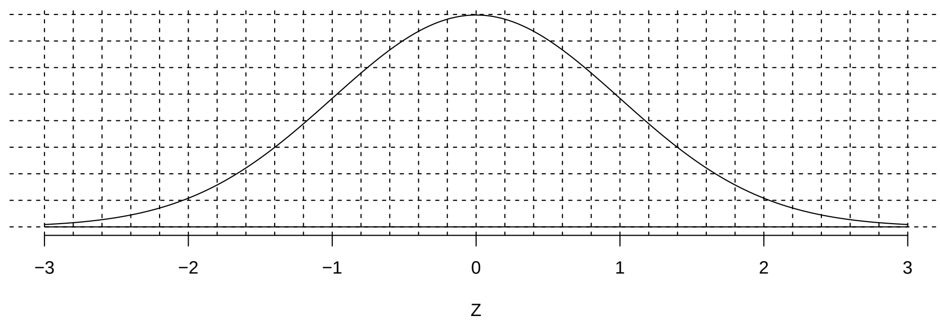
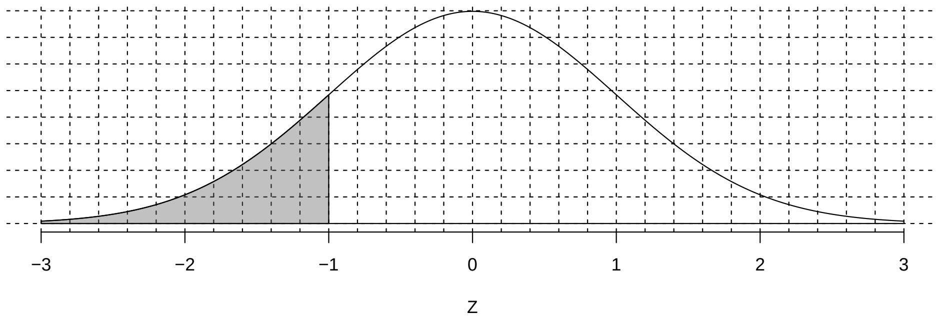
1. **Problem:**
   The figure below shows the standard normal density. Each grid square represents 1% of probability.



   (a) Estimate $P(Z < -1)$ by shading and counting.
   (b) Determine $P(Z < -1)$ by using the z-table.

Solution:

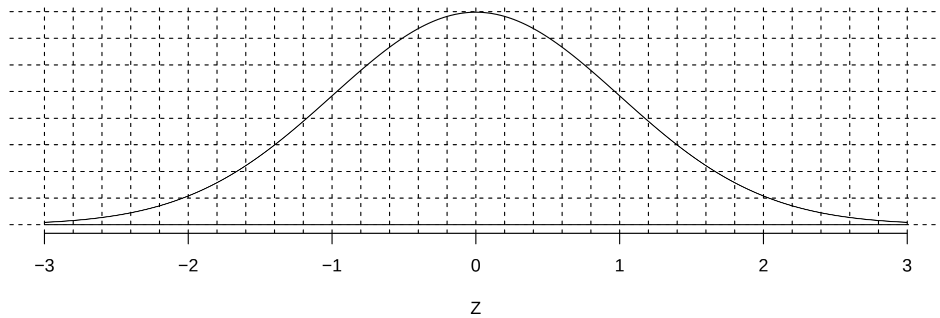
(a) The shaded region is shown below.



You should count about 16 shaded squares, giving a probability of about 0.16.

(b) The probability is 0.1587.

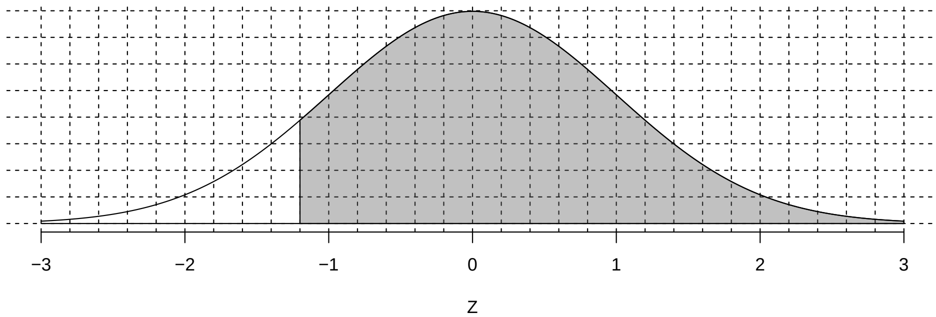
2. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(Z > -1.2)$ by shading and counting.
(b) Determine $P(Z > -1.2)$ by using the z-table.

Solution:

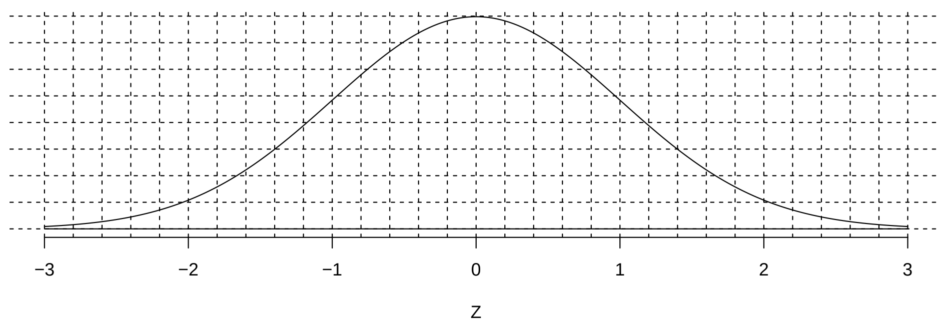
(a) The shaded region is shown below.



You should count about 88 shaded squares, giving a probability of about 0.88.

(b) The probability is 0.8849.

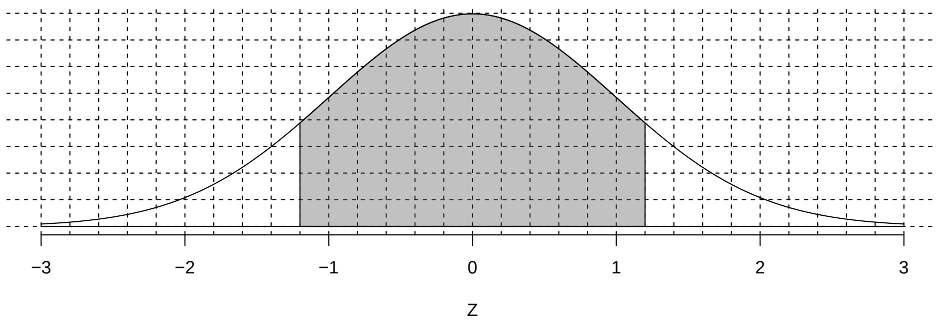
3. **Problem:**
   The figure below shows the standard normal density. Each grid square represents 1% of probability.



   (a) Estimate $P(|Z| < 1.2)$ by shading and counting.
   (b) Determine $P(|Z| < 1.2)$ by using the z-table.

Solution:

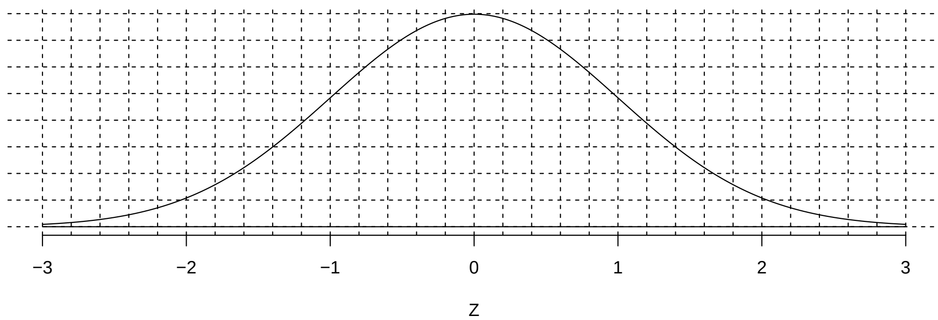
(a) The shaded region is shown below.



You should count about 77 shaded squares, giving a probability of about 0.77.

(b) The probability is 0.7699.

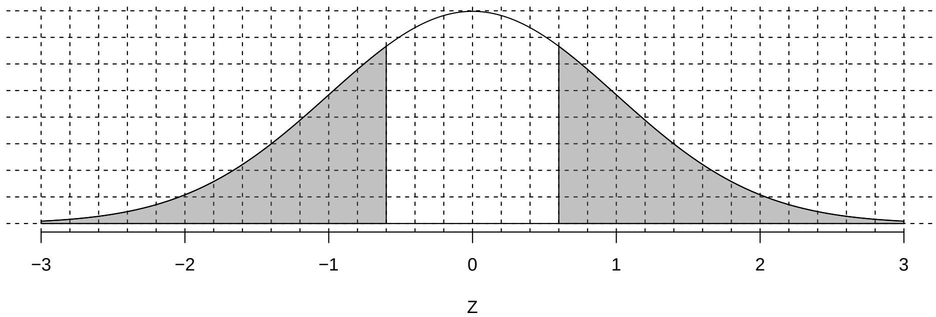
4. **Problem:**
   The figure below shows the standard normal density. Each grid square represents 1% of probability.



   (a) Estimate $P(|Z| > 0.6)$ by shading and counting.
   (b) Determine $P(|Z| > 0.6)$ by using the z-table.

Solution:

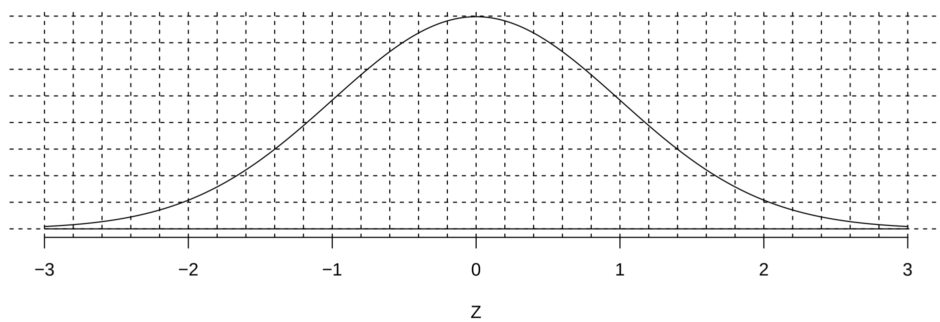
(a) The shaded regions are shown below.



You should count about 55 shaded squares, giving a probability of about 0.55.

(b) The probability is 0.5485.

5. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

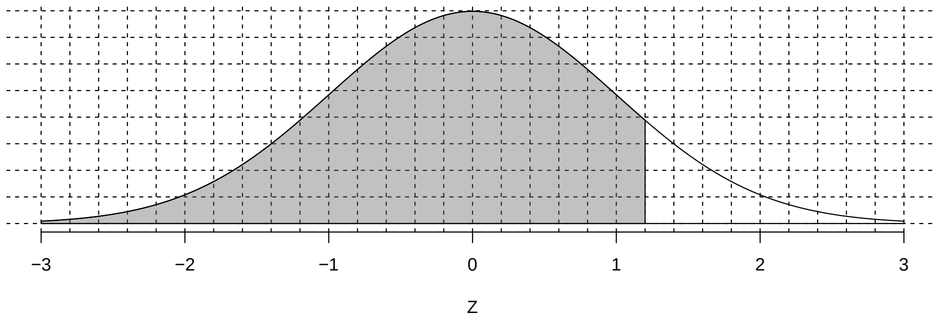


(a) Estimate z such that $P(Z < z) = 0.88$ by shading and counting.

(b) Determine z such that $P(Z < z) = 0.88$ by using the z-table.

Solution:

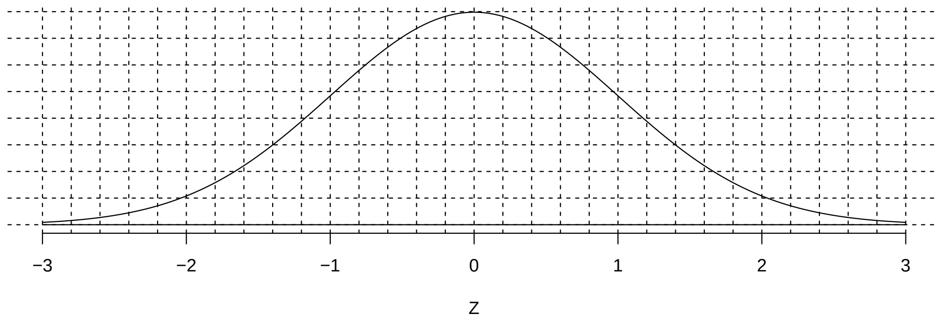
(a) The shaded region is shown below.



When you have shaded 88 squares, starting on the left, you should end around $z = 1.2$.

(b) $z \approx 1.17$

6. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

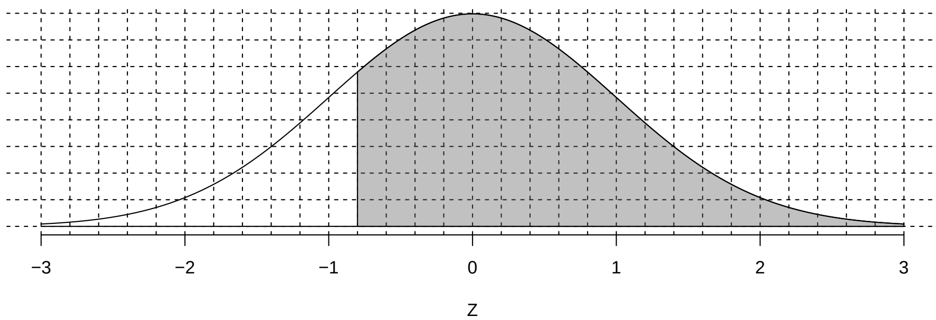


(a) Estimate z such that $P(Z > z) = 0.79$ by shading and counting.

(b) Determine z such that $P(Z > z) = 0.79$ by using the z-table.

Solution:

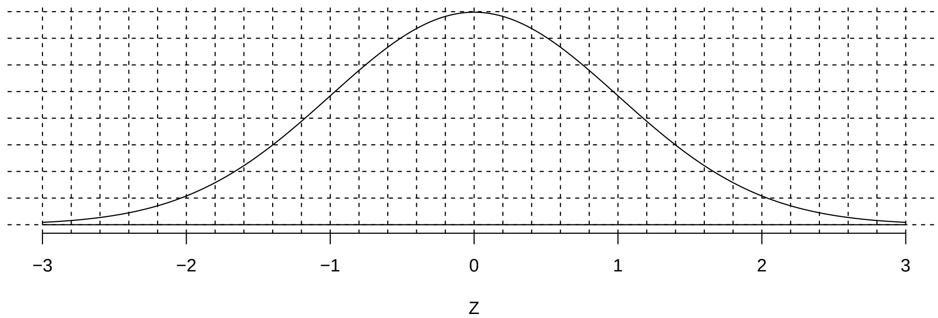
(a) The shaded region is shown below.



When you have shaded 79 squares, starting on the right, you should end around $z = -0.8$.

(b) $z = 0.81$

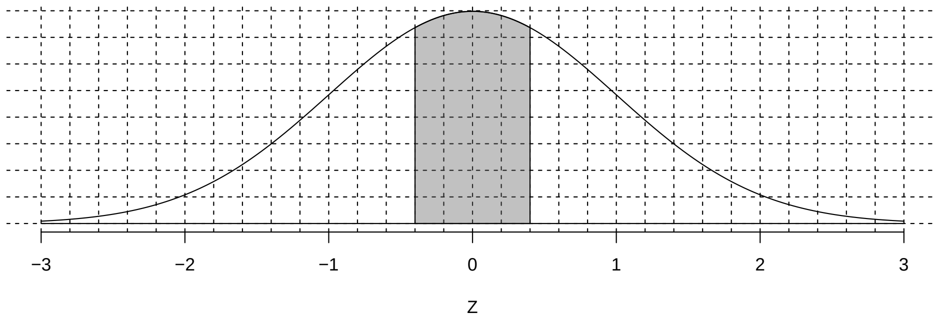
7. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate z such that $P(|Z| < z) = 0.31$ by shading and counting.
(b) Determine z such that $P(|Z| < z) = 0.31$ by using the z-table.

