Chapter 4: Practice Problem Answers

TEMPERATURE CONVERSIONS

For problems 1-5, convert the Fahrenheit temperatures to Celsius using Formula #1. Round answers to the nearest tenth.
Formula #1: 9C = 5F – 160 (where C is degrees Celsius and F is degrees Fahrenheit)

1. 12 °F

   Insert 12 For F in Formula #1.

   9C = (5 x 12) – 160

   9C = 60 – 160

   9C = -100

   Divide both sides by 9.

   $\frac{9C}{9} = \frac{-100}{9}$

   C = -100 9 = -11.1111 rounded to -11.1

   Therefore, 12 degrees Fahrenheit is equivalent to -11.1 degrees Celsius.

2. 54 °F

   Insert 54 For F in Formula #1.

   9C = (5 x 54) – 160

   9C = 270 – 160 = 110

Divide both sides by 9.

$$\frac{9C}{9} = \frac{110}{9}$$

C = 12.222 rounded to 12.2

Therefore, 54 degrees Fahrenheit is equivalent to 12.2 degrees Celsius.

3. 63 °F

   Insert 63 For F in Formula #1.

   9C = (5 x 63) – 160

   9C = 315– 160 = 155

   Divide both sides by 9.

   $$\frac{9C}{9} = \frac{155}{9}$$

   C = 17.222 rounded to 17.2

   Therefore, 63 degrees Fahrenheit is equivalent to 17.2 degrees Celsius.

4. 76 °F

   Insert 76 For F in Formula #1.

   9C = (5 x 76) – 160

   9C = 380 – 160 = 220

   Divide both sides by 9.

   $$\frac{9C}{9} = \frac{220}{9}$$

   C = 24.444 rounded to 24.4

Therefore, 76 degrees Fahrenheit is equivalent to 24.4 degrees Celsius.

5. 107 °F

   Insert 107 into Formula #1 For F.

   $9C = (5 \times 107) - 160$

   $9C = 535 - 160 = 375$

   Divide both sides by 9.

   $\frac{9C}{9} = \frac{375}{9}$

   $C = 375 \div 9 = 41.666$ rounded to 41.7

   Therefore, 107 degrees Fahrenheit is equivalent to 41.7 degrees Celsius.

For problems 6-10, Convert the Following Celsius temperatures to Fahrenheit using Formula #1. Round answers to the nearest tenth.
Formula #1: 9C = 5F – 160 (where C is degrees Celsius and F is degrees Fahrenheit)

6. 51 °C

   Insert 51 For C into Formula #1.

   $9 \times 51 = 5F - 160$

   $459 = 5F - 160$

   Add 160 to both sides.

   $459 + 160 = 5F - 160 + 160$

   $619 = 5F$

   Divide both sides by 5.

   $\frac{619}{5} = \frac{5F}{5}$

619 5 = F

123.8 = F

Therefore, 51 degrees Celsius is equivalent to 123.8 degrees Fahrenheit.

7. 23 °C

   Insert 23 For C into Formula #1.

   9 x 23 = 5F – 160

   207 = 5F – 160

   Add 160 to each side.

   207 + 160 = 5F – 160 + 160

   367 = 5F

   Divide both sides by 5.

   $\frac{367}{5} = \frac{5F}{5}$

   73.4 = F

   Therefore, 23 degrees Celsius is equivalent to 73.4 degrees Fahrenheit.

8. 4 °C

   Insert 4 For C into Formula #1.

   9 x 4 = 5F – 160

   36 = 5F – 160

   Add 160 to each side.

   36 + 160 = 5F – 160 + 160

196 = 5F

Divide both sides by 5.

$\frac{196}{5} = \frac{5F}{5}$

39.2 = F

Therefore, 4 degrees Celsius is equivalent to 39.2 degrees Fahrenheit.

9. 36 °C

Insert 36 For C into Formula #1.

9 x 36 = 5F – 160

324 = 5F – 160

Add 160 to both sides.

324 + 160 = 5F – 160 + 160

484 = 5F

Divide both sides by 5.

$\frac{484}{5} = \frac{5F}{5}$

96.8= F

Therefore, 36 degrees Celsius is equivalent to 96.8 degrees Fahrenheit.

10. 12 °C

Insert 12 For C into Formula #1.

9 x 12 = 5F – 160

108 = 5F – 160

Add 160 to each side.

$108 + 160 = 5F - 160 + 160$

$268 = 5F$

Divide both sides by 5.

