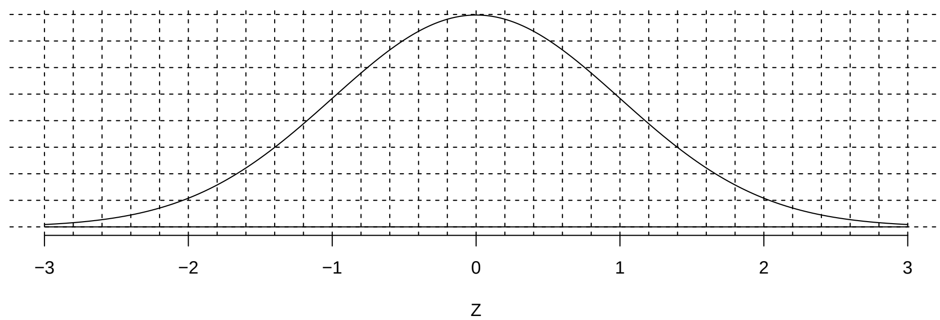
1. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.

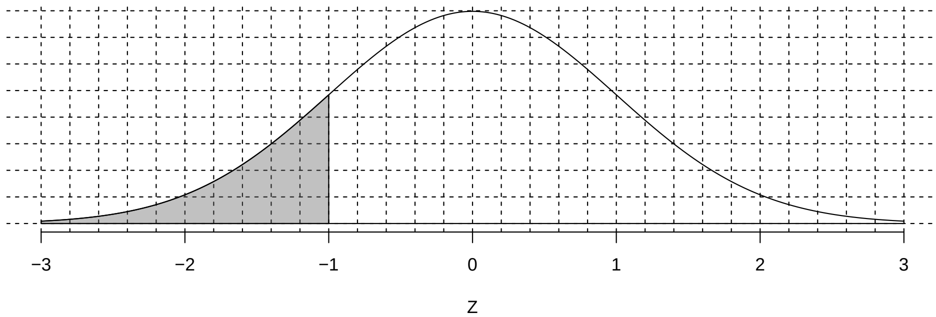


(a) Estimate $P(Z < -1)$ by shading and counting.

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

Solution:

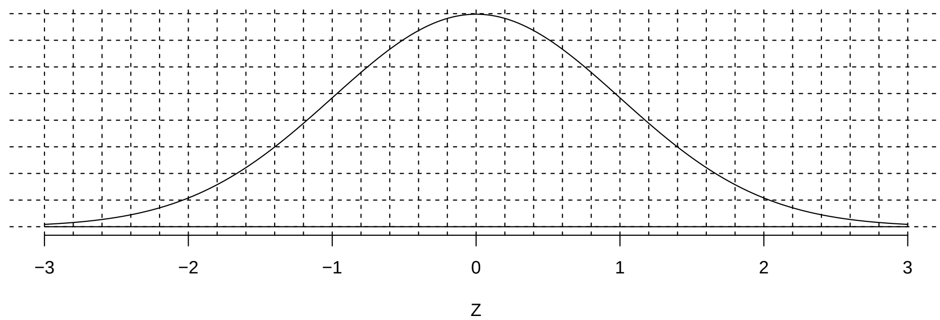
(a) The shaded region is shown below.



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.

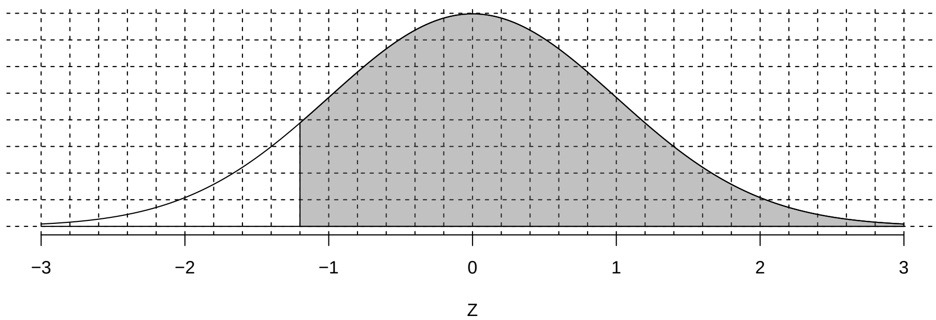


(a) Estimate $P(Z > -1.2)$ by shading and counting.