Solution:

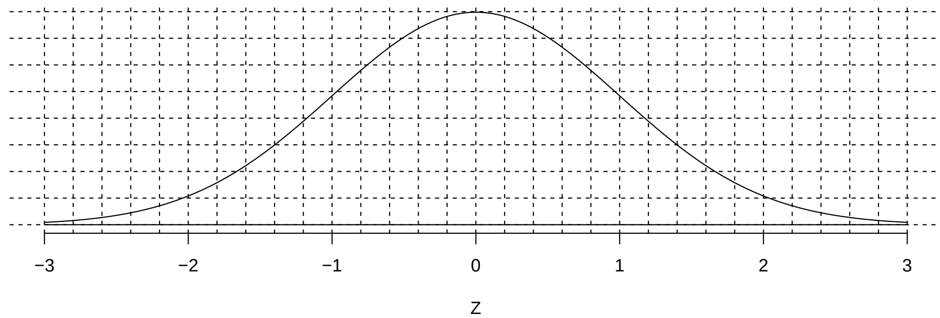
(a) The shaded region is shown below.



When you have shaded 31 squares, starting in the middle, you should end near $z = 0.4$.

(b) $z = -0.5$

8. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

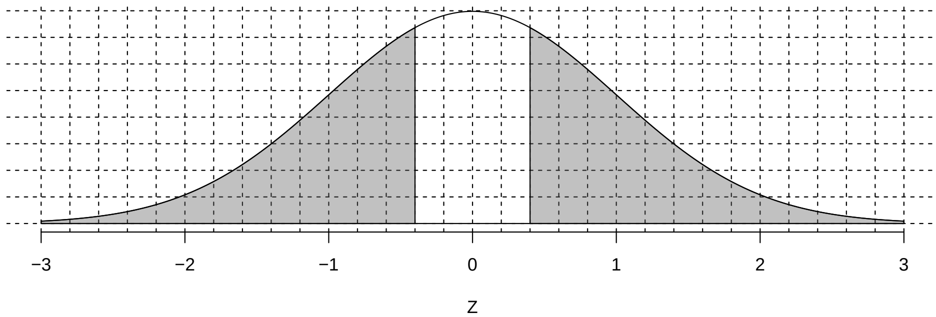


(a) Estimate z such that $P(|Z| > z) = 0.69$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.69$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 69 squares, starting at both tails, you should end near $z = 0.4$. Really, you want to shade 34.5 squares starting from the left and also 34.5 squares starting from the right.

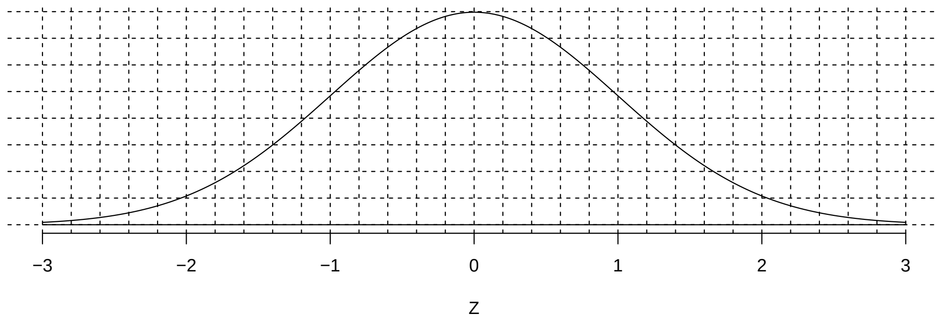
(b) Each tail has half the two-tail area. So each tail has an area of 0.345. We can find the z score with this left area...

$$z_{\text{left tail}} = -0.4$$

But, we want the positive value (the right tail's z boundary).

$$z = \boxed{0.4}$$

9. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

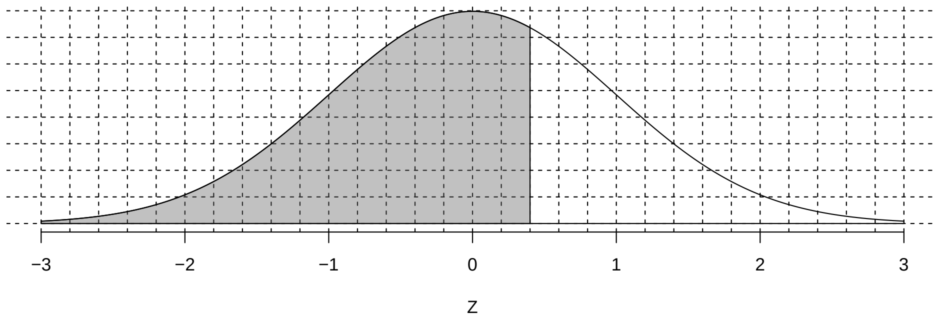


(a) Estimate z such that $P(Z < z) = 0.66$ by shading and counting.

(b) Determine z such that $P(Z < z) = 0.66$ by using the z-table.

Solution:

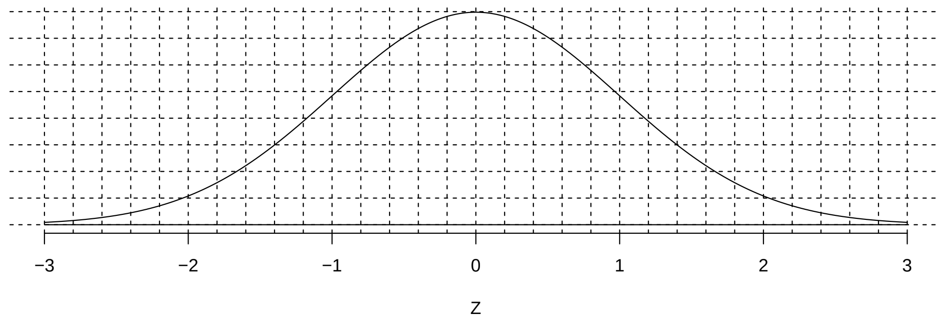
(a) The shaded region is shown below.



When you have shaded 66 squares, starting on the left, you should end around $z = 0.4$.

(b) $z \approx 0.41$

10. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

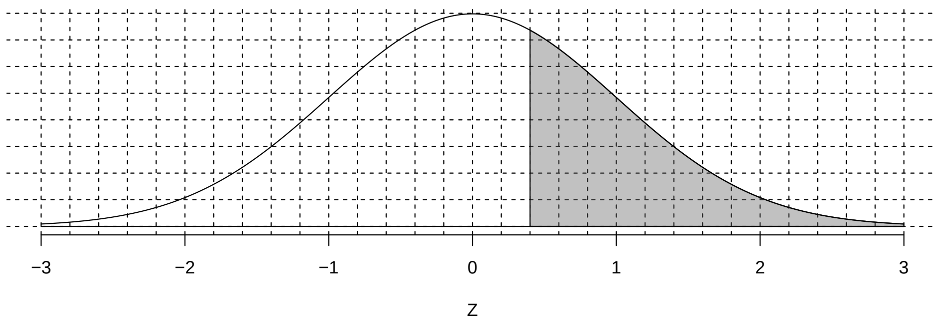


(a) Estimate z such that $P(Z > z) = 0.34$ by shading and counting.

(b) Determine z such that $P(Z > z) = 0.34$ by using the z-table.

Solution:

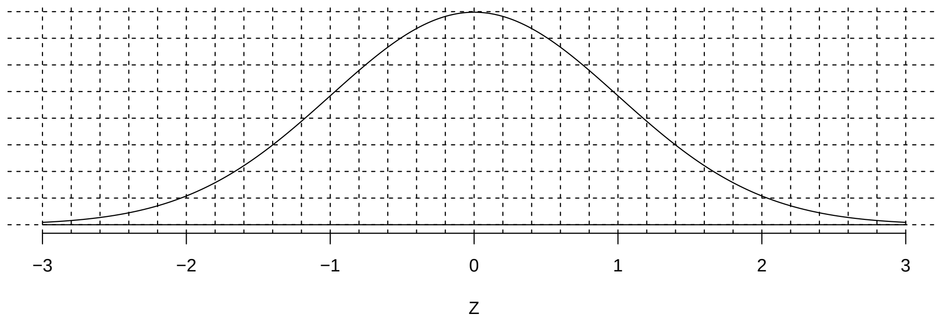
(a) The shaded region is shown below.



When you have shaded 34 squares, starting on the right, you should end around $z = 0.4$.

(b) $z = -0.41$

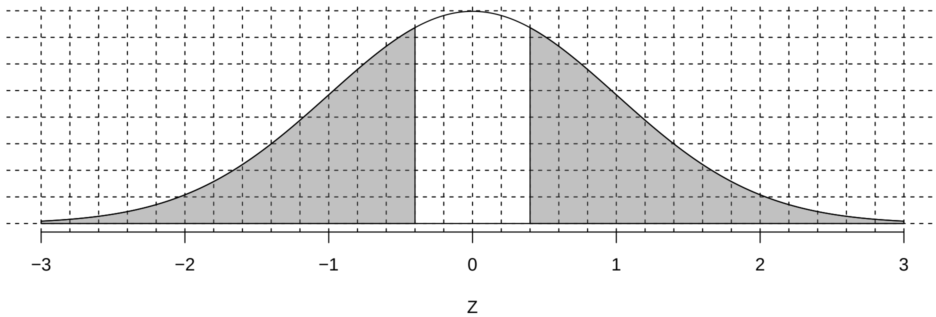
11. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate z such that $P(|Z| > z) = 0.69$ by shading and counting.
(b) Determine z such that $P(|Z| > z) = 0.69$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 69 squares, starting at both tails, you should end near $z = 0.4$. Really, you want to shade 34.5 squares starting from the left and also 34.5 squares starting from the right.

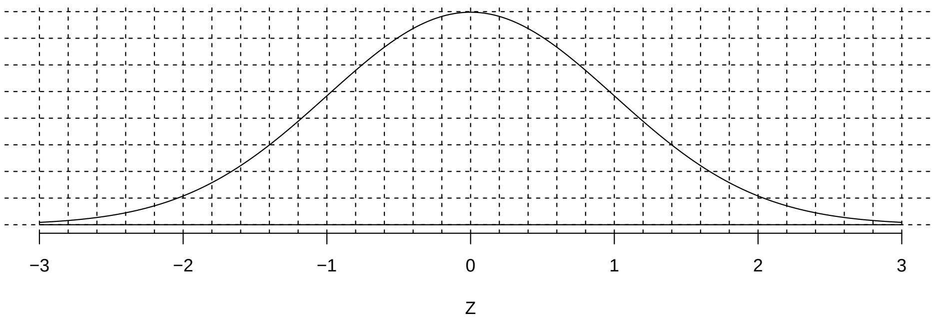
(b) Each tail has half the two-tail area. So each tail has an area of 0.345. We can find the z score with this left area...

$$z_{\text{left tail}} = -0.4$$

But, we want the positive value (the right tail's z boundary).

$$z = \boxed{0.4}$$

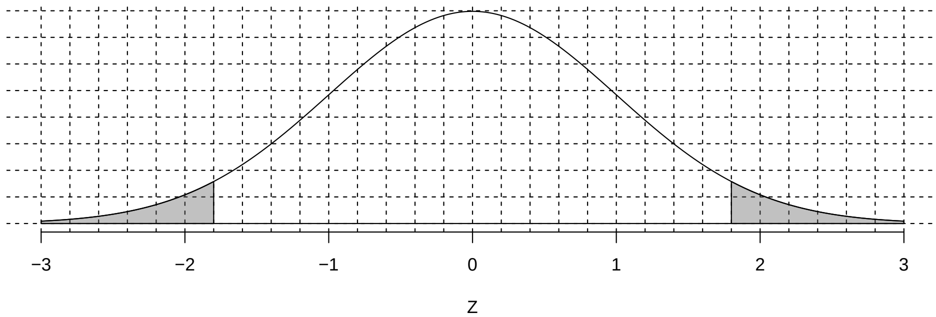
12. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(|Z| > 1.8)$ by shading and counting.
(b) Determine $P(|Z| > 1.8)$ by using the z-table.

Solution:

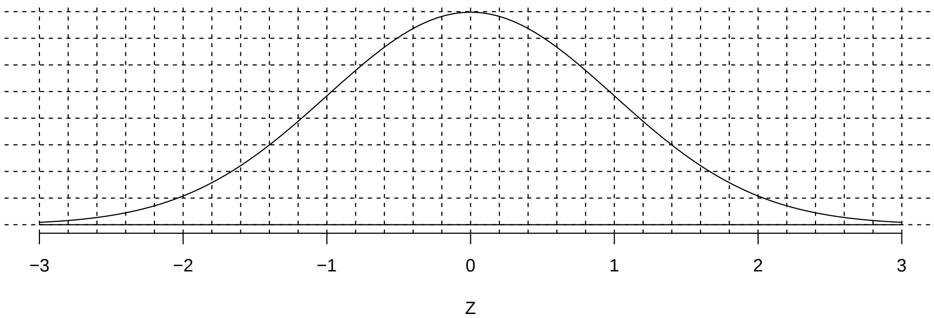
(a) The shaded regions are shown below.



You should count about 7 shaded squares, giving a probability of about 0.07.

(b) The probability is 0.0719.

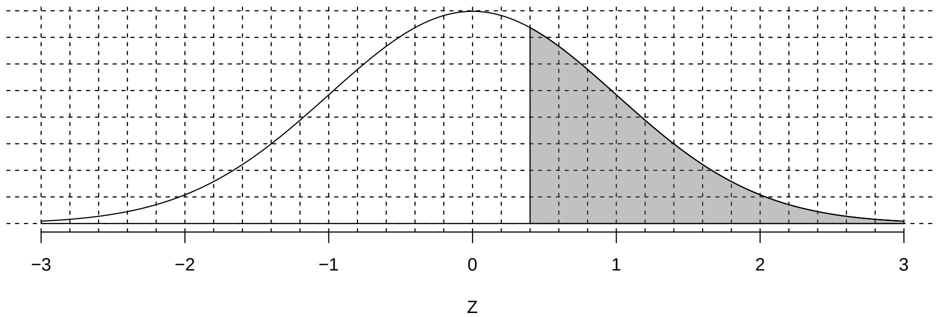
13. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate z such that $P(Z > z) = 0.34$ by shading and counting.
(b) Determine z such that $P(Z > z) = 0.34$ by using the z-table.

Solution:

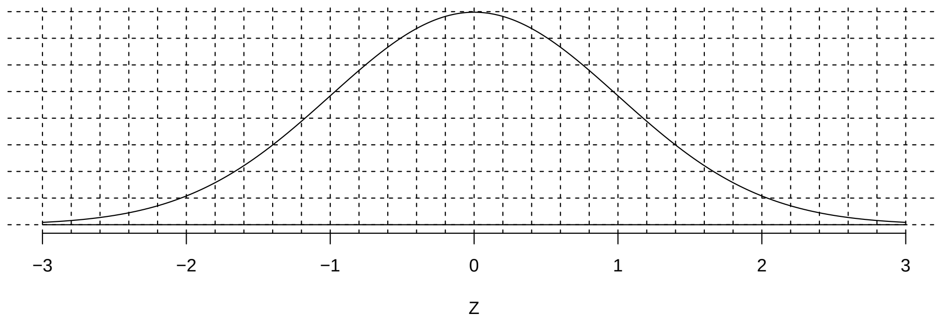
(a) The shaded region is shown below.



When you have shaded 34 squares, starting on the right, you should end around $z = 0.4$.

(b) $z = -0.41$

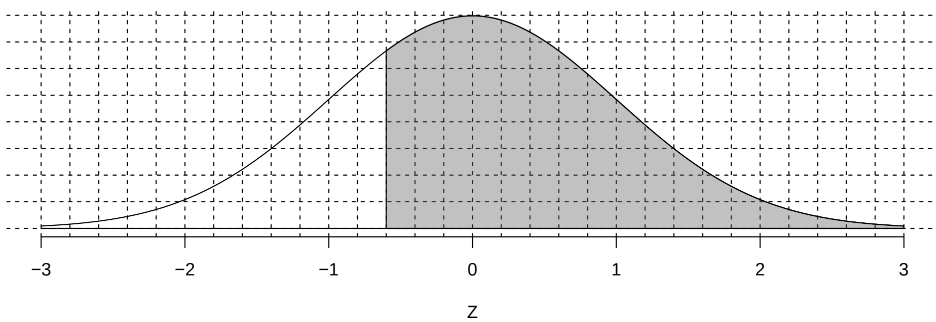
14. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate z such that $P(Z > z) = 0.73$ by shading and counting.
(b) Determine z such that $P(Z > z) = 0.73$ by using the z-table.

