8. Round 5.0983 to the nearest hundredth.

Example 8 Rounding Decimal Numbers

Round 5.83971 to the nearest thousandth.

Solution

9 is in the thousandths place.

5.83971

The next digit to the right is 7.

Since 7 is greater than 5, increase 9 by one and replace 7 and 1 with 0s. (Increasing 9 by one gives 10, which affects the digit 3 as well.)

Thus, 5.83971 rounds to 5.840 to the nearest thousandth, and only two 0s are dropped. Notice that the digit 3 changed to a 4 since the 9 was made one larger during rounding.

Now work margin exercise 8.

9. Round 2.3953 to the nearest thousandth.

Completion Example 9 Rounding Decimal Numbers

Round 0.6753 to the nearest hundredth.

Solution

The digit in the hundredths position is _____.

The next digit to the right is _____.

Since _____ is equal to 5, change the _____ to _____ and replace _____ and _____ with 0s.

So, 0.6753 rounds to _____ to the nearest hundredth (with two 0s dropped).

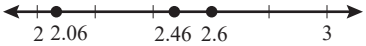
Now work margin exercise 9.

Completion Example Answers

9. The digit in the hundredths position is 7; The next digit to the right is 5; Since 5 is equal to 5, change the 7 to 8 and replace 5 and 3 with 0s; 0.6753 rounds to 0.68

Margin Exercise Answers

1. 19.3; nineteen and three tenths **2.** 39.0184; thirty-nine and one hundred eighty-four ten-thousandths **3. a.** 1200.0005 **b.** 0.1205 **4.** 6.44 **5.** 9.251 **6.** 2.06, 2.46, 2.6



7. 9.3 **8.** 5.10 **9.** 2.395

3.1 Exercises

Concept Check

Fill-in-the-Blank. Complete each sentence using information found in this section.

1. When reading or writing decimal numbers, the decimal point is represented by the word _____.
2. The place value three places to the right of the decimal is the _____ place.
3. 2.08 would be written as _____ and _____ _____.

4. To compare two decimal numbers, move from left to right and compare digits with the same _____ _____.

5. When rounding, all zeros to the _____ of the decimal point can be dropped, unless they are needed to emphasize (or show) the place of accuracy.

6. When rounding decimal numbers, look at the digit to the _____ of the place of accuracy to determine if the digit in the place of accuracy should remain the same or increase by 1.

True/False. Determine whether each statement is true or false. If a statement is false, explain how it can be changed so the statement will be true. (**Note:** There may be more than one acceptable change.)

7. Two hundred thousand, four hundred six and twelve hundredths can be written as 200,406.12.

8. 92.586 is greater than 92.6.

9. On a number line, any number to the left of another number is larger than that other number.

10. When a decimal number is rounded, all numbers to the right of the place of accuracy become zeros in the final answer.

Practice

Write each mixed number in decimal notation. See Examples 1 and 2.

1. $6\frac{5}{10}$
2. $8\frac{4}{10}$
3. $18\frac{76}{100}$
4. $2\frac{57}{100}$
5. $56\frac{3}{100}$
6. $13\frac{2}{100}$
7. $37\frac{498}{1000}$
8. $62\frac{547}{1000}$
9. $87\frac{3}{1000}$
10. $12\frac{37}{1000}$

Write each decimal number in words. See Examples 1 and 2.

11. 0.9
12. 0.5
13. 20.7
14. 96.3
15. 1.53
16. 2.79
17. 19.102
18. 18.051
19. 800.009
20. 500.005

Write each number in decimal notation. See Example 3.

21. three tenths
22. seven tenths
23. seventeen and nine tenths
24. eight hundred and three tenths
25. twenty-three hundredths
26. seventy-two hundredths
27. six and twenty-eight thousandths
28. fourteen and ninety-seven thousandths

29. four thousand five hundred two ten-thousandths

30. seven thousand one hundred sixty-five ten-thousandths

For each pair of decimal numbers, determine which number is larger. See Examples 4 and 5.

31. 0.26, 0.27

32. 0.45, 0.48

33. 0.153, 0.163

34. 4.537, 4.527

35. 23.521, 24.295

36. 110.241, 101.862

37. 0.01, 0.009

38. 4.002, 4.0008

Arrange each set of decimal numbers in order from smallest to largest. Then, graph the numbers on a number line. See Example 6.

39. 0.3, 0.03, 0.33

40. 0.55, 0.05, 0.5

41. 0.2, 0.26, 0.17

42. 1.8, 1.75, 1.86

43. 0.157, 0.2611, 0.192, 0.26

44. 1.432, 1.54, 1.14, 1.5422

Fill in the blanks to correctly complete each statement. See Examples 7 through 9.

45. Round 34.78 to the nearest tenth.

- **a.** The digit in the tenths position is ___.
- **b.** The next digit to the right is ___.
- **c.** Since ___ is greater than 5, change ___ to ___ and replace ___ with 0.
- **d.** So 34.78 rounds to _____ to the nearest tenth.

