Solution

$3.1^2 + 7.05 \div 1.5$

$= 9.61 + 7.05 \div 1.5$ Evaluate the exponential expression.

$= 9.61 + 4.7$ Divide.

$= 14.31$ Add.

Now work margin exercise 8.

9. Simplify:
$3.2\left(0.5^2 + 1.1\right) - 7.3$

Example 9 Using the Order of Operations with Decimal Numbers

Simplify: $2.1\left(-45.2 + 10.8\right) - 15.38$

Solution

$2.1\left(-45.2 + 10.8\right) - 15.38$

$= 2.1\left(-34.4\right) - 15.38$ Subtract inside the parentheses.

$= -72.24 - 15.38$ Multiply.

$= -87.62$ Subtract.

Now work margin exercise 9.

Margin Exercise Answers
1. 42.0667 **2.** 5.891 **3.** $8.68 **4.** 16.0146 **5.** 18.72 **6.** 14.9 **7.** 8 meters per second **8.** 7.28 **9.** –2.98

1.6 Exercises

Concept Check

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

1. When adding or subtracting decimal numbers, keep the decimal points aligned _____.

2. When adding or subtracting, to help keep corresponding digits aligned, _____ may be written in place of missing place values.

3. Once the numbers and decimal points have been aligned, addition or subtraction can be performed the same as with _____ numbers.

4. The first step in multiplying decimal numbers is to multiply the two numbers as if they were _____ _____.

5. If the decimal point is moved 3 places to the right in the divisor, then the decimal point in the _____ must also be moved 3 places to the right.

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.)

6. In subtracting decimal numbers, line up all the last digits vertically.

7. Once decimal points and corresponding digits have been aligned vertically, add or subtract from left to right.

8. When multiplying decimal numbers, the answer should have the same number of decimal places as the total number of decimal places in the numbers being multiplied.

9. The decimal point should be placed in the quotient before actually dividing.

Practice

Perform the indicated operations. Round any quotient to the nearest hundredth, if necessary.