Solution:

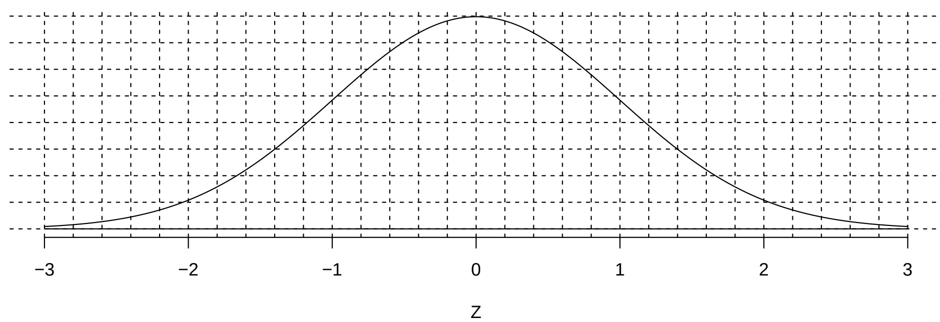
(a) The shaded region is shown below.



When you have shaded 73 squares, starting on the right, you should end around $z = -0.6$.

(b) $z = 0.61$

15. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

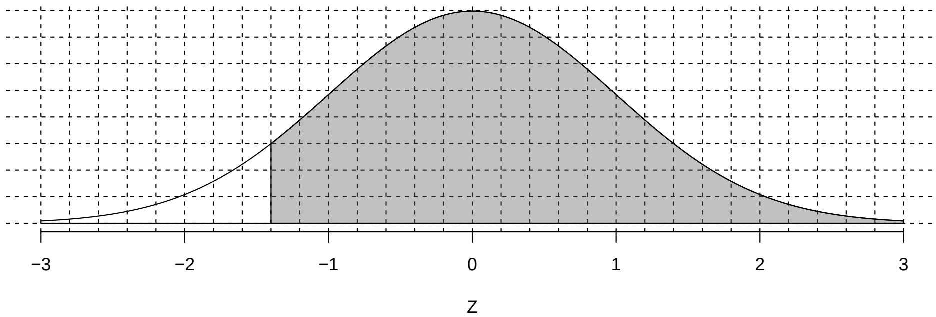


(a) Estimate z such that $P(Z > z) = 0.92$ by shading and counting.

(b) Determine z such that $P(Z > z) = 0.92$ by using the z-table.

Solution:

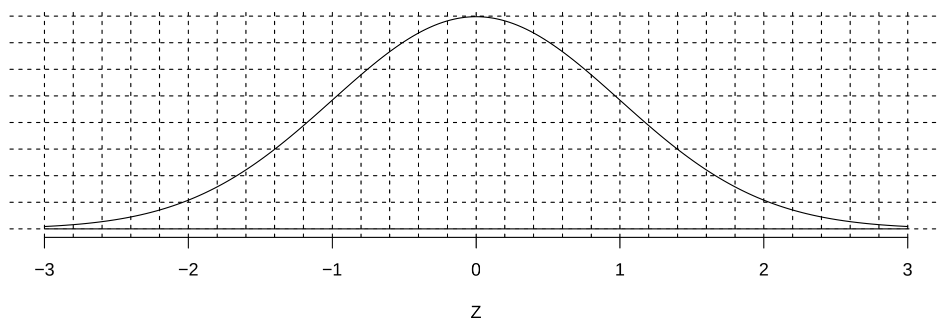
(a) The shaded region is shown below.



When you have shaded 92 squares, starting on the right, you should end around $z = -1.4$.

(b) $z = 1.41$

16. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

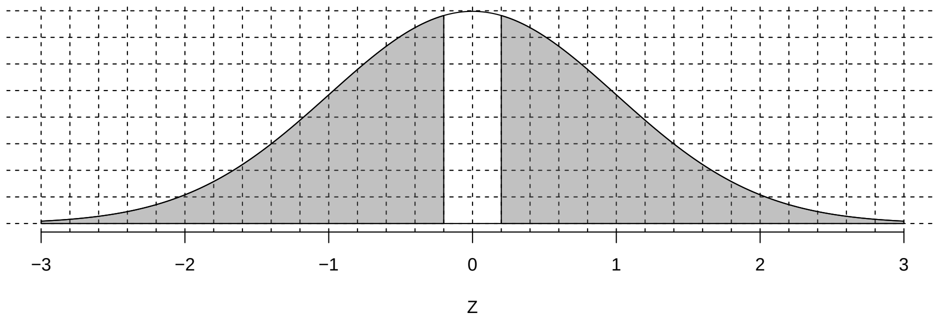


(a) Estimate z such that $P(|Z| > z) = 0.84$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.84$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 84 squares, starting at both tails, you should end near $z = 0.2$. Really, you want to shade 42 squares starting from the left and also 42 squares starting from the right.

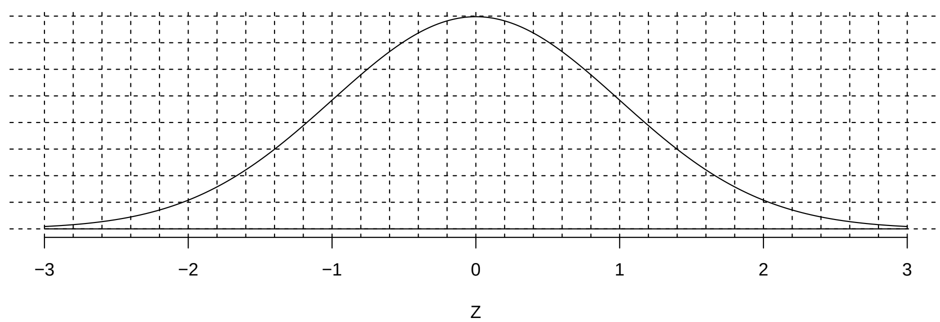
(b) Each tail has half the two-tail area. So each tail has an area of 0.42. We can find the z score with this left area...

$$z_{\text{left tail}} = -0.2$$

But, we want the positive value (the right tail's z boundary).

$$z = \boxed{0.2}$$

17. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

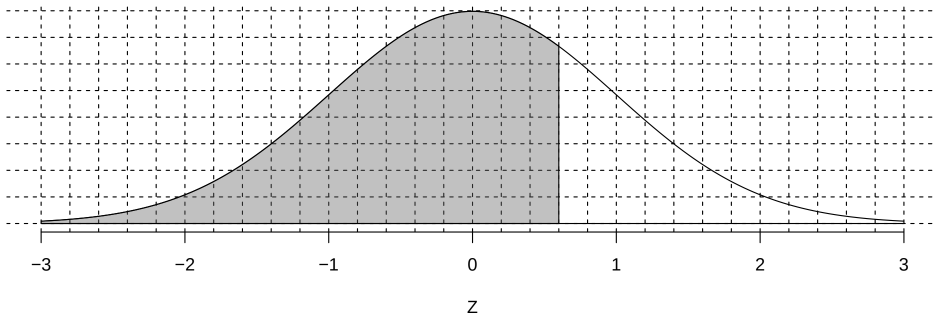


(a) Estimate $P(Z < 0.6)$ by shading and counting.

(b) Determine $P(Z < 0.6)$ by using the z-table.

Solution:

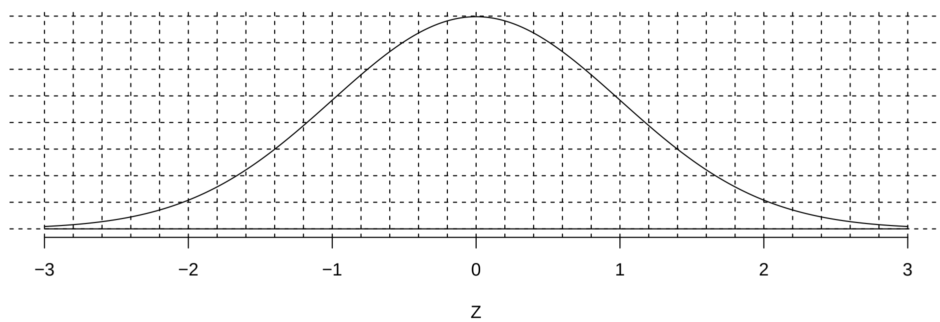
(a) The shaded region is shown below.



You should count about 73 shaded squares, giving a probability of about 0.73.

(b) The probability is 0.7257.

18. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

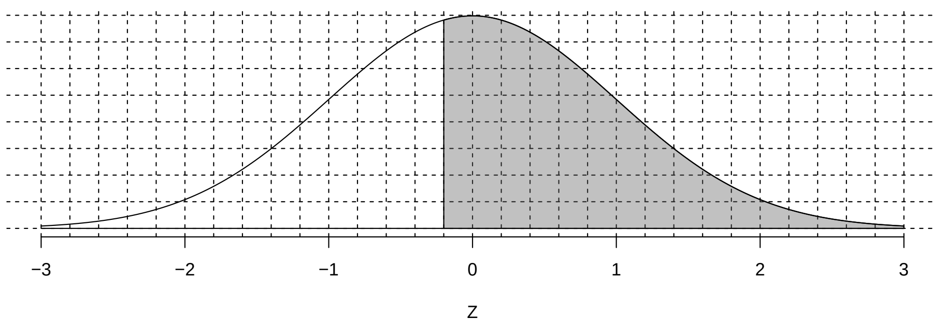


(a) Estimate $P(Z > -0.2)$ by shading and counting.

(b) Determine $P(Z > -0.2)$ by using the z-table.

Solution:

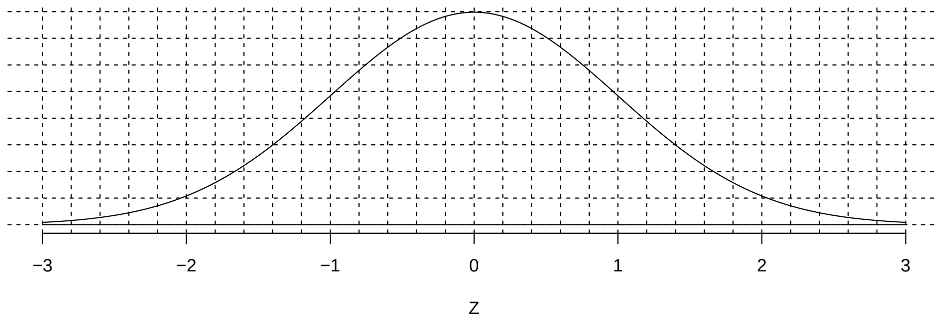
(a) The shaded region is shown below.



You should count about 58 shaded squares, giving a probability of about 0.58.

(b) The probability is 0.5793.

19. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

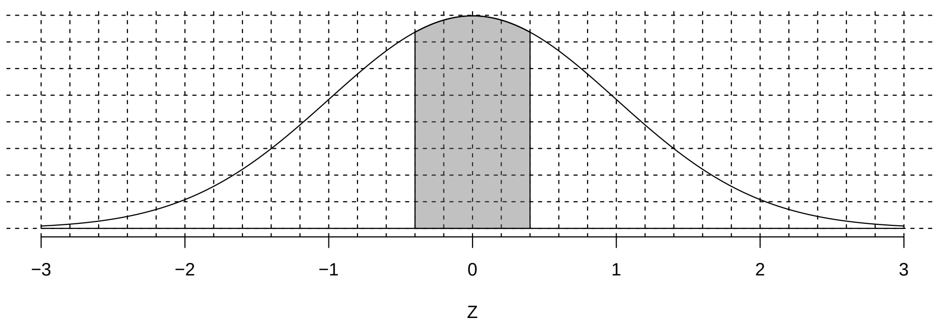


(a) Estimate z such that $P(|Z| < z) = 0.31$ by shading and counting.

(b) Determine z such that $P(|Z| < z) = 0.31$ by using the z-table.

Solution:

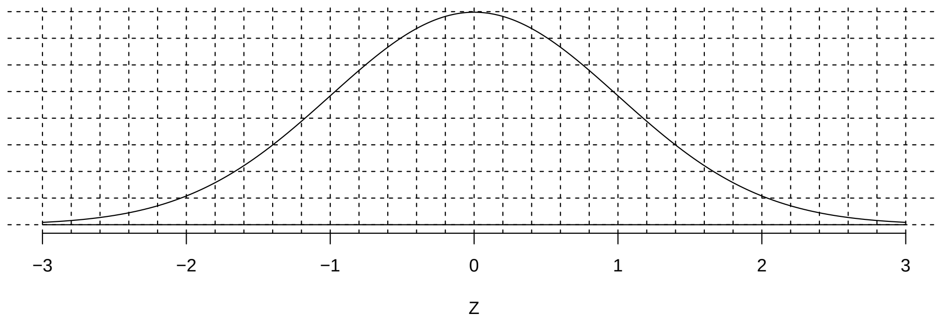
(a) The shaded region is shown below.



When you have shaded 31 squares, starting in the middle, you should end near $z = 0.4$.

(b) $z = -0.5$

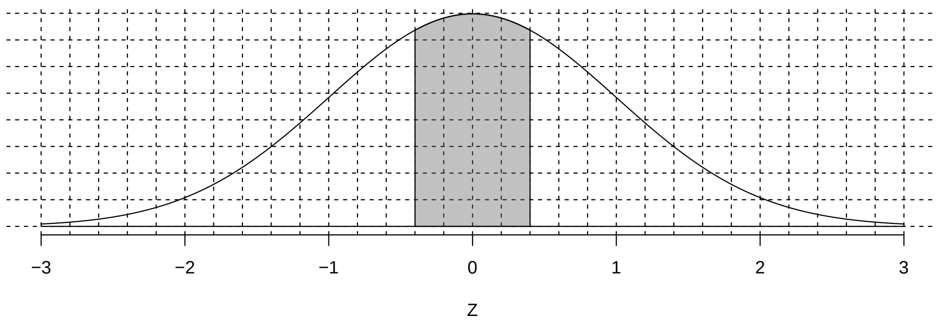
20. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(|Z| < 0.4)$ by shading and counting.
(b) Determine $P(|Z| < 0.4)$ by using the z-table.

Solution:

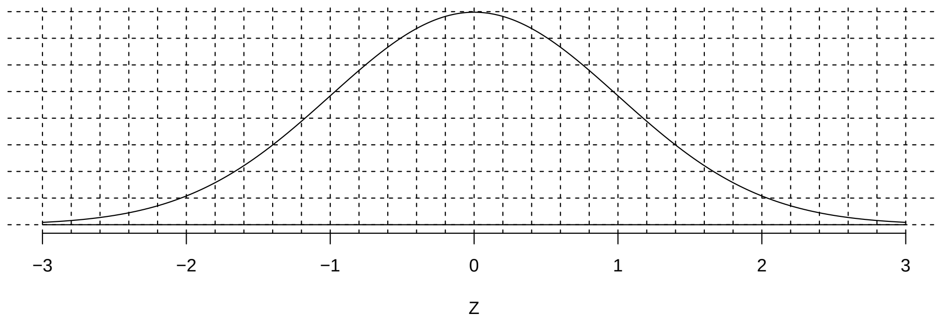
(a) The shaded region is shown below.



You should count about 31 shaded squares, giving a probability of about 0.31.

(b) The probability is 0.3108.

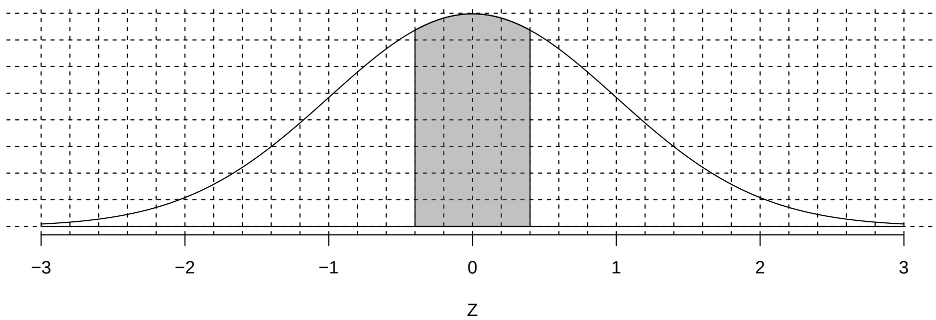
21. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(|Z| < 0.4)$ by shading and counting.
(b) Determine $P(|Z| < 0.4)$ by using the z-table.