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

Solution:

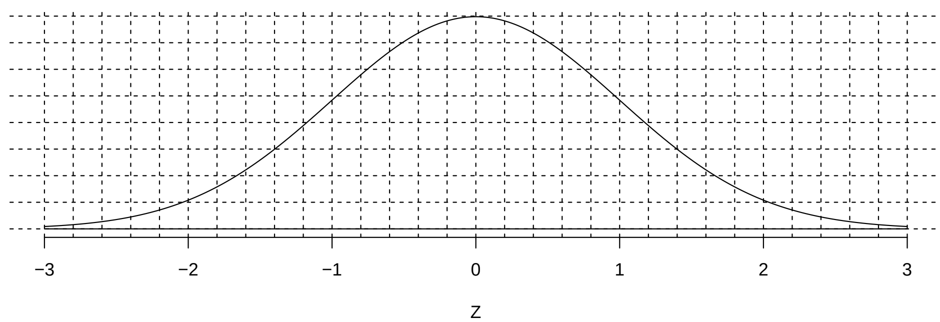
(a) The shaded region is shown below.



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

(b) The probability is 0.8849.

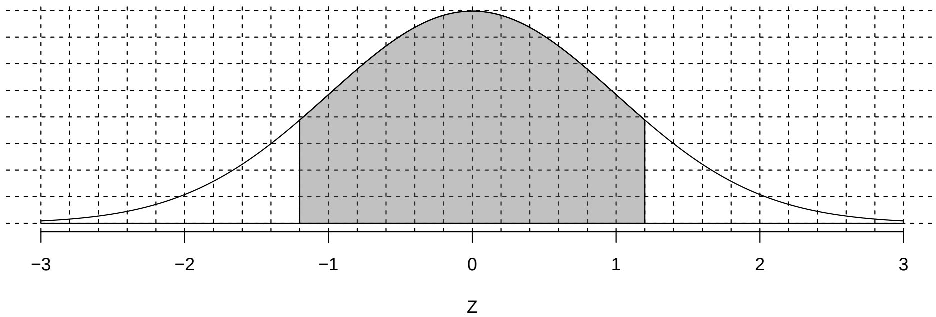
3. **Problem:**
   The figure below shows the standard normal density. Each grid square represents 1% of probability.



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

Solution:

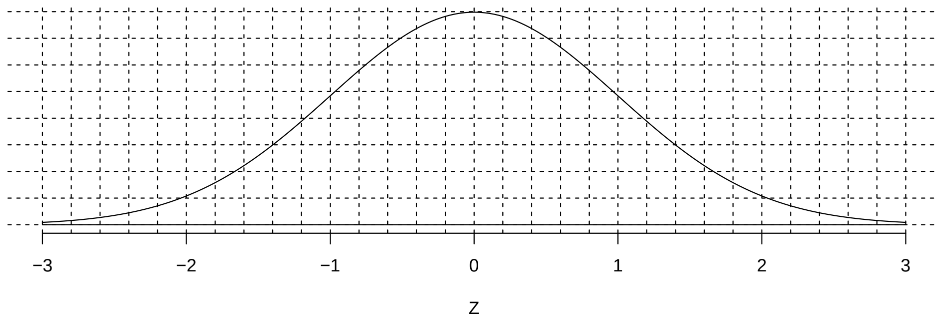
(a) The shaded region is shown below.



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

(b) The probability is 0.7699.

