.
   - ❑ A. $\sqrt{42}$
   - ❑ B. $\sqrt{100}$
   - ❑ C. $\sqrt{64}$
   - ❑ D. $\sqrt{21}$

3. Which numbers are rational? The dots, ..., indicate that the pattern continues.

   I.   1.1111111...

   II. 1.567

   III. 1.10110111...

   - ○ A. II and III
   - ○ B. III only
   - ○ C. II only
   - ○ D. I and II
   - ○ E. I only
   - ○ F. None of the above.

4. Is 5.78778777... a rational or irrational number?

5. Find the sets of numbers to which $-\dfrac{8}{9}$ belongs. Check all that apply.
   - ❑ A. integers
   - ❑ B. whole numbers
   - ❑ C. irrational numbers
   - ❑ D. real numbers
   - ❑ E. rational numbers
   - ❑ F. natural numbers

6. Which numbers are rational? Check all that apply.
   - ❑ A. $\dfrac{8}{5}$
   - ❑ B. π
   - ❑ C. 0
   - ❑ D. $4.\overline{46}$
   - ❑ E. 10
   - ❑ F. $\dfrac{19}{3}$
   - ❑ G. −6
   - ❑ H. There are no rational numbers.

7. **Reasoning** The numbers 2.888... and 2.999... are both rational numbers. Which of the following is an irrational number that is between the two rational numbers? Check all that apply.

☐ A. 2.889

☐ C. 2.998999...

☐ B. 3.889888...

☐ D. 2.889888...

8. a) **Multiple Representations** Is the decimal form of $\frac{13}{3}$ a rational number?

b) Explain how you can give the answer to this question without identifying the decimal form for the fraction.

9. a) **Writing** Is 8.33333333... a rational or irrational number?

b) Describe how you would explain the difference between rational and irrational numbers to someone who has never heard these terms.

10. **Error Analysis** Deena says that 9.56556555... is a rational number. Elijah disagrees and says the number is irrational. Who is correct? What might likely cause one of them to make the error?

○ A. Elijah is correct. Deena may see 9.56556555... as showing a repeating pattern.

○ B. Both Deena and Elijah are correct. Numbers like this one are both rational and irrational.

○ C. Deena is correct. Elijah may see 9.56556555... as not showing a repeating pattern.

○ D. Neither is correct. The numbers cannot be classified as rational or irrational.

11. Estimated Value of π The circumference of a circle is found using the formula $C = \pi d$. In the formula, d is the diameter of the circle and $\frac{62,832}{20,000}$ is a number that represents π. Find the sets of numbers to which $\frac{62,832}{20,000}$ belongs. Check all that apply.

- ❑ A. irrational numbers
- ❑ B. rational numbers
- ❑ C. integers
- ❑ D. whole numbers
- ❑ E. natural numbers
- ❑ F. real numbers

12. You are given the list of numbers $\{-5, 0, 6, -\frac{8}{3}, \sqrt{47}, 3.73773777...\}$.

a) Which numbers are rational? Check all that apply.

- ❑ A. $\sqrt{47}$
- ❑ B. $-\frac{8}{3}$
- ❑ C. 0
- ❑ D. -5
- ❑ E. 6
- ❑ F. $3.73773777...$

b) Which numbers are irrational? Check all that apply.

- ❑ A. 0
- ❑ B. $\sqrt{47}$
- ❑ C. $3.73773777...$
- ❑ D. 6
- ❑ E. $-\frac{8}{3}$
- ❑ F. -5

13. Evaluate $\sqrt{49} + \sqrt{169}$.

14. a) Simplify $\sqrt{324 + 576}$.

b) Find the sets of numbers to which the number belongs. Check all that apply.

- ❑ A. irrational numbers
- ❑ B. real numbers
- ❑ C. integers
- ❑ D. whole numbers
- ❑ E. natural numbers
- ❑ F. rational numbers

15. Challenge You are given the numbers $\sqrt{1,815}$ and $\sqrt{3,025}$.

a) Are the numbers rational?

- ○ A. Only $\sqrt{1,815}$ is rational.
- ○ B. Only $\sqrt{3,025}$ is rational.
- ○ C. Both numbers are rational.
- ○ D. Both numbers are irrational.

b) How many perfect squares, n, are there that are greater than 1,815 and less than 3,025?

16. **Challenge** You are given the numbers $\{32 + n, \frac{n}{8}, \sqrt{n + 225}\}$. Find the smallest value of n so that all of the numbers in the set are natural numbers.