Solution:

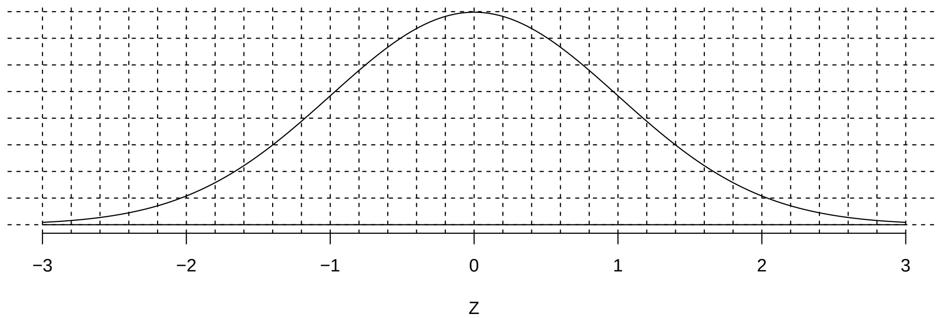
(a) The shaded region is shown below.



You should count about 31 shaded squares, giving a probability of about 0.31.

(b) The probability is 0.3108.

22. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

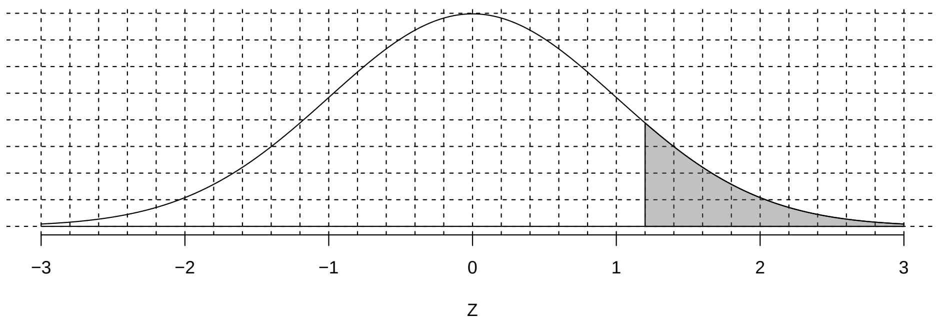


(a) Estimate $P(Z > 1.2)$ by shading and counting.

(b) Determine $P(Z > 1.2)$ by using the z-table.

Solution:

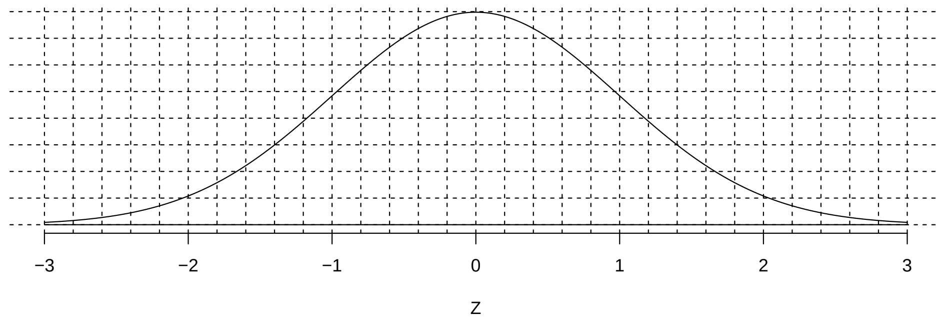
(a) The shaded region is shown below.



You should count about 12 shaded squares, giving a probability of about 0.12.

(b) The probability is 0.1151.

23. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

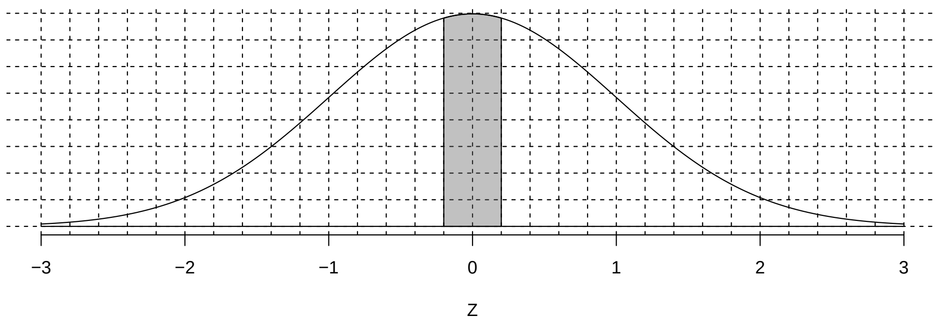


(a) Estimate z such that $P(|Z| < z) = 0.16$ by shading and counting.

(b) Determine z such that $P(|Z| < z) = 0.16$ by using the z-table.

Solution:

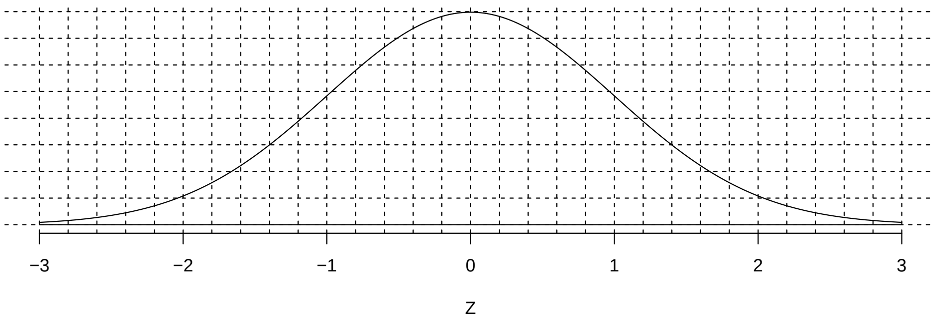
(a) The shaded region is shown below.



When you have shaded 16 squares, starting in the middle, you should end near $z = 0.2$.

(b) $z = -0.99$

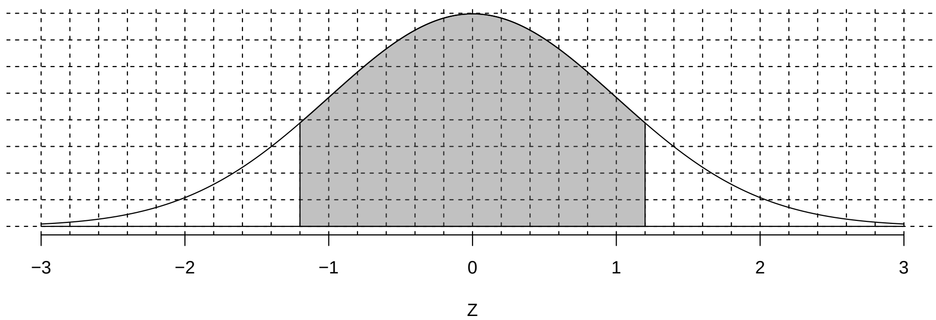
24. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate z such that $P(|Z| < z) = 0.77$ by shading and counting.
(b) Determine z such that $P(|Z| < z) = 0.77$ by using the z-table.

Solution:

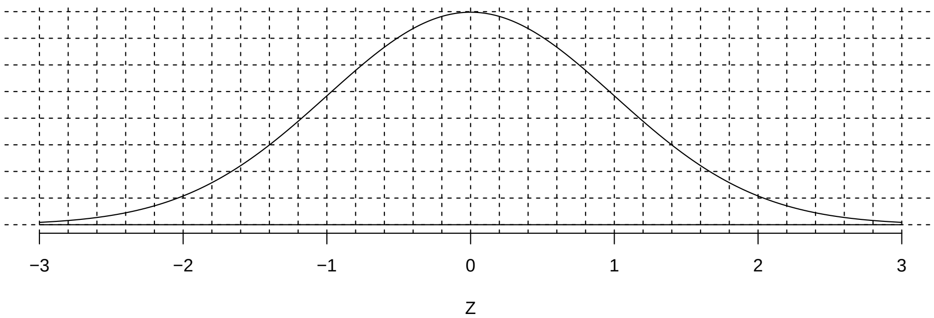
(a) The shaded region is shown below.



When you have shaded 77 squares, starting in the middle, you should end near $z = 1.2$.

(b) $z = 0.74$

25. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

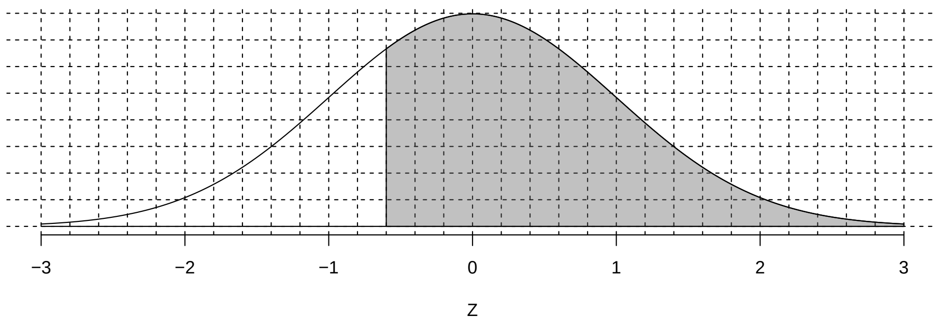


(a) Estimate z such that $P(Z > z) = 0.73$ by shading and counting.

(b) Determine z such that $P(Z > z) = 0.73$ by using the z-table.

Solution:

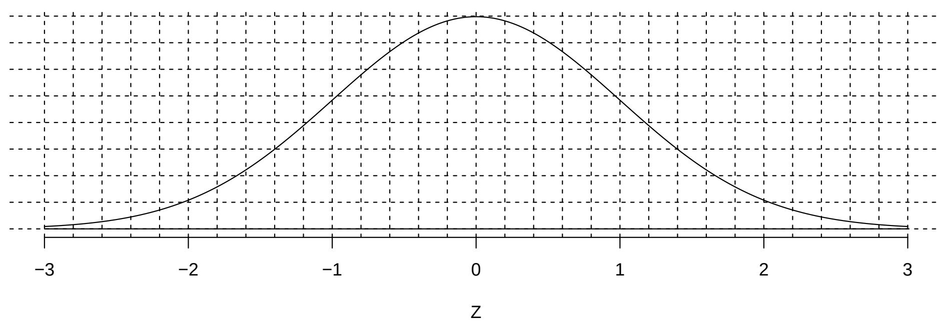
(a) The shaded region is shown below.



When you have shaded 73 squares, starting on the right, you should end around $z = -0.6$.

(b) $z = 0.61$

26. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

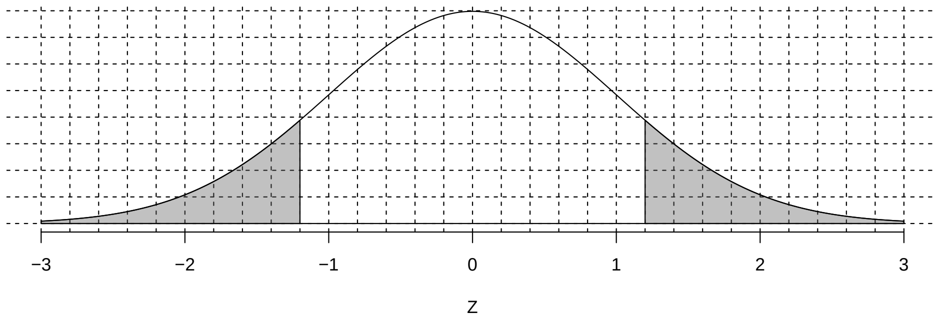


(a) Estimate $P(|Z| > 1.2)$ by shading and counting.

(b) Determine $P(|Z| > 1.2)$ by using the z-table.

Solution:

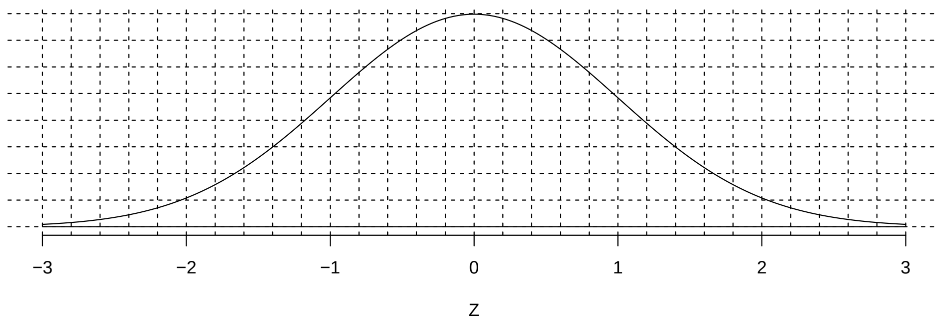
(a) The shaded regions are shown below.



You should count about 23 shaded squares, giving a probability of about 0.23.

(b) The probability is 0.2301.

27. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

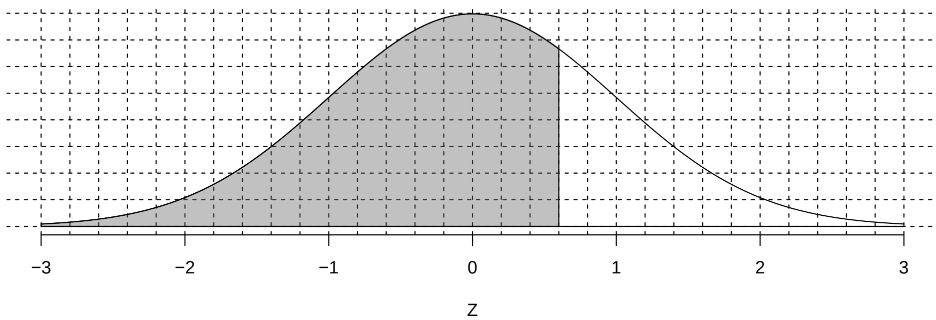


(a) Estimate z such that $P(Z < z) = 0.73$ by shading and counting.

(b) Determine z such that $P(Z < z) = 0.73$ by using the z-table.

Solution:

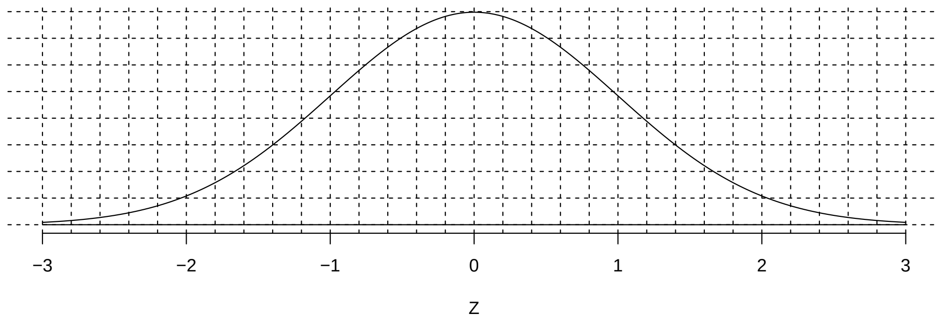
(a) The shaded region is shown below.



When you have shaded 73 squares, starting on the left, you should end around $z = 0.6$.

(b) $z \approx 0.61$

28. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

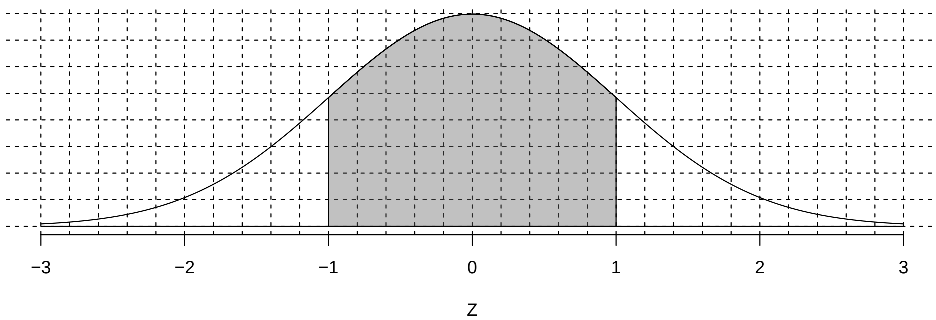


(a) Estimate z such that $P(|Z| < z) = 0.68$ by shading and counting.

(b) Determine z such that $P(|Z| < z) = 0.68$ by using the z-table.