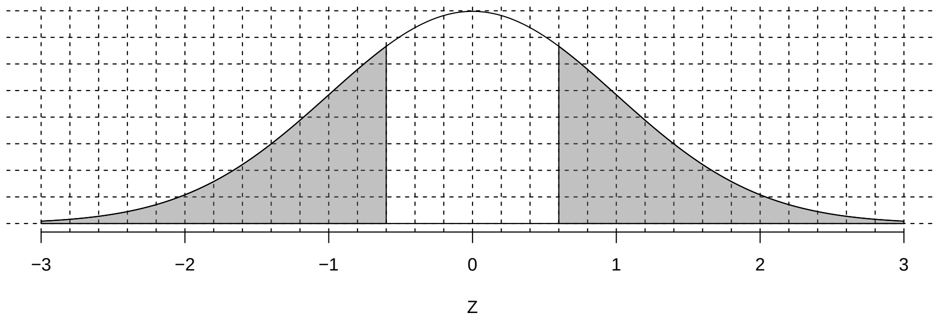
4. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



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

Solution:

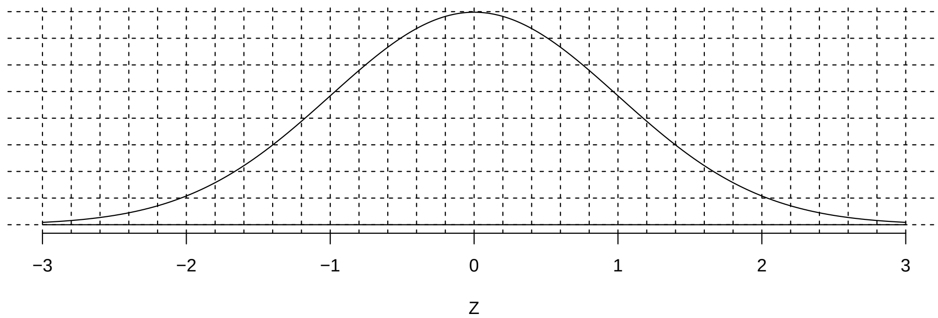
(a) The shaded regions are shown below.



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

(b) The probability is 0.5485.

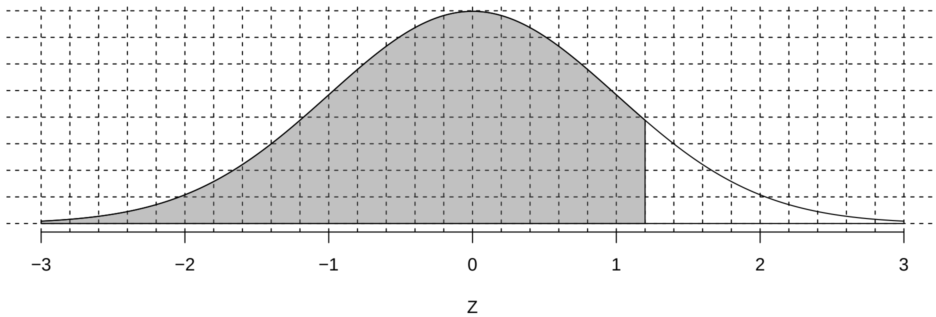
5. **Problem:**
   The figure below shows the standard normal density. Each grid square represents 1% of probability.



   (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:

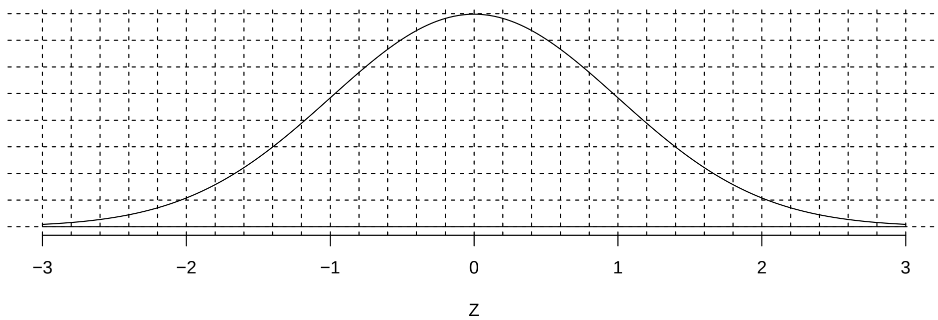
(a) The shaded region is shown below.



