1-1 Rational and Irrational Numbers

Name _____ Date _____

Write all classifications of 2.1 that apply (*rational number*, *fraction*, *mixed number*, *integer*, *repeating decimal*, *terminating decimal*, *irrational number*).

2.1 can be written as the fraction $\frac{21}{10}$, so 2.1 is rational number.

2.1 is not a fraction, mixed number, integer, irrational number or repeating decimal.

2.1 is a terminating decimal.

So 2.1 is rational number and a terminating decimal.

> **Remember:** Numbers that are not rational are *irrational*, such as decimals that do not terminate or repeat, square roots of nonperfect squares, and the number π.

Approximate the value of $\sqrt{86}$.

$$81 \qquad 86 \qquad 100 \quad \longleftarrow \text{ Locate 86 between two consecutive perfect squares.}$$
$$\sqrt{81} < \sqrt{86} < \sqrt{100} \quad \longleftarrow \text{ } 81 = 9^2 \text{ and } 100 = 10^2$$
$$9 < \sqrt{86} < \qquad 10 \quad \longleftarrow \text{ Find the square roots of the two consecutive perfect squares.}$$

So $\sqrt{86}$ lies between 9 and 10, closer to 9 (since 86 is closer to 81 than to 100).

For each number, list all the terms that apply: *fraction*, *mixed number*, *integer*, *repeating decimal*, *terminating decimal*, *rational number*, **and** *irrational number*.

1. 36

      integer,
terminating decimal,
rational number
_____

2. -8

_____

3. $-\frac{17}{3}$

_____

4. $\frac{2}{5}$

_____

5. $\sqrt{2}$

_____

6. $\sqrt{23}$

_____

7. $2.\overline{8}$

_____

8. $6.12\overline{34}$

_____

9. $2.010010001\ldots$

_____

10. $-0.21384269\ldots$

_____

11. $-\sqrt{36}$

_____

12. $\sqrt{25}$

_____

13. $9\frac{7}{8}$

_____

14. $-9\frac{12}{13}$

_____

15. -115

_____

16. 0

_____

17. 9.25

_____

18. 13.0606

_____

If the number is rational, find its square root. If the radicand is a nonperfect square, give the two consecutive integers it lies between, and the closer integer.

19. $\sqrt{30}$

$\sqrt{25} < \sqrt{30} < \sqrt{36}$
$5 < \sqrt{30} < 6$
5 and 6; 5

20. $\sqrt{70}$

21. $\sqrt{81}$

22. $\sqrt{9}$

23. $\sqrt{13}$

24. $\sqrt{24}$

25. $\sqrt{100}$

26. $\sqrt{16}$

27. $\sqrt{145}$

28. $\sqrt{50}$

29. $\sqrt{79}$

30. $\sqrt{62}$

31. $\sqrt{105}$

32. $\sqrt{3}$

33. $\sqrt{10}$

34. $\sqrt{95}$

35. $-\sqrt{121}$

36. $-\sqrt{225}$

37. $-\sqrt{150}$

38. $-\sqrt{130}$

Solve. Show your work

39. A cabinet door in the shape of a square covers 5 square feet. Find the length of the side of the door to the nearest integer.

40. A farmer's square field covers 2000 square feet. Find the length of the side of the field to the nearest integer.

Problem Solving

41. The area of a square is 24.783 square feet. Find the width of the side of the square to the nearest integer. Explain your reasoning.

42. If the lengths of the sides of a square are between 3.7 feet and 5.2 feet and the area is a perfect square, then what are the possible areas of the square?

WRITE ABOUT IT

43. Explain how to find the next five perfect squares after 100. Then find them.