Solution:

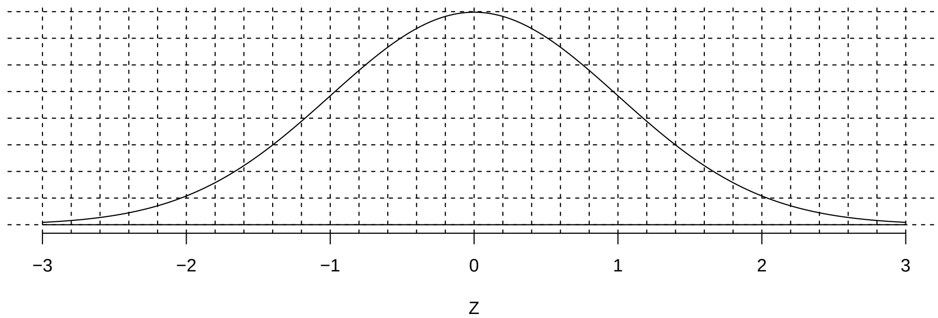
(a) The shaded region is shown below.



When you have shaded 68 squares, starting in the middle, you should end near $z = 1$.

(b) $z = 0.47$

29. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

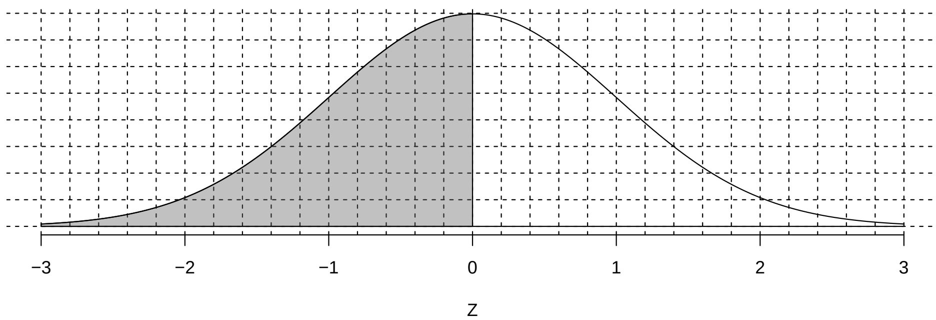


(a) Estimate $P(Z < 0)$ by shading and counting.

(b) Determine $P(Z < 0)$ by using the z-table.

Solution:

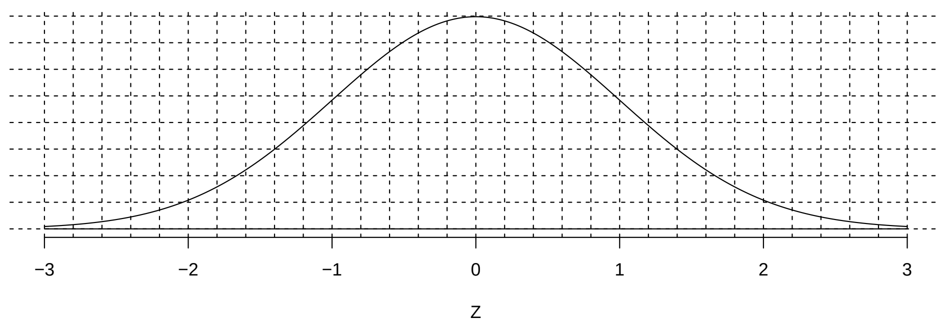
(a) The shaded region is shown below.



You should count about 50 shaded squares, giving a probability of about 0.5.

(b) The probability is 0.5.

30. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

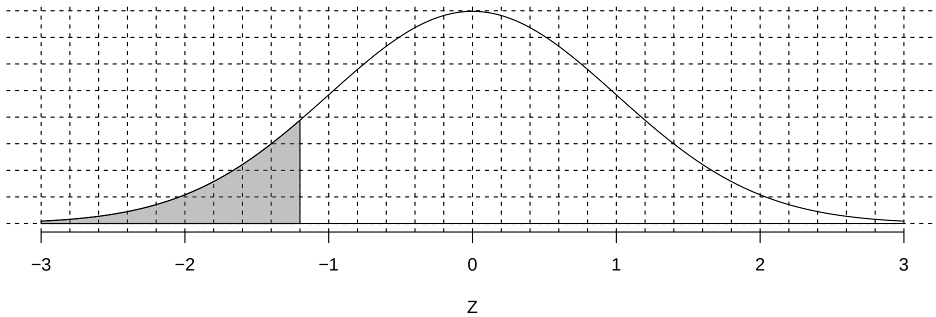


(a) Estimate z such that $P(Z < z) = 0.12$ by shading and counting.

(b) Determine z such that $P(Z < z) = 0.12$ by using the z-table.

Solution:

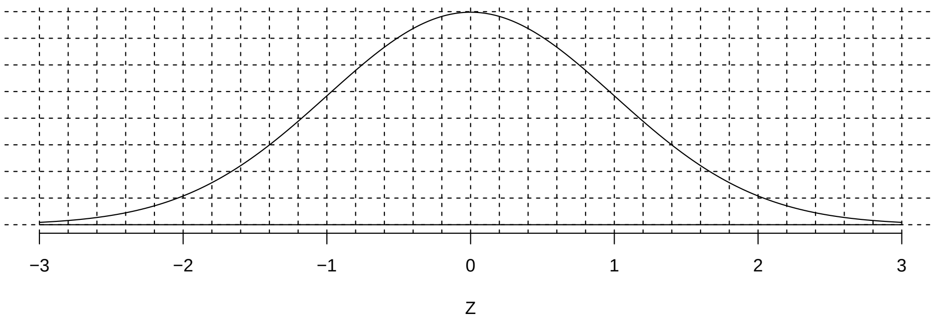
(a) The shaded region is shown below.



When you have shaded 12 squares, starting on the left, you should end around $z = -1.2$.

(b) $z \approx -1.17$

31. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

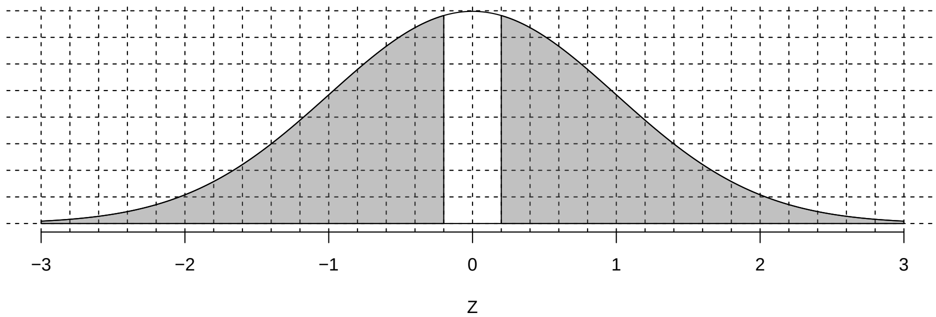


(a) Estimate z such that $P(|Z| > z) = 0.84$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.84$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 84 squares, starting at both tails, you should end near $z = 0.2$. Really, you want to shade 42 squares starting from the left and also 42 squares starting from the right.

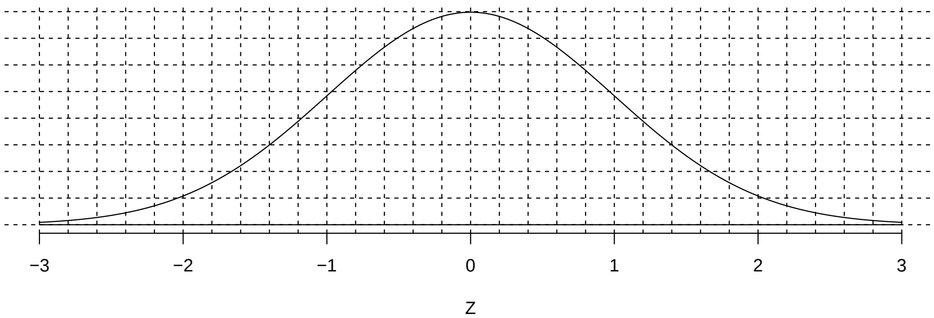
(b) Each tail has half the two-tail area. So each tail has an area of 0.42. We can find the z score with this left area...

$$z_{\text{left tail}} = -0.2$$

But, we want the positive value (the right tail's z boundary).

$$z = \boxed{0.2}$$

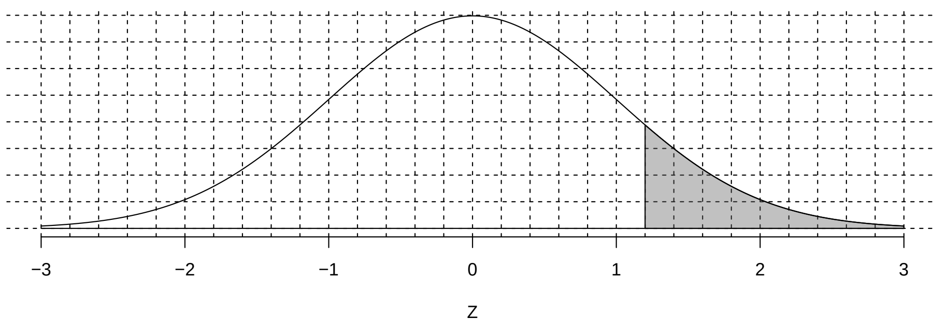
32. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate z such that $P(Z > z) = 0.12$ by shading and counting.
(b) Determine z such that $P(Z > z) = 0.12$ by using the z-table.

Solution:

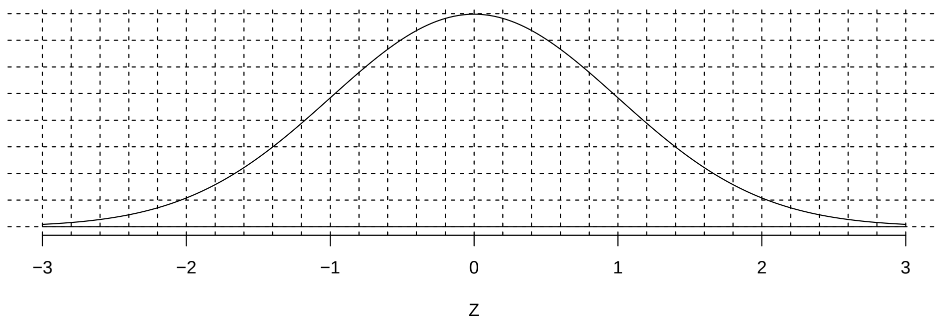
(a) The shaded region is shown below.



When you have shaded 12 squares, starting on the right, you should end around $z = 1.2$.

(b) $z = -1.17$

33. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

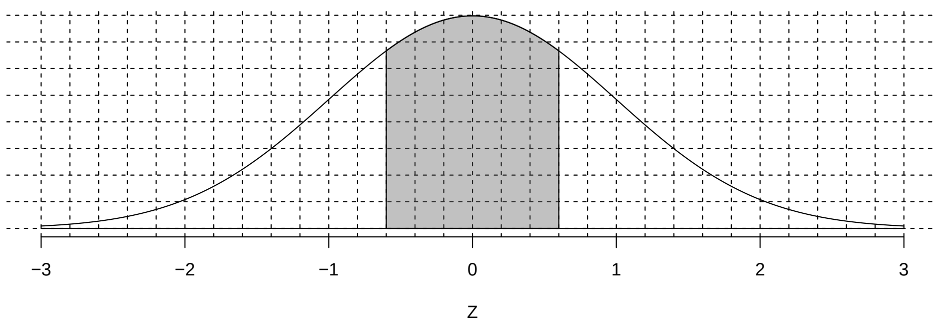


(a) Estimate z such that $P(|Z| < z) = 0.45$ by shading and counting.

(b) Determine z such that $P(|Z| < z) = 0.45$ by using the z-table.

Solution:

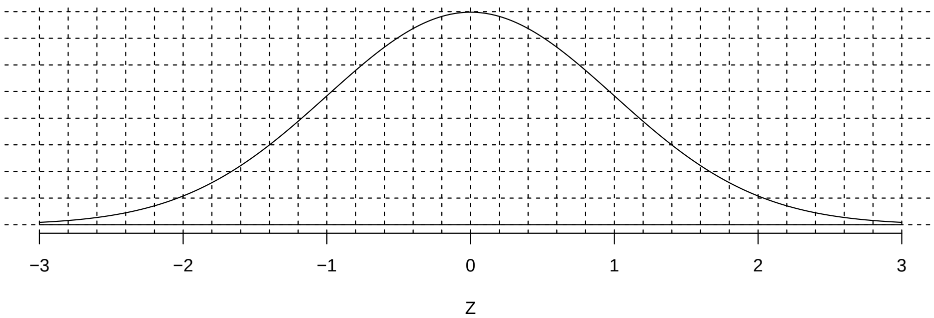
(a) The shaded region is shown below.



When you have shaded 45 squares, starting in the middle, you should end near $z = 0.6$.

(b) $z = -0.13$

34. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

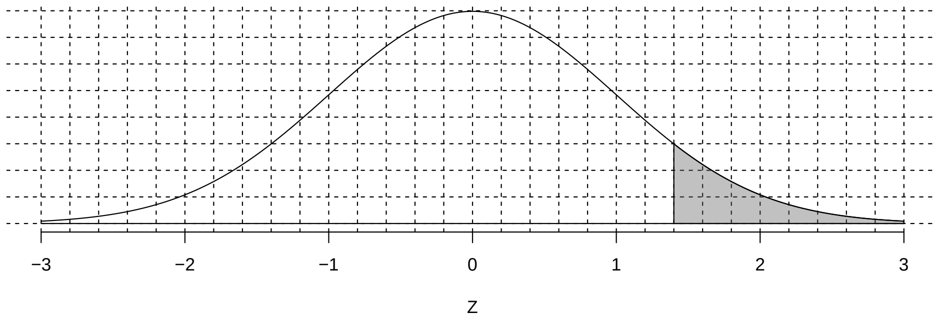


(a) Estimate $P(Z > 1.4)$ by shading and counting.

(b) Determine $P(Z > 1.4)$ by using the z-table.

Solution:

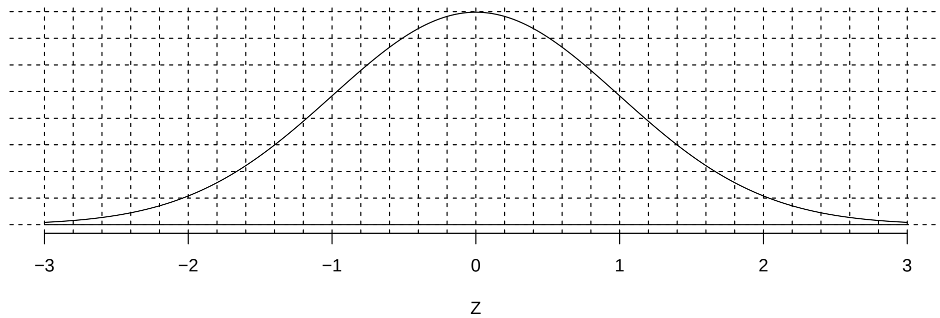
(a) The shaded region is shown below.



You should count about 8 shaded squares, giving a probability of about 0.08.

(b) The probability is 0.0808.

35. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

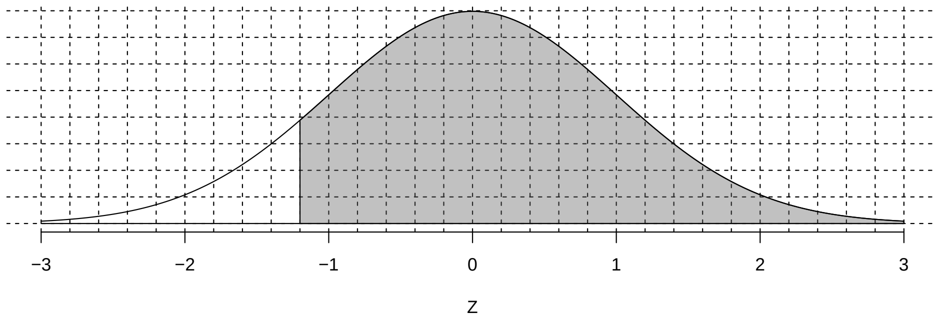


(a) Estimate $P(Z > -1.2)$ by shading and counting.

(b) Determine $P(Z > -1.2)$ by using the z-table.