46. Round 70.53 to the nearest tenth.

- **a.** The digit in the tenths position is ___.
- **b.** The next digit to the right is ___.
- **c.** Since ___ is less than 5, leave ___ as it is and replace ___ with 0.
- **d.** So 70.53 rounds to _____ to the nearest tenth.

47. Round 3.00652 to the nearest ten-thousandth.

- **a.** The digit in the ten-thousandths position is ___.
- **b.** The next digit to the right is ___.
- **c.** Since ___ is less than 5, leave ___ as it is and replace ___ with 0.
- **d.** So 3.00652 rounds to _____ to the nearest ten-thousandth.

48. Round 8.00516 to the nearest ten-thousandth.

- **a.** The digit in the ten-thousandths position is ___.
- **b.** The next digit to the right is ___.
- **c.** Since ___ is greater than 5, change ___ to ___ and replace ___ with 0.
- **d.** So 8.00516 rounds to _____ to the nearest ten-thousandth.

Round each decimal number to the nearest tenth. See Example 7.

49. 8.555 **50.** 3.251 **51.** 9.961 **52.** 4.980

Round each decimal number to the nearest hundredth. See Example 9.

53. 1.677 **54.** 19.444 **55.** 0.0764 **56.** 0.0439

Round each decimal number to the nearest thousandth. See Example 8.

57. 0.0572 **58.** 0.6388 **59.** 3.00254 **60.** 19.01655

Round each decimal number to the nearest whole number (or nearest unit).

61. 4.41 **62.** 8.73 **63.** 29.999 **64.** 19.888

Round each decimal number to the nearest hundred.

65. 5163 **66.** 6475 **67.** 435.7 **68.** 263.9

Round each decimal number to the nearest thousand.

69. 103,499 **70.** 37,495 **71.** 50,766.4 **72.** 40,397.9

Applications

In each exercise, write the decimal numbers that are not whole numbers in words.

73. The tallest unicycle ever ridden was 114.8 feet tall, and was ridden by Sam Abrahams (with a safety wire suspended from an overhead crane) for a distance of 28 feet in Pontiac, Michigan, on January 29, 2004. [1]

74. A penny dated from 1959 through 1982 had an original weight of 3.11 grams. A penny dated 1983 or later had an original weight of 2.5 grams.

75. One yard is equal to 36 inches. One yard is also approximately equal to 0.914 meter. One meter is approximately equal to 1.09 yards. One meter is also approximately equal to 39.37 inches. (Thus, a meter is longer than a yard by about 3.37 inches.)

76. One foot is equal to 12 inches. One foot is also equal to 30.48 centimeters. One square foot is approximately 0.093 square meters.

77. One quart of water weighs approximately 2.0825 pounds.

78. The number π is approximately equal to 3.14159.

79. Euler's number e is approximately equal to 2.71828.

80. The largest state in the United States is Alaska, which covers approximately 656.4 thousand square miles. The second largest state is Texas, which covers approximately 268.6 thousand square miles. Alaska is more than 10 times the size of Wisconsin (twenty-third in size), which covers about 65.5 thousand square miles.

1 Source: semcycle.biz/record

81. A few track world records are as follows: 9.58 seconds for 100 meters (by Usain Bolt, Jamaica, 2009); 19.19 seconds for 200 meters (by Usain Bolt, Jamaica, 2009); 43.03 seconds for 400 meters (by Wayde van Niekerk, South Africa, 2016). [2]

82. The mean distance from the Sun to Earth is about 92.9 million miles and from the Sun to Venus is 67.24 million miles. One period of revolution of the Earth about the Sun takes 365.2 days, and one period of revolution of Venus about the sun takes 224.7 days.

83. An interesting fact about aging is that the longer you live, the longer you can expect to live. A white male of age 40 can expect to live 35.8 more years; of age 50, can expect to live 26.9 more years; of age 60 can expect to live 18.9 more years; of age 70 can expect to live 12.3 more years; and of age 80 can expect to live 7.2 more years. (This same phenomenon is true of men and women of all races.)

Writing & Thinking

84. In your own words, state why the word "and" is so commonly misused when numbers are spoken and/or written. Bring an example of this from a newspaper, magazine, or television show to share with the class.

85. Suppose you are writing a check to pay your phone bill. How would you write the amount due in standard notation and in English word form?

86. Discuss situations where you think it is particularly appropriate (or necessary) to write numbers in English word form.

87. Using parts a. and b. as examples, explain in your own words how you can tell quickly when one decimal number is larger (or smaller) than another decimal number.

a. The decimal number 2.765274 is larger than the decimal number 2.763895.

b. The decimal number 17.345678 is larger than the decimal number 17.345578.

2 Source: trackandfieldnews.com/records/mens-world-records