6.2 Section Exercises

Converting to the Standard Normal Distribution

Calculate the standard score of the given x-value. Indicate where the z-value would be on the standard normal distribution.

1. $\mu = 65$ and $\sigma = 20$; $x = 40$

2. $\mu = 5.00$ and $\sigma = 0.25$; $x = 4.80$

3. $\mu = 15$ and $\sigma = 2$; $x = 19$

4. $\mu = 10.75$ and $\sigma = 0.35$; $x = 11.15$

5. $\mu = 0.023$ and $\sigma = 0.001$; $x = 0.020$

6. $\mu = 12{,}000$ and $\sigma = 2000$; $x = 10{,}750$

Using the *z*-Score Formula

Use the z-score formula to complete each exercise.

7. Find the missing value in each row of the table.

	z	x	μ	σ
a.	?	35.0	37.0	1.6
b.	1.75	12.3	?	2.8
c.	–3.10	?	3.40	0.20
d.	2.15	479	436	?

8. Find the missing value in each row of the table.

	z	x	μ	σ
a.	?	2.87	2.45	0.21
b.	–2.80	579.0	?	8.5
c.	1.40	?	89.10	7.45
d.	–3.20	13.67	15.11	?

9. Write a formula for x in terms of the population mean, population standard deviation, and z-score.

Area under the Standard Normal Curve

Find the area under the standard normal curve to the left of the given z-value.

10. $z = 2.35$

11. $z = 1.78$

12. $z = -1.25$

13. $z = -0.19$

14. $z = 2$

15. $z = 1.3$

16. $z = 3.57$

17. $z = -4.12$

Find the area under the standard normal curve to the right of the given z-value.

18. $z = 1.35$

19. $z = 1.7$

20. $z = -2.51$

21. $z = -0.39$

22. $z = -1$

23. $z = 3.68$

Find the area under the standard normal curve between the given z-values.

24. $z_1 = 0.35, \quad z_2 = 1.85$

25. $z_1 = -1.25, \quad z_2 = 2.16$

26. $z_1 = -1.78, \quad z_2 = -0.95$

27. $z_1 = -0.19, \quad z_2 = 1$

28. $z_1 = -3.57, \quad z_2 = 1.85$

29. $z_1 = 1.51, \quad z_2 = 2.61$

30. Find the area under the standard normal curve between $z_1 = -1.00$ and $z_2 = 1.00$. What is the difference between the amount you found for this area and the amount the Empirical Rule approximates for this area? (See Section 3.2 to review the Empirical Rule.)

31. Find the difference between the more precise value found using the normal distribution tables or technology and the approximation given by the Empirical Rule for the area under the standard normal curve within two standard deviations of the mean. Do the same for the area within three standard deviations of the mean. (See Section 3.2 to review the Empirical Rule.)

Find the total of the areas under the standard normal curve to the left of z_1 and to the right of z_2.

32. $z_1 = -1.46, \quad z_2 = 1.46$

33. $z_1 = -2.11, \quad z_2 = 2.11$

34. $z_1 = -3.05, \quad z_2 = 3.05$

35. $z_1 = -2.31, \quad z_2 = 1.67$

36. $z_1 = -1.75, \quad z_2 = 1.89$

37. $z_1 = -2, \quad z_2 = 1$

38. $z_1 = -3.81, \quad z_2 = 2.37$

39. $z_1 = 1.31, \quad z_2 = 1.93$

40. $z_1 = 0.35, \quad z_2 = 1.75$

41. $z_1 = -2.31, \quad z_2 = -1.67$

42. $z_1 = -3, \quad z_2 = -2$

43. $z_1 = 1.51, \quad z_2 = 2.61$

Probability for the Standard Normal Distribution

Find each specified probability.

44. $P(z < -3.14)$

45. $P(z < 1.43)$

46. $P(z > 2.72)$

47. $P(z > -0.81)$

48. $P(-1.86 < z < 3.14)$

49. $P(0.78 < z < 2.64)$

50. $P(0 < z < 2.78)$

51. $P(-2.81 < z < -1.14)$

52. $P(z < -1.26 \text{ or } z > 1.26)$

53. $P(z < -2.39 \text{ or } z > 2.39)$

54. Find the probability that z differs from the mean by more than one standard deviation.

55. Find the probability that z differs from the mean by more than two standard deviations.

56. Find the probability that z differs from the mean by less than two standard deviations.

57. Find the probability that z differs from the mean by less than 1.5 standard deviations.

58. $P(z < 0.85 \text{ or } z > -2.34)$

59. $P(-4.92 < z < 3.68)$

60. $P(z > 4.08)$