Solution:

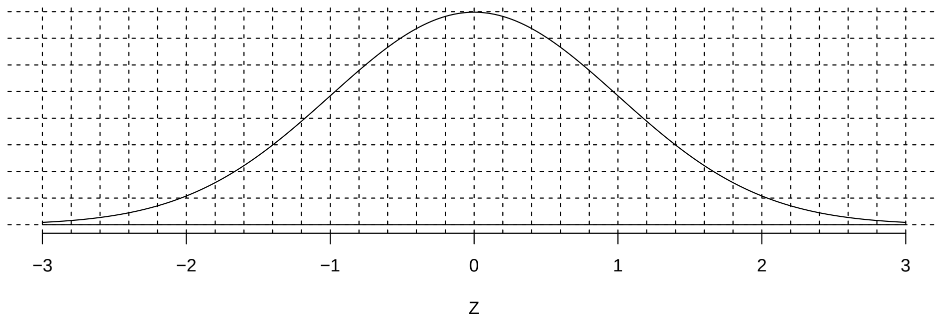
(a) The shaded region is shown below.



You should count about 88 shaded squares, giving a probability of about 0.88.

(b) The probability is 0.8849.

36. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

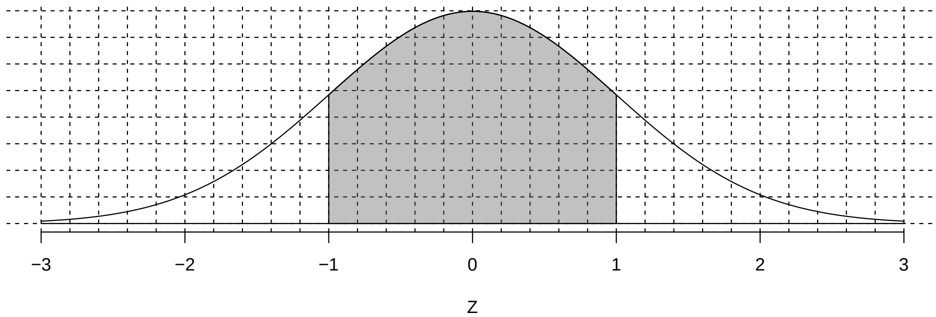


(a) Estimate $P(|Z| < 1)$ by shading and counting.

(b) Determine $P(|Z| < 1)$ by using the z-table.

Solution:

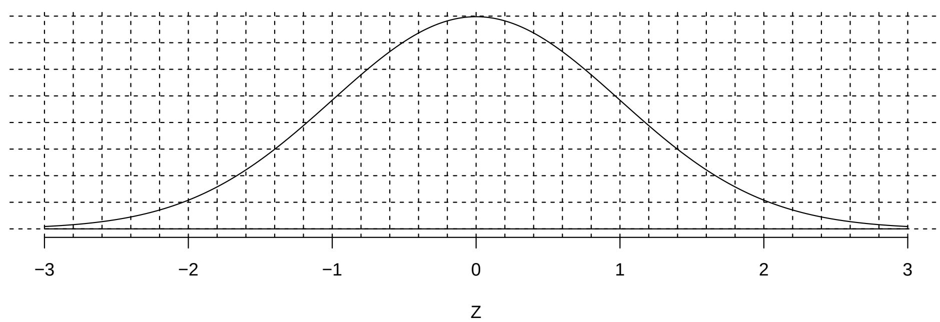
(a) The shaded region is shown below.



You should count about 68 shaded squares, giving a probability of about 0.68.

(b) The probability is 0.6827.

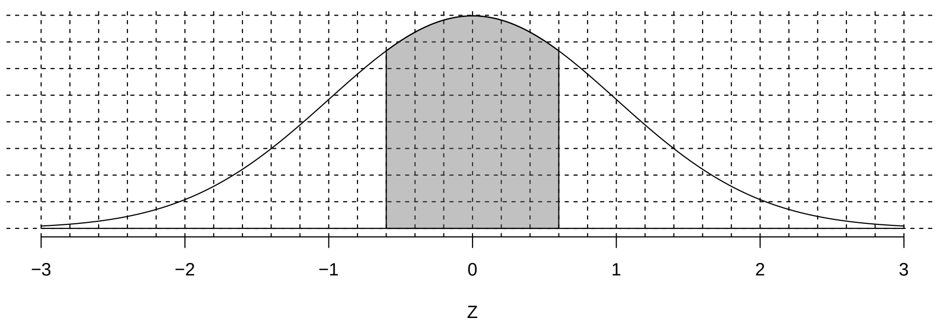
37. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(|Z| < 0.6)$ by shading and counting.
(b) Determine $P(|Z| < 0.6)$ by using the z-table.

Solution:

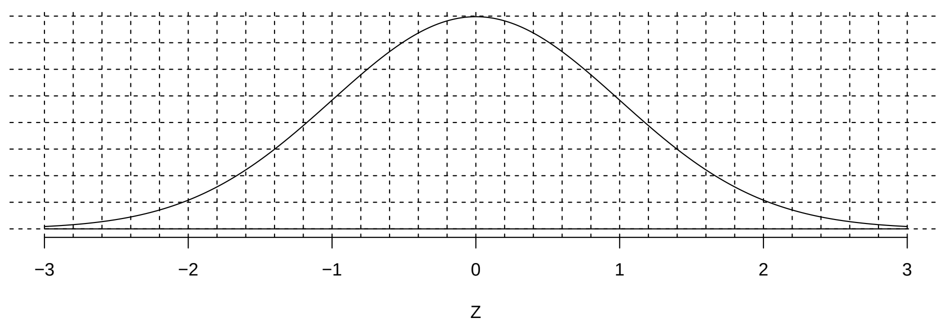
(a) The shaded region is shown below.



You should count about 45 shaded squares, giving a probability of about 0.45.

(b) The probability is 0.4515.

38. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

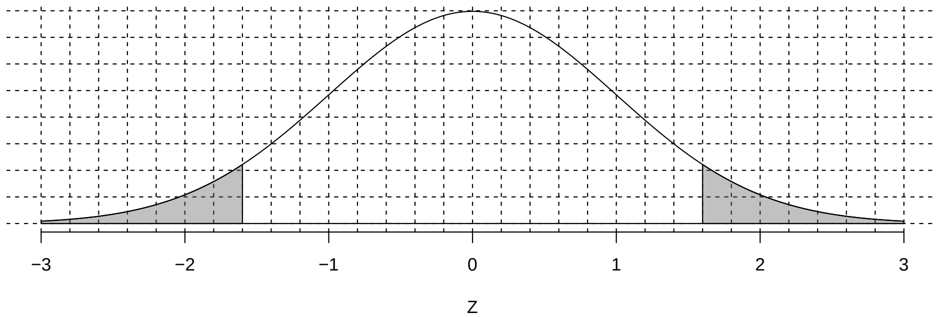


(a) Estimate z such that $P(|Z| > z) = 0.11$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.11$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 11 squares, starting at both tails, you should end near z = 1.6. Really, you want to shade 5.5 squares starting from the left and also 5.5 squares starting from the right.

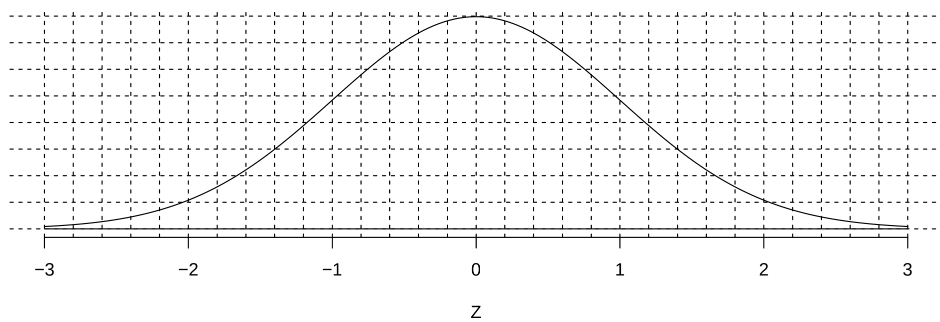
(b) Each tail has half the two-tail area. So each tail has an area of 0.055. We can find the z score with this left area...

$$z_{\text{left tail}} = -1.6$$

But, we want the positive value (the right tail's z boundary).

$$z = \boxed{1.6}$$

39. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

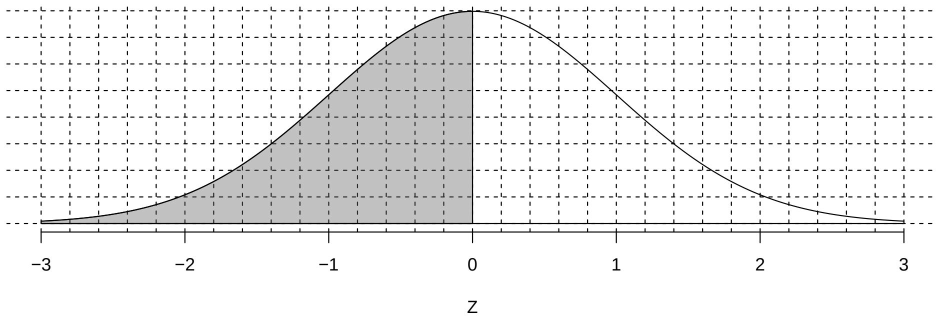


(a) Estimate z such that $P(Z < z) = 0.5$ by shading and counting.

(b) Determine z such that $P(Z < z) = 0.5$ by using the z-table.

Solution:

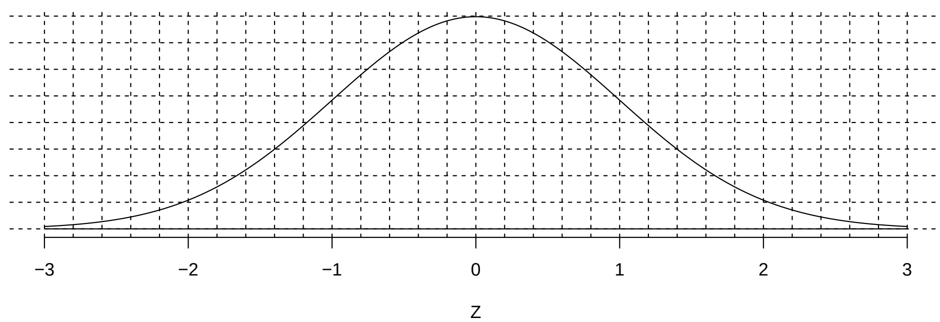
(a) The shaded region is shown below.



When you have shaded 50 squares, starting on the left, you should end around $z = 0$.

(b) $z \approx 0$

40. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

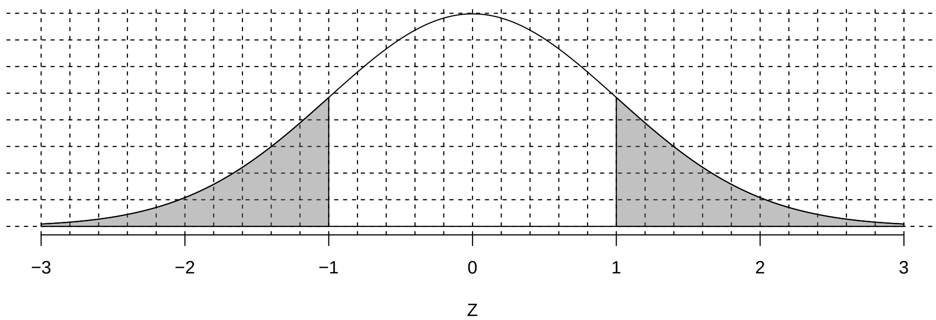


(a) Estimate $P(|Z| > 1)$ by shading and counting.

(b) Determine $P(|Z| > 1)$ by using the z-table.

Solution:

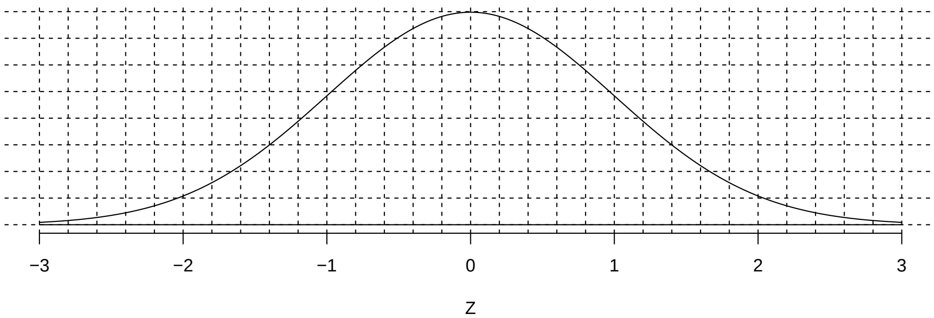
(a) The shaded regions are shown below.



You should count about 32 shaded squares, giving a probability of about 0.32.

(b) The probability is 0.3173.

41. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

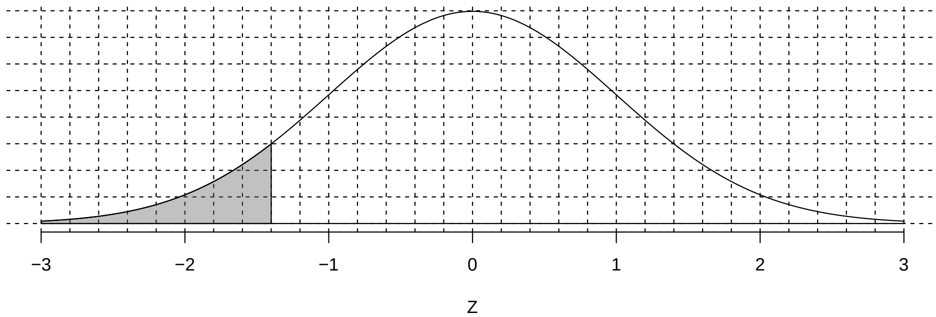


(a) Estimate $P(Z < -1.4)$ by shading and counting.

(b) Determine $P(Z < -1.4)$ by using the z-table.

Solution:

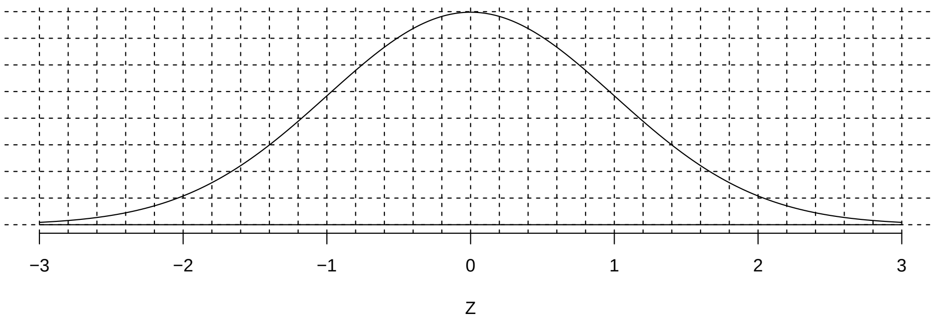
(a) The shaded region is shown below.



You should count about 8 shaded squares, giving a probability of about 0.08.

(b) The probability is 0.0808.

42. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

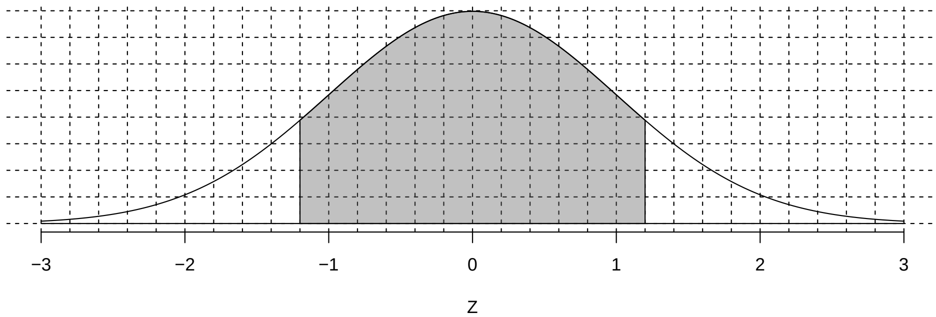


(a) Estimate z such that $P(|Z| < z) = 0.77$ by shading and counting.

(b) Determine z such that $P(|Z| < z) = 0.77$ by using the z-table.