$\frac{268}{5} = \frac{5F}{5}$

$53.6 = F$

Therefore, 12 degrees Celsius is equivalent to 53.6 degrees Fahrenheit.

For problems 11-15, convert the Following Fahrenheit temperatures to Celsius using Formula #2. Round answers to the nearest tenth.
Formula #2a: C = (F – 32) 1.8 (where C is degrees Celsius and F is degrees Fahrenheit)

11. 64 °F

Substitute 64 for F into Formula #2a.

C = (64 – 32) 1.8

C = 32 1.8

C = 17.7777 rounded to 17.8

Therefore, 64 degrees Fahrenheit is equivalent to 17.8 degrees Celsius.

12. 48 °F

Substitute 48 For F into Formula #2a.

C = (48 – 32) 1.8

C = 16 ÷ 1.8

C = 8.888 rounded to 8.9

Therefore, 48 degrees Fahrenheit is equivalent to 8.9 degrees Celsius.

13. -4 °F

Substitute -4 for F into Formula #2a.

C = (-4 – 32) ÷ 1.8

C = -36 ÷ 1.8

C = -20

Therefore, -4 degrees Fahrenheit is equivalent to -20 degrees Celsius.

14. 28 °F

Substitute 28 For F into Formula #2a.

C = (28 – 32) ÷ 1.8

C = -4 ÷ 1.8

C = -2.2222 rounded to -2.2

Therefore, 28 degrees Fahrenheit is equivalent to -2.2 degrees Celsius.

15. 19 °F

Substitute 19 for F into Formula #2a.

C = (19 – 32) ÷ 1.8

C = -13 ÷ 1.8

C = -7.2222 rounded to -7.2

Therefore, 19 degrees Fahrenheit is equivalent to -7.2 degrees Celsius.

16. 34 °F

Substitute 34 for F into Formula #2a.

C = (34 – 32) ÷ 1.8

C = 2 ÷ 1.8 = 1.111 rounded to 1.1

Therefore, 34 degrees Fahrenheit is equivalent to 1.1 degrees Celsius.

17. 79 °F

Substitute 79 for F into Formula #2a.

C = (79 – 32) ÷ 1.8

C = 47 ÷ 1.8 = 26.1111 rounded to 26.1

Therefore, 79 degrees Fahrenheit is equivalent to 26.1 degrees Celsius.

18. 44 °F

Substitute 44 for F into Formula #2a.

C = (44 – 32) ÷ 1.8

C = 12 ÷ 1.8 = 6.6666 rounded to 6.7

Therefore, 44 degrees Fahrenheit is equivalent to 6.7 degrees Celsius.

19. 81 °F

Substitute 81 for F in Formula #2a.

C = (81 – 32) ÷ 1.8

C = 49 ÷ 1.8 = 27.222 rounded to 27.2

Therefore, 81 degrees Fahrenheit is equivalent to 27.2 degrees Celsius.

20. 63 °F

Substitute 63 for F into Formula #2a.

C = (63 – 32) ÷ 1.8

C = 31 ÷ 1.8 = 17.222 rounded to 17.2

Therefore, 63 degrees Fahrenheit is equivalent to 17.2 degrees Celsius.

For problems 21-30, convert the Following Celsius temperatures to Fahrenheit using Formula #2b. Round answers to the nearest tenth.
Formula #2b: F = (C x 1.8) + 32 (where C is degrees Celsius and F is degrees Fahrenheit)

21. 3 °C

Substitute 3 for C into Formula #2b.

F = (3 x 1.8) + 32

F = 5.4 + 32

F = 37.4

Therefore, 3 degrees Celsius is equivalent to 37.4 degrees Fahrenheit.

22. -14 °C

Substitute -14 for C into Formula #2b.

F = (-14 x 1.8) + 32

F = -25.2 + 32

F = 6.8

Therefore, -14 degrees Celsius is equivalent to 6.8 degrees Fahrenheit.

23. 18 °C

Substitute 18 for C into Formula #2b.

F = (18 x 1.8) + 32

F = 32.4 + 32

F = 64.4

Therefore, 18 degrees Celsius is equivalent to 64.4 degrees Fahrenheit.

24. 27 °C

Substitute 28 for C into Formula #2b.

F = (27 x 1.8) + 32

F = 48.6 + 32

F = 80.6

Therefore, 27 degrees Celsius is equivalent to 80.6 degrees Fahrenheit.

25. 10 °C

Substitute 10 for C into Formula #2b.