1.
$$\begin{array}{r} 42.08 \\ +\ 8.005 \\ \hline \end{array}$$

2.
$$\begin{array}{r} 14.5 \\ +\ 9.09 \\ \hline \end{array}$$

3.
$$\begin{array}{r} 0.09 \\ 165.1 \\ +\ 72.55 \\ \hline \end{array}$$

4.
$$\begin{array}{r} 3.8771 \\ 0.307 \\ +\ 4.0086 \\ \hline \end{array}$$

5.
$$\begin{array}{r} 1.1 \\ 0.32 \\ 2.4 \\ +\ 6.01 \\ \hline \end{array}$$

6.
$$\begin{array}{r} 3.2 \\ 0.39 \\ 1.004 \\ +\ 4.205 \\ \hline \end{array}$$

7.
$$\begin{array}{r} 37.02 \\ 25 \\ 6.4 \\ +\ 3.89 \\ \hline \end{array}$$

8.
$$\begin{array}{r} 5 \\ 2.37 \\ 436 \\ +\ 10.88 \\ \hline \end{array}$$

9. $3.07 + 596$

10. $2.3 + 10.022$

11. $152.3 + 4.005$

12. $22.051 + 0.2006$

13. $2.59 + 16.9 + 0.051$

14. $2.48 + 51.22 + 10.734$

15. $9 + 5.6 + 0.58 + 25.133$

16. $3.766 + 9.33 + 14 + 206$

17.
$$\begin{array}{r} 39.542 \\ -\ 28.411 \\ \hline \end{array}$$

18.
$$\begin{array}{r} 46.918 \\ -\ 31.702 \\ \hline \end{array}$$

19.
$$\begin{array}{r} 87.1 \\ -\ 69.3 \\ \hline \end{array}$$

20.
$$\begin{array}{r} 63.4 \\ -\ 27.8 \\ \hline \end{array}$$

21. $51.3 - 6.29$

22. $72.6 - 8.54$

23. $4.8 - 0.0026$

24. $7.6 - 0.0097$

25. $17.83 - 8.9$

26. $14.59 - 2.8$

27. $5.2 - 3.76$

28. $29.5 - 13.61$

29. $1.0057 - 0.03$

30. $78.015 - 13.06$

31. $18 - 0.4384$

32. $23 - 2.3196$

33. $8.2 + 1.35 + (-22.70)$

34. $77.5 + (-38.1) + 56.3$

35. $-8.45 - 6.98$

36. $-44.7 - 98.61$

37. $-88.6 - (-91.9)$

38. $-4.55 - (-5.25)$

39. $13.4 - 22.7 + 15.6$

40. $167.1 - 290 + 145.3$

41. $2.1 + 8.2 - 1.4 - 3.1$

42. $-8.4 - 3.7 + 2.6 - 0.1$

43. $58 - 63.2 - (-14.21) + 3.5$

44. $-57.11 + 62.9 - 22.78 - (-5.49)$

45. $(0.6)(0.7)$

46. $(0.3)(0.8)$

47. $-6(0.125)$

48. $-2(0.125)$

49. $(1.4)(0.3)$

50. $(1.5)(0.6)$

51. $(5.6)(-0.02)$

52. $(4.8)(-0.06)$

53. $(-5.48)(-0.002)$

54. $(-4.29)(-0.003)$

55. $1.6 \cdot 0.875$

56. $3.2 \cdot 0.375$

57. $-5.3 \cdot 0.75$

58. $-6.9 \cdot 0.25$

59. $4.8 \cdot 0.25$

60. $2.4 \cdot 0.75$

61. 6.884×9.5

62. 5.392×6.5

63. 0.08×0.542

64. 0.833×0.04

65. $-1.62 \div 9$

66. $-4.95 \div 5$

67. $0.064 \div (-0.8)$

68. $0.063 \div (-0.7)$

69. $-16.35 \div (-2.5)$

70. $-30.94 \div (-6.5)$

71. $48 \div 2.4$

72. $168 \div 5.6$

73. $\dfrac{0.1463}{24}$

74. $\dfrac{0.2249}{23}$

75. $-0.42753 \div (-0.074)$

76. $-0.2433 \div (-0.065)$

77. $1.23\overline{)14.91129}$

78. $3.14\overline{)15.25631}$

79. $9\overline{)5}$

80. $9\overline{)2}$

81. $1.5^2 - 4.25 \div 0.25$

82. $5.4 \div 1.8 - 2.4^2$

83. $1.52 + 0.56 - 2.2 \cdot 6.5$

84. $12.6 + 5.88 - 13.9 \cdot 6.5$

85. $3.1(50 - 25.8) - 12.9$

86. $4.1(38.6 - 29.8) + 8.6$

87. $40.7 - (2.5^2 + 7.25) \div 0.5$

88. $97.5 + (30.46 - 4.6^2) \div 1.5$

Applications

Solve.

89. Mr. Johnson bought the following items at a department store: slacks, $32.50; shoes, $43.75; shirt, $18.60.

a. How much did he spend?

b. What was his change if he gave the clerk a $100 bill? (Tax was included in the prices.)

90. Theresa got a haircut for $38.00, a manicure for $15.50, and left an $8.00 tip.

a. How much did she spend?

b. How much change should she receive from $70? (Tax was included in the prices.)

91. Suppose your checking account shows a balance of $253.70 at the beginning of the month. During the month you make deposits of $635, $279, and $428, and you make debit purchases for $124.60, $89.55, $680, and $29.80. Find the end-of-the-month balance on your account.

92. Suppose your checking account shows a balance of $382.35 at the beginning of the month. During the month, you make deposits of $580.00, $300.00, $182.50, and $45.00, and you make debit purchases for $85.35, $210.50, $43.75, and $650. Find the end-of-the-month balance in your account.

93. A special steel alloy for knife blades consists of iron along with a mixture of other chemical elements. What is the total weight of the "ingredients" if 10 tons of iron is combined with 0.28 ton of carbon, 1.58 ton of chromium, 0.269 ton of vanadium, and 0.0488 ton of manganese? [1]

1 Source: zknives.com/knives/steels/steelchart.ph

94. A college student is purchasing the necessary textbooks and supplies for an education course, which consist of the textbook for $144.37, the accompanying lesson plan guide book for $38.17, and a package of 4 by 6 inch index cards for $1.79. In addition, she is purchasing a candy bar for $0.71 and a piece of bubble gum for $0.06. How much will her total be?

95. A young child has a bunch of change in his pocket, and he wants to purchase a comic book which costs $2.26. If he has $1.25 in quarters, $0.40 in dimes, $0.35 in nickels, and $0.07 in pennies, does he have enough money to buy the comic book? If not, how much extra must he get so that he can buy it? (**Hint:** Add up the value of his coin collection. If it exceeds the cost, he has enough money. If not, subtract the cash on hand from the cost of the comic book.)

96. A college student is receiving assistance from two sources, which will be applied to the following expenses: $17,993.74 for tuition and fees, $7248.39 for room and board, and $1537.71 for books and supplies. If one of the sources of assistance supplies $9438.72 and the other $8300, how much must the student cover? (**Hint:** Add the total costs, add up the total assistance, and subtract this from the total cost to find how much the student must cover.)

97. To buy a car, you can pay $2036.50 in cash, or you can put down $400 and make 18 monthly payments of $104.30. How much would you save by paying cash?

98. To buy a new washer and dryer, you can pay $1737.83 in cash, or you can put $350 down and make 12 monthly payments of $129.54. How much would you save by paying cash?

99. At one point, Ohio funded its public libraries with $39.87 spent for each person. How much funding would have been received that year by a library that served a town of 23,500 people?

100. In March of 2022, the average price per kilogram paid by the United States for beef imported from Australia and New Zealand was $6.25. At this price, what would be the value of 20,500 kilograms of beef?

101. If four new tires with custom rims cost $958.24, what did each individual tire with rim cost?

102. If you bought 6 books for a total price of $142.98, what average amount did you pay per book, including tax?

103. If the total price of a stereo was $312.70 including a tax of 0.06 times the list price, you can find the list price by dividing the total price by 1.06. What was the list price? (**Note:** 1.06 represents the list price plus 0.06 times the list price.)

104. If the total price of a tablet PC was $266.43 including a tax of 0.07 times the list price, you can find the list price by dividing the total price by 1.07. What was the list price? (**Note:** 1.07 represents the list price plus 0.07 times the list price.)

Writing & Thinking

105. Why is it important that the decimal points and numbers be aligned vertically when adding or subtracting decimals?

106. Suppose you are given two decimal numbers with 0 as their whole number parts.

a. Explain why the difference would be less than 1.

b. Explain how the difference might be 0.

107. In your own words, discuss the similarities and differences between multiplication with whole numbers and multiplication with decimal numbers.

108. Discuss briefly, situations in which you might use division with decimal numbers in your daily life.