Solution:

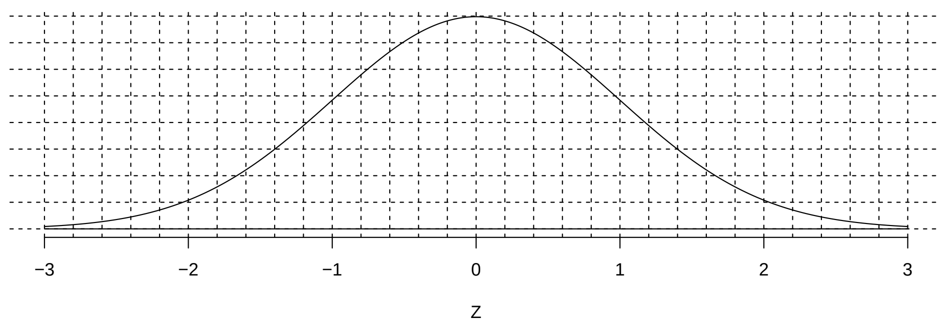
(a) The shaded region is shown below.



When you have shaded 77 squares, starting in the middle, you should end near $z = 1.2$.

(b) $z = 0.74$

43. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

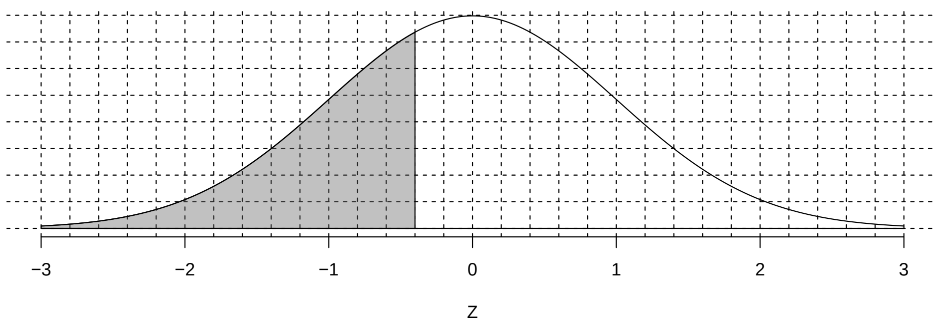


(a) Estimate $P(Z < -0.4)$ by shading and counting.

(b) Determine $P(Z < -0.4)$ by using the z-table.

Solution:

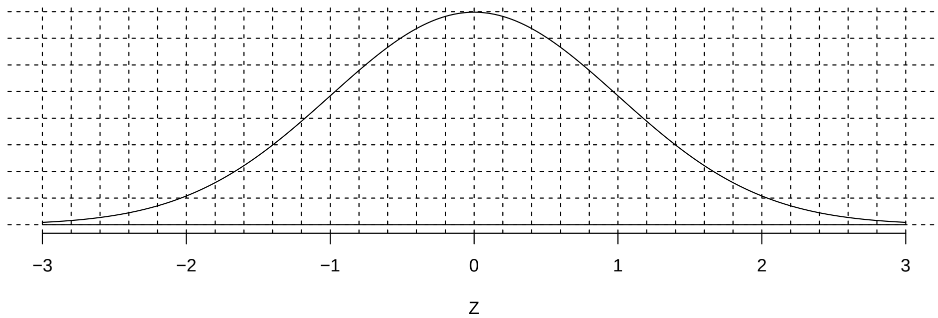
(a) The shaded region is shown below.



You should count about 34 shaded squares, giving a probability of about 0.34.

(b) The probability is 0.3446.

44. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

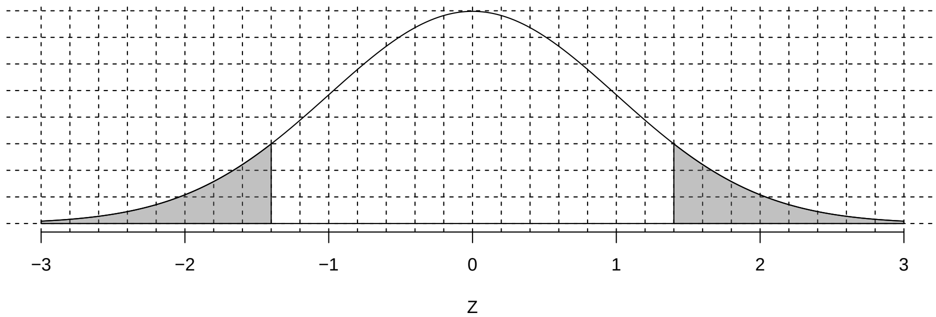


(a) Estimate z such that $P(|Z| > z) = 0.16$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.16$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 16 squares, starting at both tails, you should end near z = 1.4. Really, you want to shade 8 squares starting from the left and also 8 squares starting from the right.

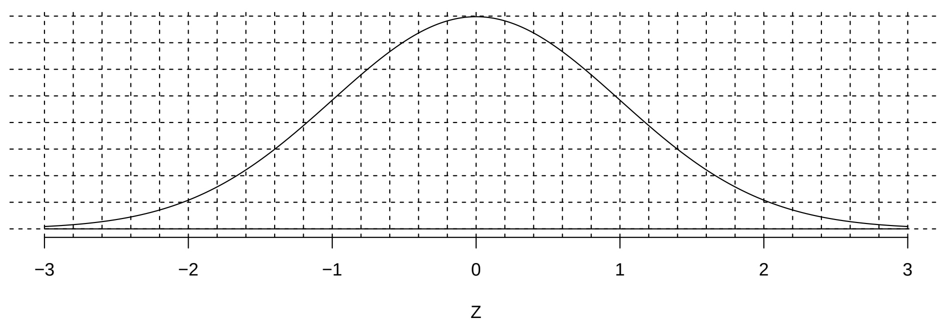
(b) Each tail has half the two-tail area. So each tail has an area of 0.08. We can find the z score with this left area...

$$z_{\text{left tail}} = -1.41$$

But, we want the positive value (the right tail's z boundary).

$$z = \boxed{1.41}$$

45. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

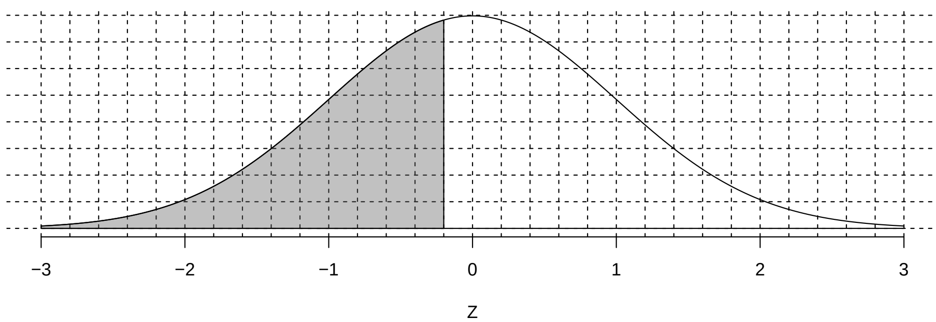


(a) Estimate z such that $P(Z < z) = 0.42$ by shading and counting.

(b) Determine z such that $P(Z < z) = 0.42$ by using the z-table.

Solution:

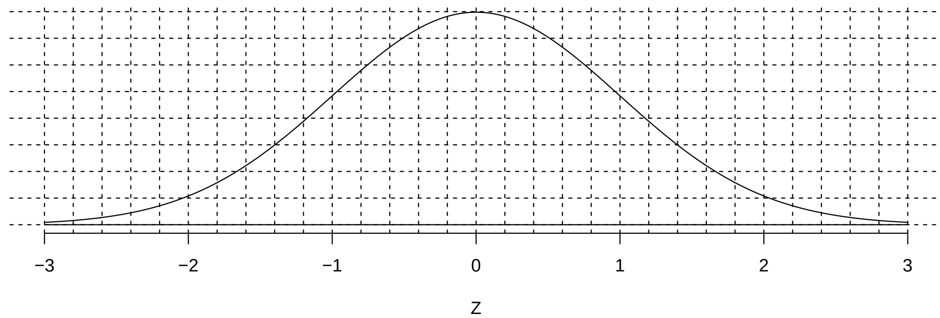
(a) The shaded region is shown below.



When you have shaded 42 squares, starting on the left, you should end around $z = -0.2$.

(b) $z \approx -0.2$

46. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

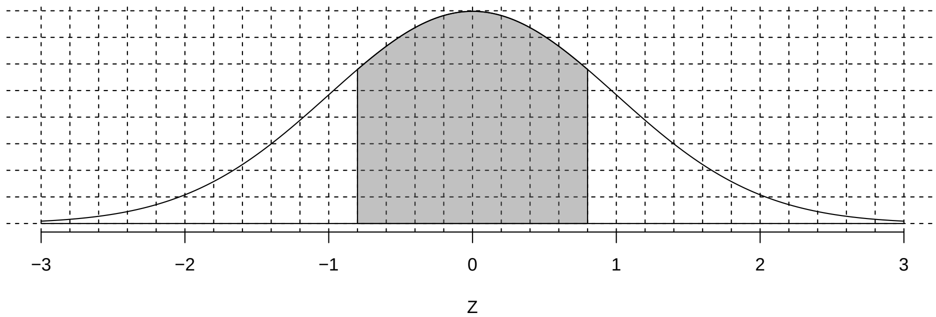


(a) Estimate $P(|Z| < 0.8)$ by shading and counting.

(b) Determine $P(|Z| < 0.8)$ by using the z-table.

Solution:

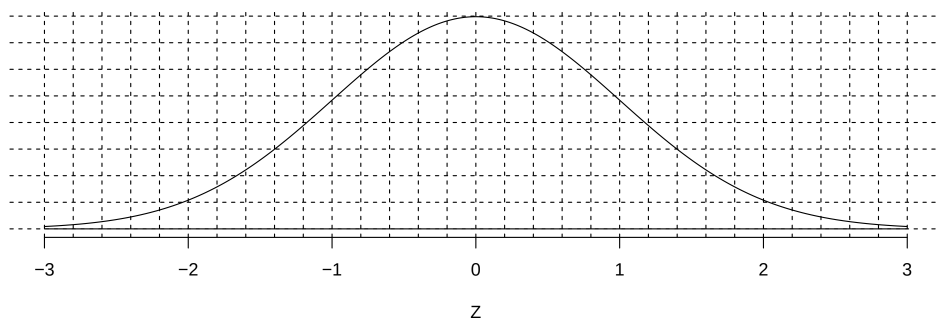
(a) The shaded region is shown below.



You should count about 58 shaded squares, giving a probability of about 0.58.

(b) The probability is 0.5763.

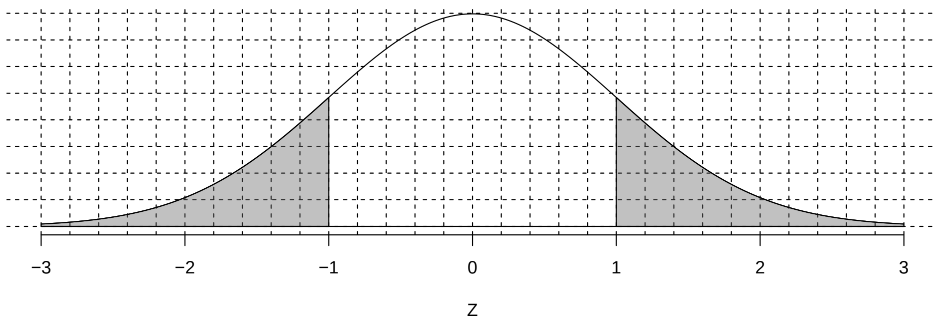
47. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(|Z| > 1)$ by shading and counting.
(b) Determine $P(|Z| > 1)$ by using the z-table.

Solution:

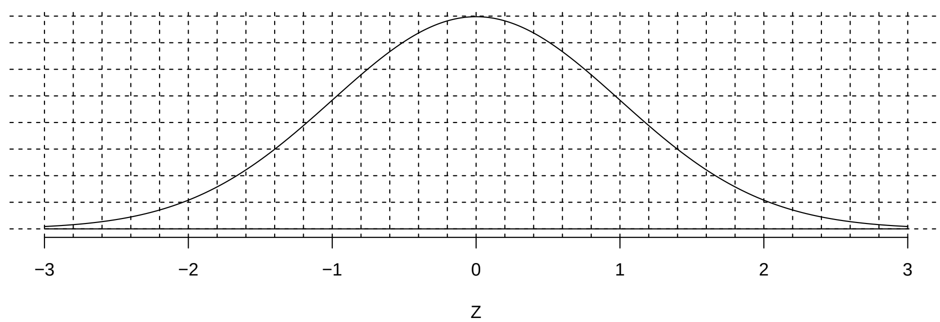
(a) The shaded regions are shown below.



You should count about 32 shaded squares, giving a probability of about 0.32.

(b) The probability is 0.3173.

48. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

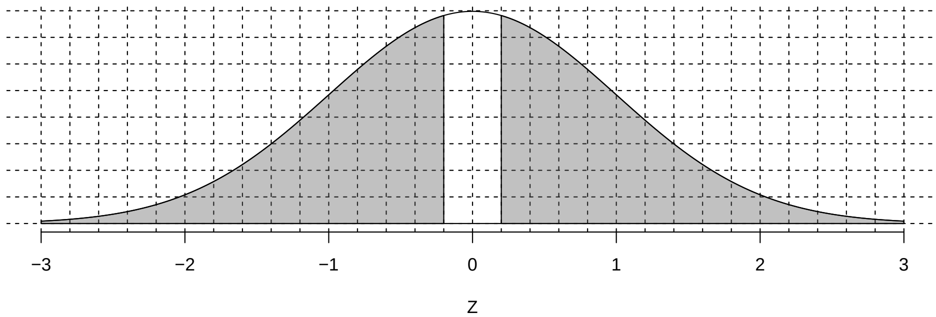


(a) Estimate $P(|Z| > 0.2)$ by shading and counting.

(b) Determine $P(|Z| > 0.2)$ by using the z-table.

Solution:

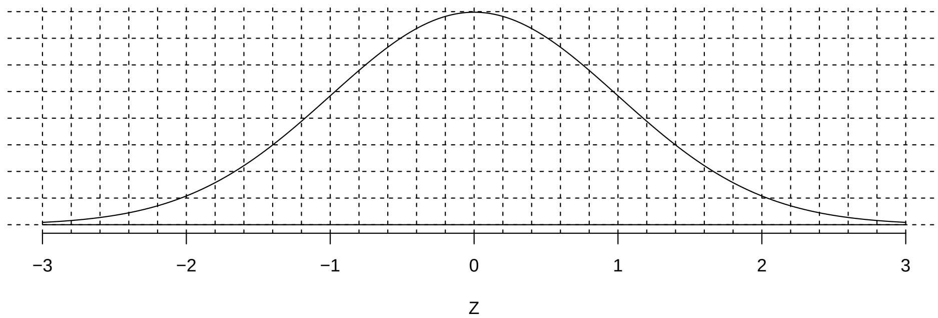
(a) The shaded regions are shown below.



You should count about 84 shaded squares, giving a probability of about 0.84.

(b) The probability is 0.8415.

49. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

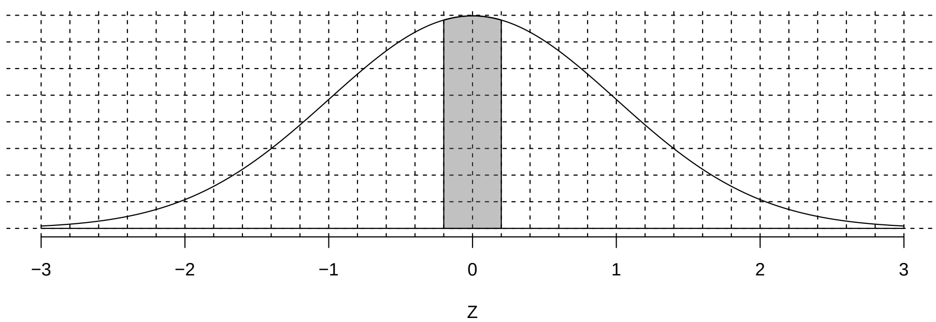


(a) Estimate $P(|Z| < 0.2)$ by shading and counting.

(b) Determine $P(|Z| < 0.2)$ by using the z-table.