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.

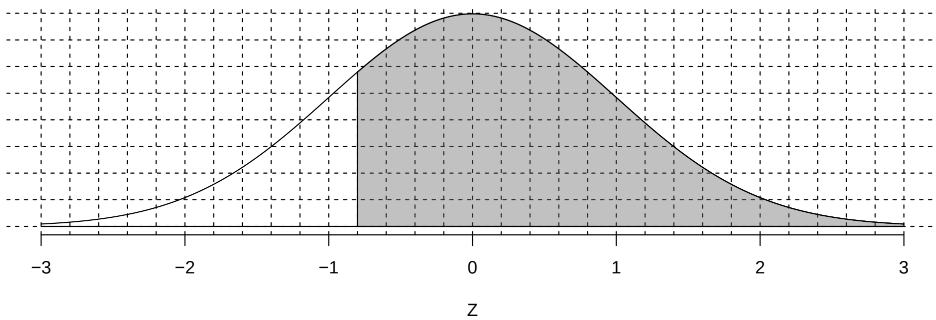


(a) Estimate z such that $P(Z > z) = 0.79$ by shading and counting.

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

Solution:

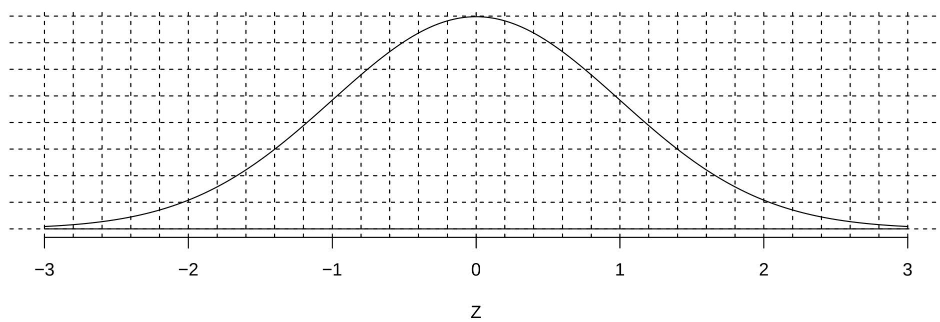
(a) The shaded region is shown below.



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.

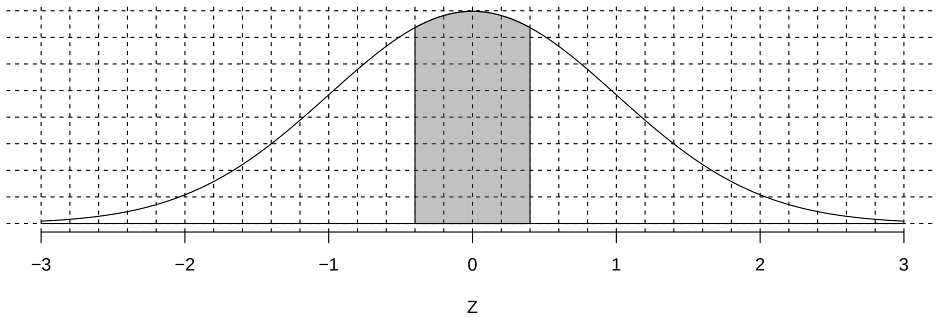


(a) Estimate z such that $P(|Z| < z) = 0.31$ by shading and counting.