F = (10 x 1.8) + 32

F = 18 + 32

F = 50

Therefore, 10 degrees Celsius is equivalent to 50 degrees Fahrenheit.

26. 16 °C

Substitute 16 for C in Formula #2b.

F= (16 x 1.8) +32

F= 28.8 + 32

F= 60.8

Therefore, 16 degrees Celsius is equivalent to 60.8 degrees Fahrenheit.

27. 9 °C

Substitute 9 for C into Formula #2b.

F = (9 x 1.8) + 32

F = 16.2 + 32

F = 48.2

Therefore, 9 degrees Celsius is equivalent to 48.2 degrees Fahrenheit.

28. 33 °C

Substitute 33 for C into Formula #2b.

F = (33 x 1.8) + 32

F = 59.4 + 32

F = 91.4

Therefore, 33 degrees Celsius is equivalent to 91.4 degrees Fahrenheit.

29. 52 °C

Substitute 52 for C into Formula #2.

F = (52 x 1.8) + 32

F = 93.6 + 32

F = 125.6

Therefore, 52 degrees Celsius is equivalent to 125.6 degrees Fahrenheit.

30. 18 °C

Substitute 18 for C into Formula #2b.

F = (18 x 1.8) + 32

F = 32.4 + 32

F = 64.4

Therefore, 18 degrees Celsius is equivalent to 64.4 degrees Fahrenheit.

For problems 31-40, convert the Following Fahrenheit temperatures to Celsius using Formula #3a. Round answers to the nearest tenth.
Formula #3a: C= (F-32) x 5/9 (where C is degrees Celsius and F is degrees Fahrenheit)

31. 350 °F

Substitute 350 for F into Formula #3a.

C = (350 – 32) x 5/9

Subtract 32 From 350.

C = 318 x 5/9

$$C = \frac{318 \times 5}{9} = \frac{1,590}{9}$$

C = 176.666 rounded to 176.7

Therefore, 350 degrees Fahrenheit is equivalent to 176.7 degrees Celsius.

32. 0 °F

Substitute 0 for F into Formula #3a.

C = (0 – 32) x 5/9

Subtract 32 From 0.

C = -32 x 5/9

$$C = \frac{-32 \times 5}{9} = \frac{-160}{9}$$

C = -17.7777 rounded to 17.8

Therefore, 0 degrees Fahrenheit is equivalent to -17.8 degrees Celsius.

33. 39 °F

Substitute 39 for F into Formula #3a.

C = (39 – 32) x 5/9

Subtract 39 From 32.

C = 7 x 5/9

$$C = \frac{7 \times 5}{9} = \frac{35}{9}$$

C = 3.888 rounded to 3.9

Therefore, 39 degrees Fahrenheit is equivalent to 3.9 degrees Celsius.

34. 26 °F

Substitute 26 for F into Formula #3a.

C = (26 – 32) x 5/9

Subtract 26 From 32.

C = -6 x 5/9

$$C = \frac{-6 \times 5}{9} = \frac{-30}{9}$$

C = -3.333 rounded to -3.3

Therefore, 26 degrees Fahrenheit is equivalent to -3.3 degrees Celsius.

35. 15 °F

Substitute 15 for F into Formula #3a.

C = (15 – 32) x 5/9

Subtract 15 From 32.

C = -17 x 5/9

$$C = \frac{-17 \times 5}{9} = \frac{-85}{9}$$

C = -9.444 rounded to -9.4

Therefore, 15 degrees Fahrenheit is equivalent to -9.4 degrees Celsius.

36. 157 °F

Substitute 157 for F into Formula #3a.

C = (157 – 32) x 5/9

C = 125 x 5/9

$C = \frac{125 \times 5}{9} = \frac{625}{9}$

C = 69.444 rounded to 69.4

Therefore, 157 degrees Fahrenheit is equivalent to 69.4 degrees Celsius.

37. 42 °F

Substitute 42 for F into Formula #3a.

C = (42 – 32) x 5/9

C = 10 x 5/9

$C = \frac{10 \times 5}{9} = \frac{50}{9}$

C = 5.555 rounded to 5.6

Therefore, 42 degrees Fahrenheit is equivalent to 5.6 degrees Celsius.

38. 53 °F

Substitute 53 for F into Formula #3a.

C = (53 – 32) x 5/9

C = 21 x 5/9

$C = \frac{21 \times 5}{9} = \frac{105}{9}$

C = 11.666 rounded to 11.7

Therefore, 53 degrees Fahrenheit is equivalent to 11.7 degrees Celsius.