Solution:

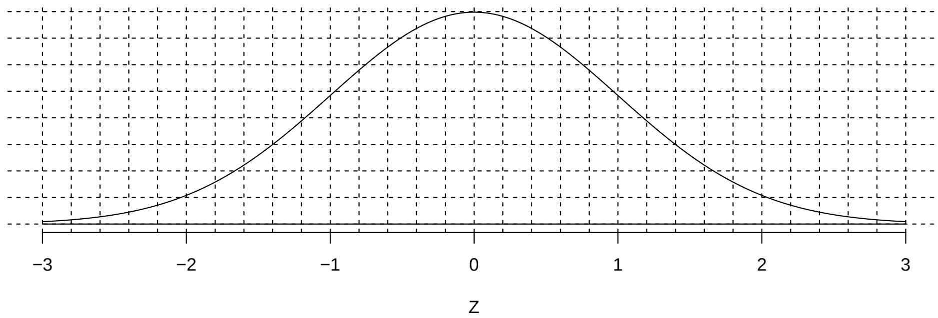
(a) The shaded region is shown below.



You should count about 16 shaded squares, giving a probability of about 0.16.

(b) The probability is 0.1585.

50. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

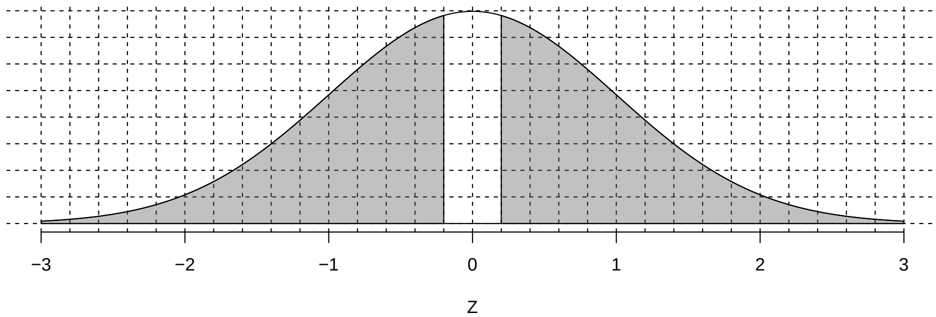


(a) Estimate z such that $P(|Z| > z) = 0.84$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.84$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 84 squares, starting at both tails, you should end near $z = 0.2$. Really, you want to shade 42 squares starting from the left and also 42 squares starting from the right.

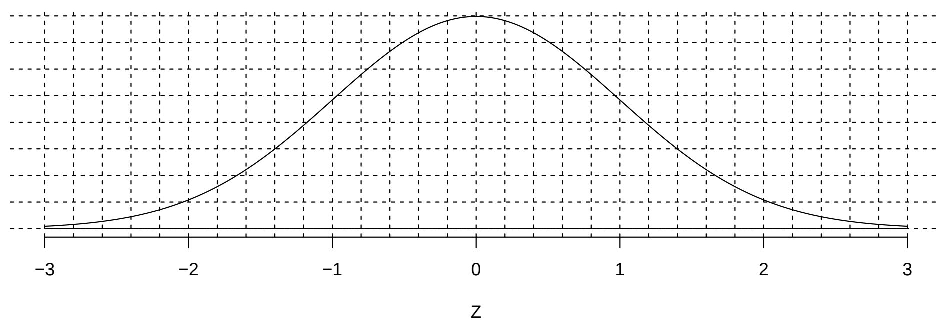
(b) Each tail has half the two-tail area. So each tail has an area of 0.42. We can find the z score with this left area...

$$z_{\text{left tail}} = -0.2$$

But, we want the positive value (the right tail's z boundary).

$$z = \boxed{0.2}$$

51. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

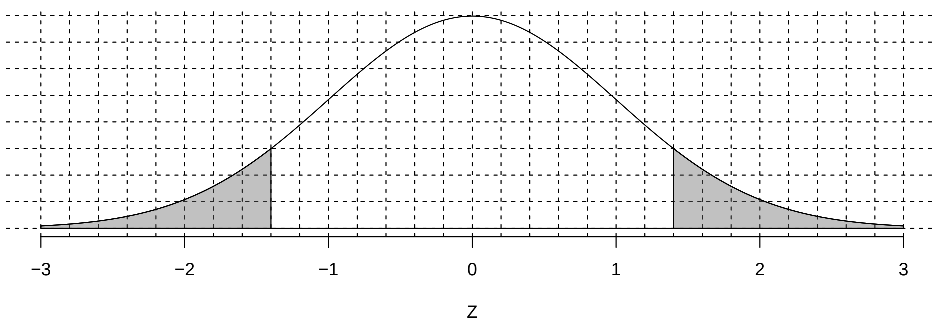


(a) Estimate $P(|Z| > 1.4)$ by shading and counting.

(b) Determine $P(|Z| > 1.4)$ by using the z-table.

Solution:

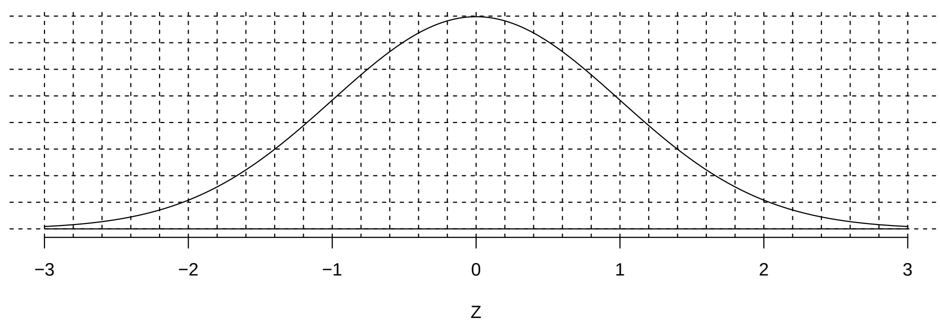
(a) The shaded regions are shown below.



You should count about 16 shaded squares, giving a probability of about 0.16.

(b) The probability is 0.1615.

52. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

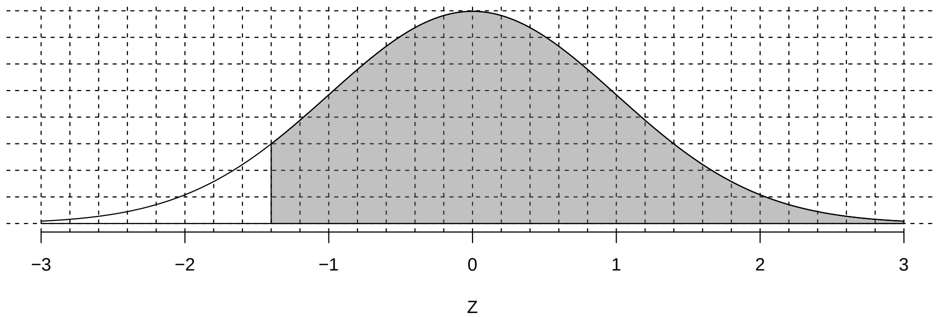


(a) Estimate $P(Z > -1.4)$ by shading and counting.

(b) Determine $P(Z > -1.4)$ by using the z-table.

Solution:

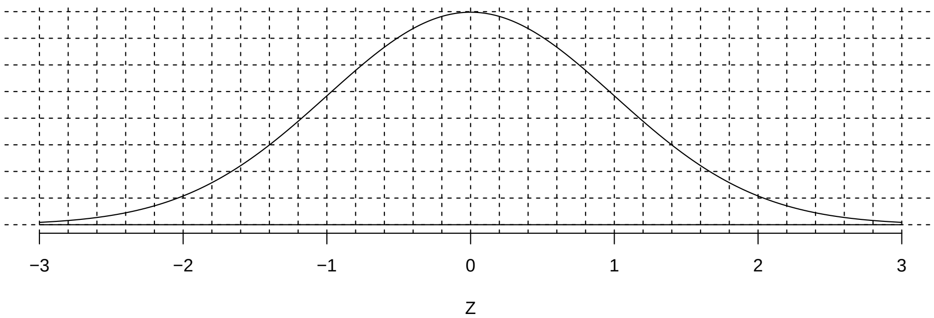
(a) The shaded region is shown below.



You should count about 92 shaded squares, giving a probability of about 0.92.

(b) The probability is 0.9192.

53. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

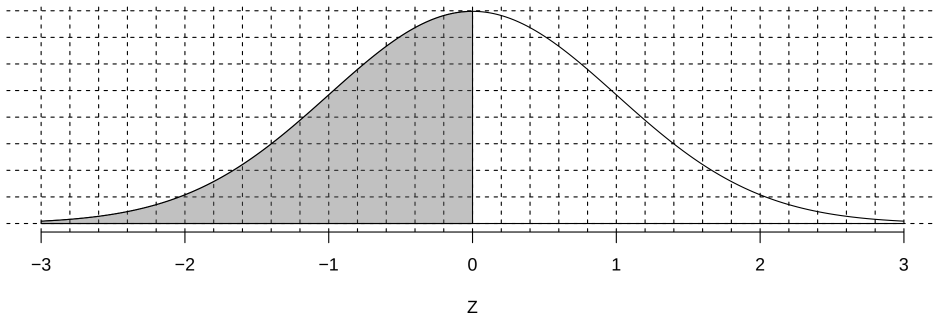


(a) Estimate $P(Z < 0)$ by shading and counting.

(b) Determine $P(Z < 0)$ by using the z-table.

Solution:

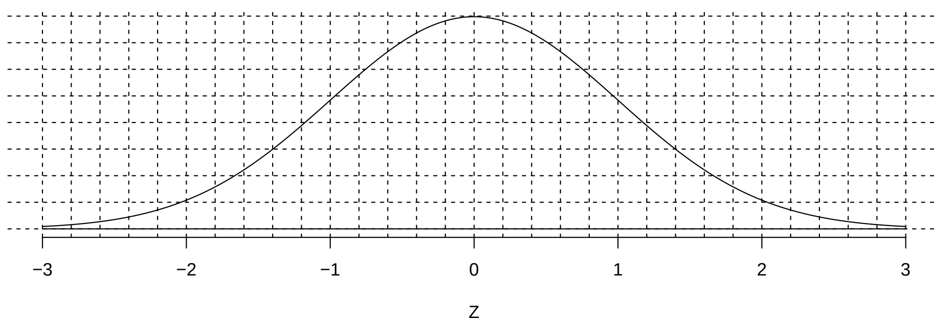
(a) The shaded region is shown below.



You should count about 50 shaded squares, giving a probability of about 0.5.

(b) The probability is 0.5.

54. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

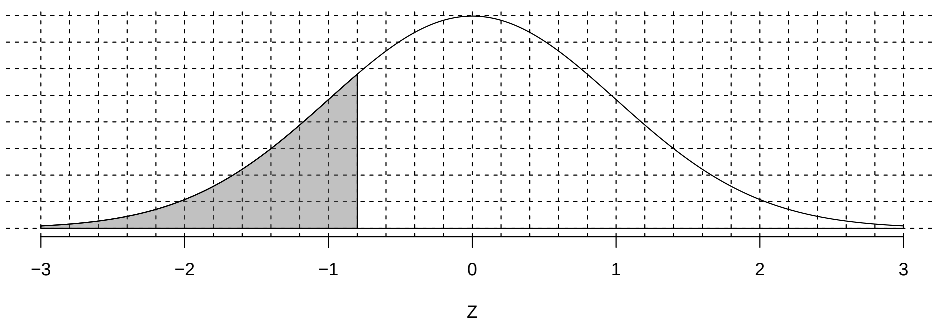


(a) Estimate z such that $P(Z < z) = 0.21$ by shading and counting.

(b) Determine z such that $P(Z < z) = 0.21$ by using the z-table.

Solution:

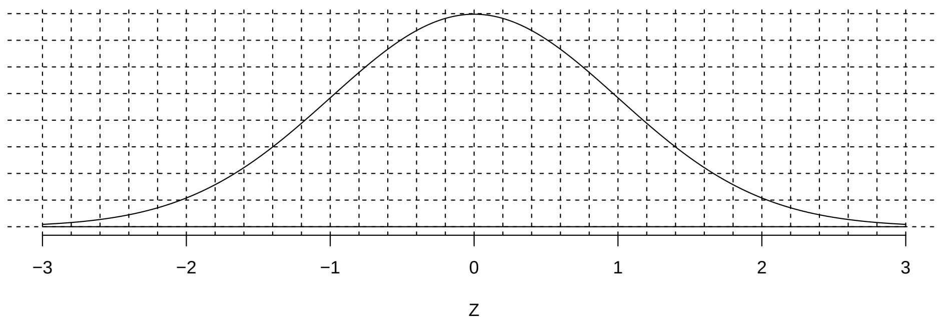
(a) The shaded region is shown below.



When you have shaded 21 squares, starting on the left, you should end around $z = -0.8$.

(b) $z \approx -0.81$

55. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

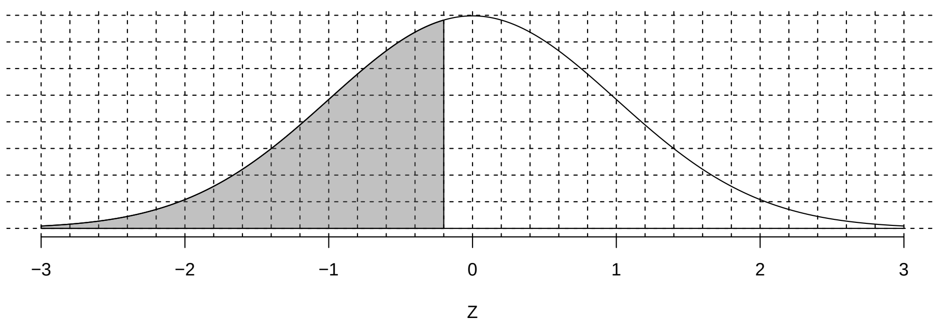


(a) Estimate $P(Z < -0.2)$ by shading and counting.

(b) Determine $P(Z < -0.2)$ by using the z-table.

Solution:

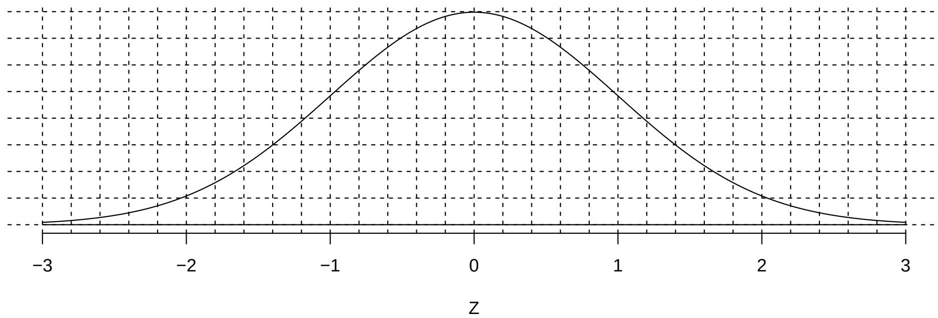
(a) The shaded region is shown below.



You should count about 42 shaded squares, giving a probability of about 0.42.

(b) The probability is 0.4207.

56. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

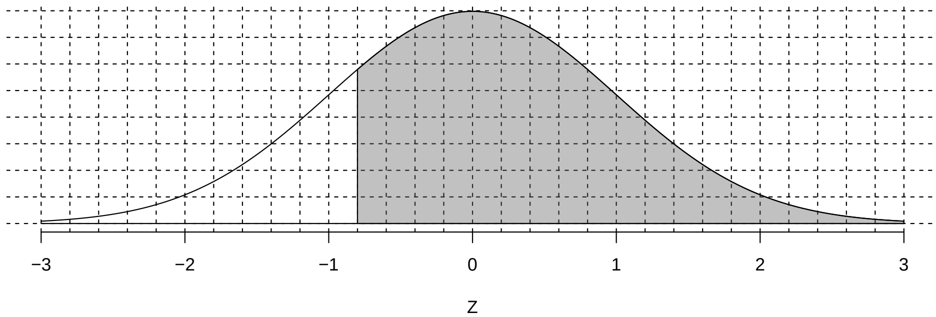


(a) Estimate $P(Z > -0.8)$ by shading and counting.

(b) Determine $P(Z > -0.8)$ by using the z-table.

Solution:

(a) The shaded region is shown below.



You should count about 79 shaded squares, giving a probability of about 0.79.

(b) The probability is 0.7881.