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

Solution:

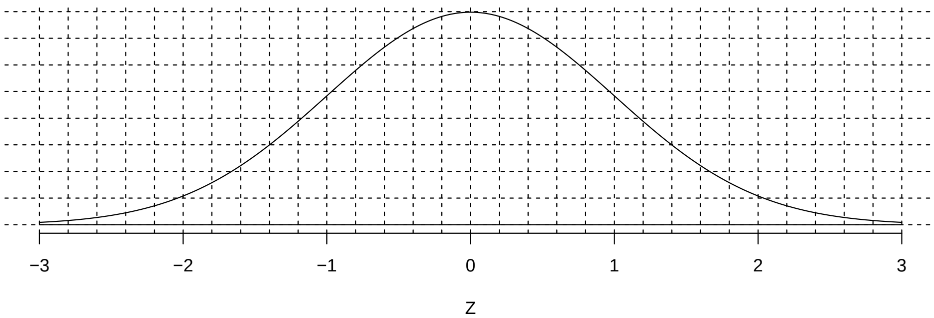
(a) The shaded region is shown below.



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

(b) $z = 0.4$

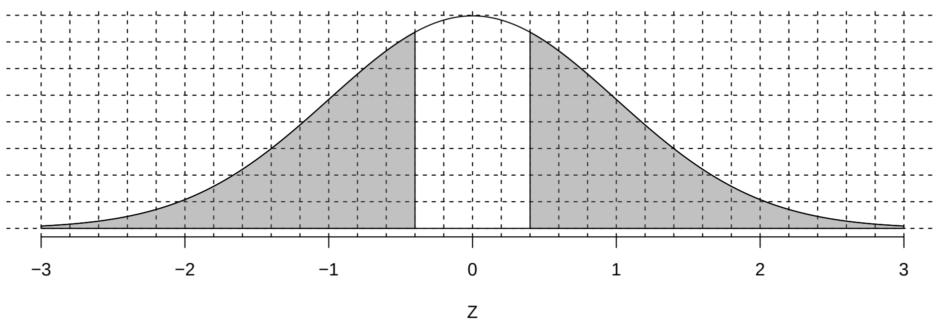
8. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(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.

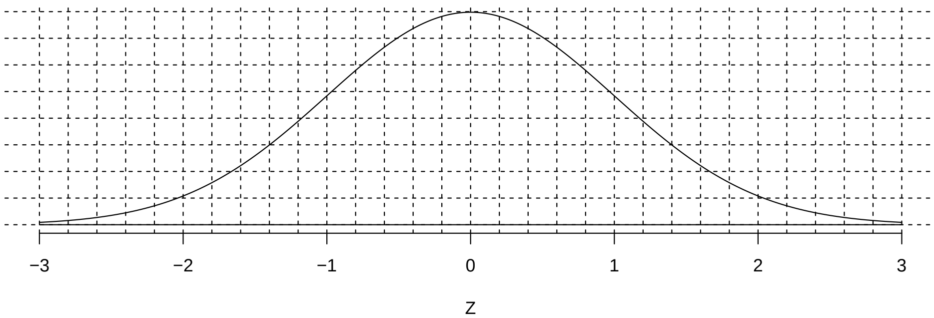
(b) Each tail has half the two-tail area. So each tail has an area of 0.345. We can find the z score with this left area...

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

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

$$z = \boxed{0.4}$$

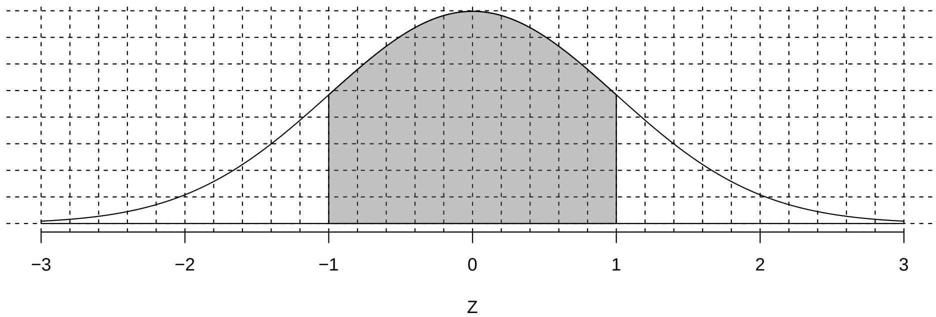
9. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