39. 37 °F

Substitute 37 for F into Formula #3a.

$C = (37 - 32) \times 5/9$

$C = 5 \times 5/9$

$C = \frac{5 \times 5}{9} = \frac{25}{9}$

C = 2.777 rounded to 2.8

Therefore, 37 degrees Fahrenheit is equivalent to 2.8 degrees Celsius.

40. 18 °F

Substitute 18 for F into Formula #3a.

$C = (18 - 32) \times 5/9$

$C = -14 \times 5/9$

$C = \frac{-14 \times 5}{9} = \frac{-70}{9}$

C = -7.777 rounded to -7.8

Therefore, 18 degrees Fahrenheit is equivalent to -7.8 degrees Celsius.

For problems 41-50, convert the Following Celsius temperatures to Fahrenheit using Formula #3b. Round answers to the nearest tenth.
Formula #3b: F = (C x 9/5) + 32 (where C is degrees Celsius and F is degrees Fahrenheit)

41. 9 °C

Substitute 9 for C into Formula #3b.

$F = (9 \times 9/5) + 32$

$F = \frac{9 \times 9}{5} = \frac{81}{5} + 32$

$F = 16.2 + 32$

$F = 48.2$

Therefore, 9 degree Celsius is equivalent to 48.2 degrees Fahrenheit.

42. 33 °C

Substitute 33 for C into Formula #3b.

$F = (33 \times 9/5) + 32$

$F = \frac{33 \times 9}{5} = \frac{297}{5} + 32$

$F = 59.4 + 32 = 91.4$

Therefore, 33 degrees Celsius is equivalent to 91.4 degrees Fahrenheit.

43. -13 °C

Substitute -13 for C into Formula #3b.

$F = (-13 \times 9/5) + 32$

$F = \frac{-13 \times 9}{5} = -\frac{117}{5} + 32$

$F = -23.4 + 32 = 8.6$

Therefore, -13 degrees Celsius is equivalent to 8.6 degrees Fahrenheit.

44. 42 °C

Substitute 42 for C into Formula #3b.

$F = (42 \times 9/5) + 32$

$F = \frac{42 \times 9}{5} = \frac{378}{5} + 32$

$F = 75.6 + 32 = 107.6$

Therefore, 42 degrees Celsius is equivalent to 107.6 degrees Fahrenheit.

45. 20 °C

Substitute 20 for C into Formula #3b.

$F = (20 \times 9/5) + 32$

$F = \frac{20 \times 9}{5} = \frac{180}{5} + 32$

$F = 36 + 32 = 68$

Therefore, 20 degrees Celsius is equivalent to 68 degrees Fahrenheit.

46. 31 °C

Substitute 31 for C in Formula #3b.

$F = (31 \times 9/5) + 32$

$F = \frac{31 \times 9}{5} = \frac{279}{5} + 32$

$F = 55.8 + 32$

$F = 87.8$

Therefore, 31 degrees Celsius is equivalent to 87.8 degrees Fahrenheit.

47. 4 °C

Substitute 4 for C in Formula #3b.

$F = (4 \times 9/5) + 32$

$F = \frac{4 \times 9}{5} = \frac{36}{5} + 32$

$F = 7.2 + 32$

$F = 39.2$

Therefore, 4 degrees Celsius is equivalent to 39.2 degrees Fahrenheit.

48. 22 °C

Substitute 22 for C in Formula #3b.

$F = (22 \times 9/5) + 32$

$F = \frac{22 \times 9}{5} = \frac{198}{5} + 32$

$F = 39.6 + 32$

$F = 71.6$

Therefore, 22 degrees Celsius is equivalent to 71.6 degrees Fahrenheit.

49. 51 °C

Substitute 51 for C into Formula #3b.

$F = (51 \times 9/5) + 32$

$F = \frac{51 \times 9}{5} = \frac{459}{5} + 32$

$F = 91.8 + 32$

$F = 123.8$

Therefore, 51 degrees Celsius is equivalent to 123.8 degrees Fahrenheit.

50. -7 °C

Substitute -7 for C in Formula #3b.

$F = (-7 \times 9/5) + 32$

$F = \frac{-7 \times 9}{5} = \frac{-63}{5} + 32$

$F = -12.6 + 32$

$F = 19.4$

Therefore, -7 degrees Celsius is equivalent to 19.4 degrees Fahrenheit.