6.4 Exercises

Concept Check

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

1. In the US customary system, temperature is measured in degrees _____.
2. In the metric system, temperature is measured in degrees _____.
3. One inch equals exactly ____ centimeters.
4. One square foot is about _____ square meters.
5. One quart is approximately _____ liters.
6. One kilogram is approximately _____ pounds.

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. Water freezes at 32 degrees Celsius.
8. When converting between US customary and metric units, often the results will be approximations.
9. A 5K (km) run is longer than a 5 mile run.
10. One square meter covers more area than one square yard.

Practice

Convert each measurement. Round to the nearest hundredth if necessary. See Examples 2 and 3.

1. 25 °C = ___ °F
2. 80 °C = ___ °F
3. 10 °F = ___ °C
4. 0 °C = ___ °F
5. 113 °F = ___ °C
6. 392 °F = ___ °C
7. 50 °C = ___ °F
8. 35 °C = ___ °F
9. Change 32 °F to degrees Celsius.
10. Change 41 °F to degrees Celsius.
11. Change 15 °C to degrees Fahrenheit.
12. Change 30 °C to degrees Fahrenheit.

Convert each measurement. Round to the nearest hundredth if necessary. See Example 4.

13. 9 ft = ___ m
14. 15 ft = ___ m
15. 11 m = ___ yd
16. 8 m = ___ yd

17. 33 in. = ___ cm

18. 21 in. = ___ cm

19. 8.5 m = ___ ft

20. 40 m = ___ ft

21. 20 mi = ___ km

22. 35 mi = ___ km

23. How many meters are in 3 yd?

24. How many meters are in 5 yd?

25. Change 60 miles to kilometers.

26. Change 100 kilometers to miles.

27. Convert 200 kilometers to miles.

28. Convert 100 miles to kilometers.

29. How many inches are in 50 cm?

30. How many inches are in 100 cm?

31. Convert 14 inches to centimeters.

32. Convert 14 centimeters to inches.

Convert each measurement. Round to the nearest hundredth if necessary. See Example 5.

33. 3 $in.^2$ = _____ cm^2

34. 16 $in.^2$ = _____ cm^2

35. 600 ft^2 = _____ m^2

36. 300 ft^2 = _____ m^2

37. 100 yd^2 = _____ m^2

38. 250 yd^2 = _____ m^2

39. 1000 acres = _____ ha

40. 250 acres = _____ ha

41. How many acres are in 300 ha?

42. How many acres are in 400 ha?

43. Change 5 m^2 to square feet.

44. Change 10 m^2 to square feet.

45. Change 30 cm^2 to square inches.

46. Change 50 cm^2 to square inches.

Convert each measurement. Round to the nearest hundredth if necessary. See Example 6.

47. 4 qt = ___ L

48. 7 qt = ___ L

49. 4 L = ___ gal

50. 9 L = ___ gal

51. 10 qt = ___ L

52. 20 qt = ___ L

53. 78 mL = ___ cc

54. 91 cc = ___ mL

55. 42 L = ___ gal

56. 50 L = ___ gal

57. How many quarts are in 10 L?

58. How many quarts are in 25 L?

59. How many liters are in 50 gal?

60. How many liters are in 36 gal?

Convert each measurement. Round to the nearest hundredth if necessary. See Example 7.

61. 33 kg = ___ lb

62. 95 kg = ___ lb

63. 35 oz = ___ g

64. 55 oz = ___ g

65. 10 lb = ___ kg

66. 70 lb = ___ kg

67. 100 g = ___ oz

68. 53 g = ___ oz

69. Convert 16 oz to grams.

70. Convert 64 oz to grams.

71. How many pounds are in 120 kg?

72. How many pounds are in 500 kg?

Applications

Solve.

73. While visiting her aunt in Germany, Helga wants to surprise her aunt with a cake. She brought her mom's cake recipe with her from Georgia. The recipe says to bake the cake at 350 degrees Fahrenheit but the temperature gauge on her aunt's oven is in degrees Celsius. To what temperature should Helga set her aunt's oven in order to bake the cake at the correct temperature? Round the temperature to the nearest degree.

74. Michael, who lives in Fargo, North Dakota, is packing for his trip to France. He looks up the weather for the duration of his trip to help him determine what type of clothing to pack. The average temperature for the week he will be in France is 24 degrees Celsius. What will the average temperature be in degrees Fahrenheit? Round the temperature to the nearest degree.

75. The Palace at Versailles is 23.5 km from the center of the city of Paris, France. If it takes Pierre 1.5 hours to bike between the two places, what is his speed in miles per hour (to the nearest tenth)?

76. Roger Bannister is famous for being the first man to break the 4-minute mile. He ran the mile in 3 minutes and 59 seconds. Today, most track meets do not have a one mile race. Instead, they have the "metric mile" race, which is 1500 meters. How much further is the actual mile race than the 1500-meter race (rounded to the nearest whole meter)?

77. The Ironman Triathlon championship in Hawaii consists of a swim of 3.86 km, a bike ride of 180.25 km, and finishes with a run equal to the length of a standard marathon. A marathon is typically 26.2 miles. What is the total length of the Ironman Triathlon in kilometers? Round the length to the nearest tenth of a km.

78. Darren needs to retool his widget maker so that it takes measurements in centimeters instead of inches. The widget maker currently makes widgets that are $\frac{3}{4}$ of an inch wide, $\frac{1}{3}$ of an inch deep, and $1\frac{3}{7}$ inches long. Determine the measurements of the widgets in centimeters (to the nearest tenth of a centimeter).

79. Suppose that the home you are buying sits on a rectangular shaped lot that is 270 feet by 121 feet. Convert this area to square meters.

80. A new manufacturing building covers an area of 3 acres. How many hectares of ground does the new building cover?

81. A painting of a landscape is on a rectangular canvas that measures 3 feet by 4 feet.

a. How many square centimeters of wall space will the painting cover when it is hanging?

b. How many square meters?

82. A turkey baster holds 150 mL of liquid. How many times would the turkey baster need to be filled in order to empty a 2-gallon bin of water from a dehumidifier?

83. You are making a large pot of soup and the recipe calls for 2 liters of vegetable stock. (Stock is similar to broth.) If the only cans of vegetable stock available at the super market hold 10 fluid ounces, how many cans will you need?

84. Rachel has taken up French cooking and is making chocolate éclairs. Since the recipe is in French, the measurements are given using metric units. The éclair recipe calls for 150 g butter, 225 mL water, 225 g flour, and 300 mL heavy cream. Convert the measurements given in grams into ounces and the measurements given in milliliters into fluid ounces. Round each measurement to the nearest whole number.

85. Kristy is shopping for gourmet chocolates online. The website of her favorite chocolatier only lists the mass of each box of chocolate in grams. A small box of chocolates has a mass of 153 grams, a medium box has a mass of 309 grams, and a large box has a mass of 595.4 grams. Find the weight in ounces of each box of chocolates. Round each weight to the nearest tenth.

Writing & Thinking

86. Peggy said that water boils at 100 degrees. Joel said it boils at 212 degrees. Who is correct and why?

87. Paola mistakenly thought that a meter stick was the same as a yard stick. Explain her mistake.

88. Most conversions between the US customary system of measure and metric system are not exact. Explain why this is true and give any exceptions.

89. Kai and Kristen were converting between US customary measures and metric measures. Their answers were close but not the same. The teacher said they were both right. How could this be?