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

Solution:

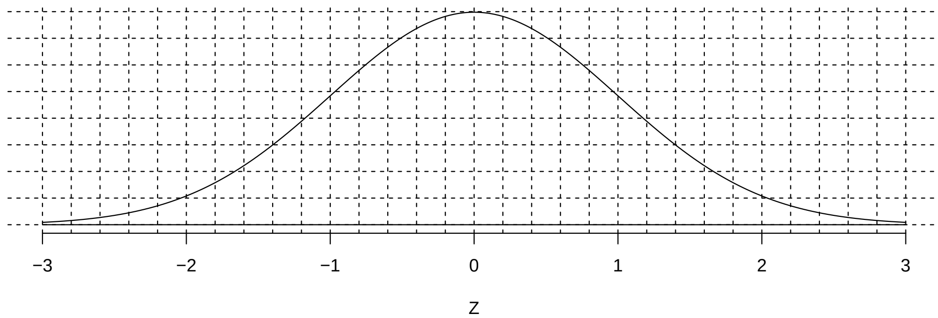
(a) The shaded region is shown below.



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

(b) The probability is 0.6827.

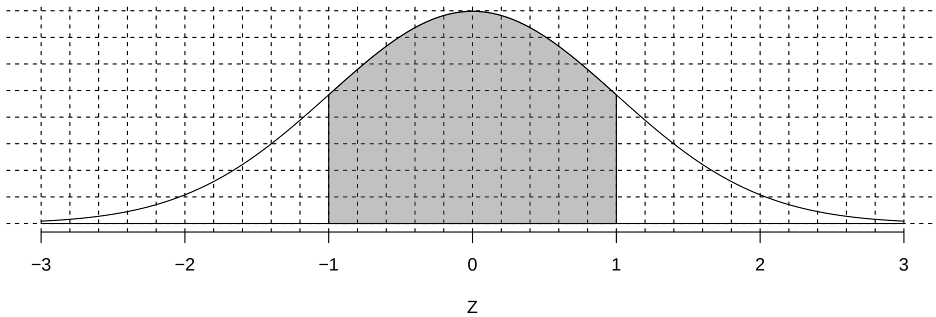
10. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



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

Solution:

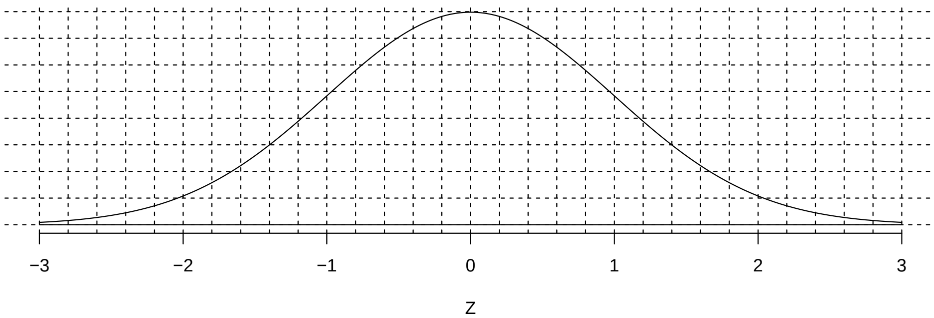
(a) The shaded region is shown below.



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

(b) The probability is 0.6827.

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

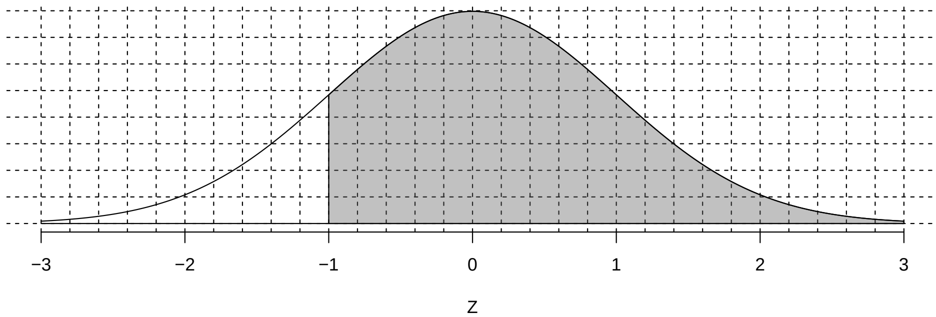


(a) Estimate z such that $P(Z > z) = 0.84$ by shading and counting.

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

Solution:

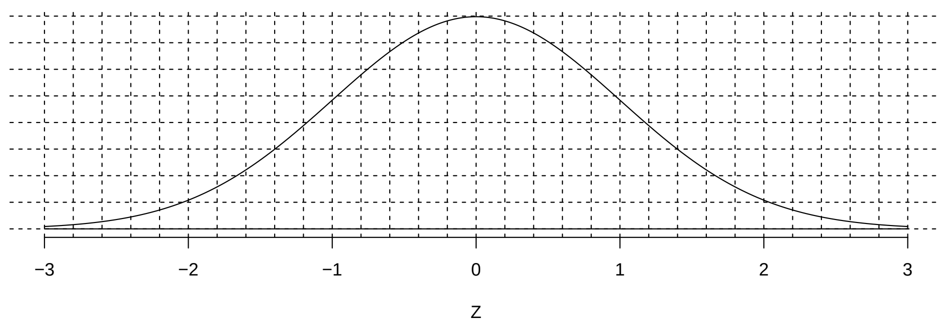
(a) The shaded region is shown below.



When you have shaded 84 squares, starting on the right, you should end around $z = -1$.

(b) $z = 0.99$

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

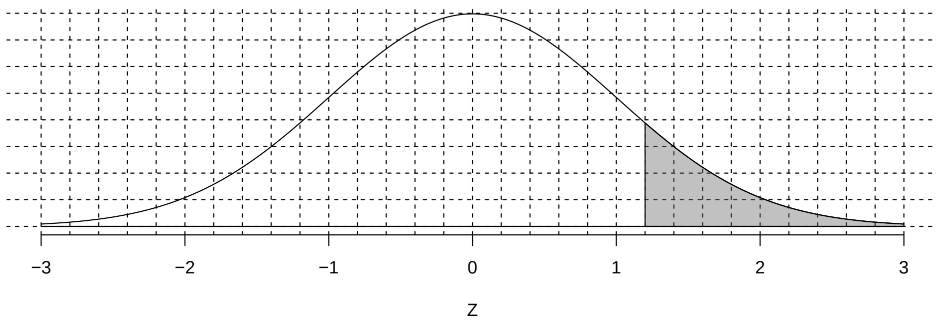


(a) Estimate $P(Z > 1.2)$ by shading and counting.

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

Solution:

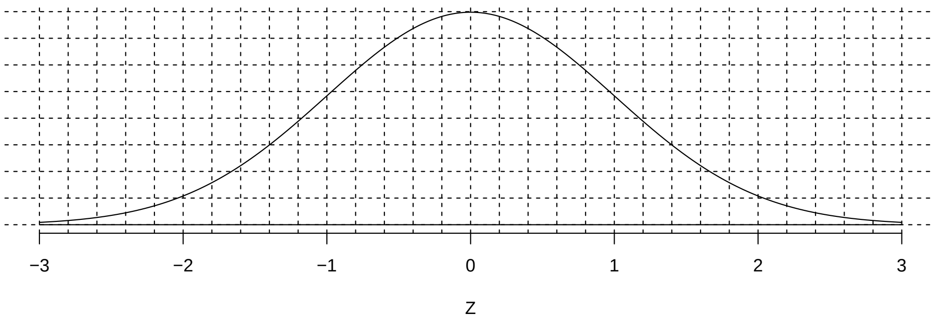
(a) The shaded region is shown below.



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

(b) The probability is 0.1151.

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

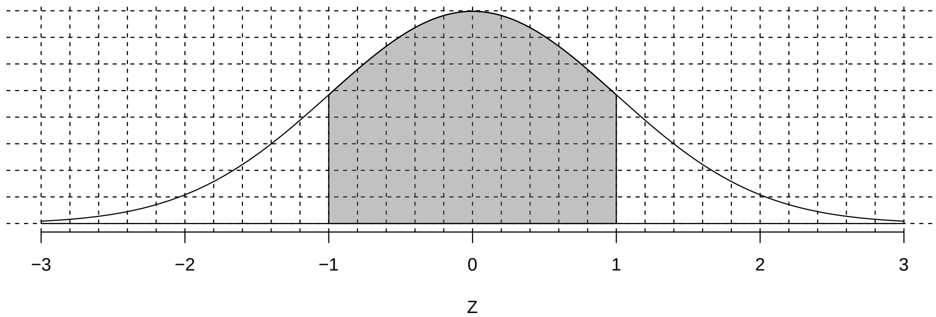


(a) Estimate $P(|Z| < 1)$ by shading and counting.

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

Solution:

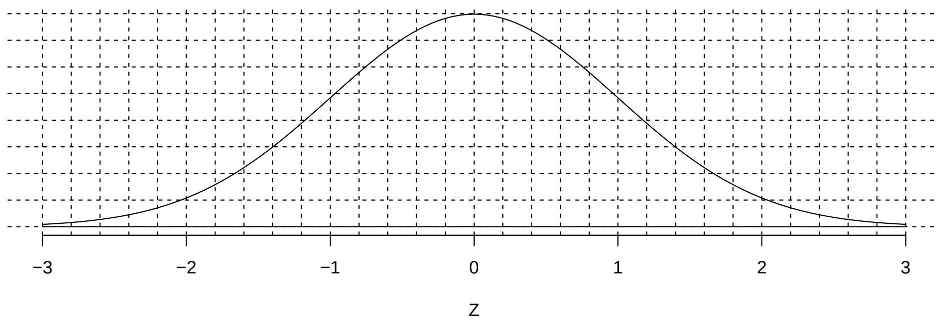
(a) The shaded region is shown below.



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

(b) The probability is 0.6827.

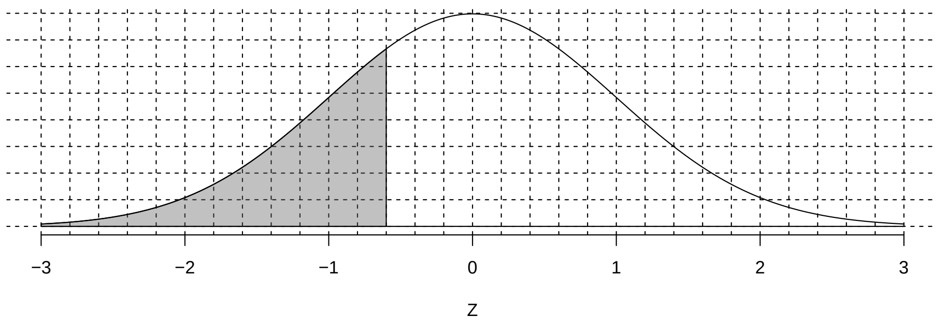
14. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate z such that $P(Z < z) = 0.27$ by shading and counting.
(b) Determine z such that $P(Z < z) = 0.27$ by using the z-table.

Solution:

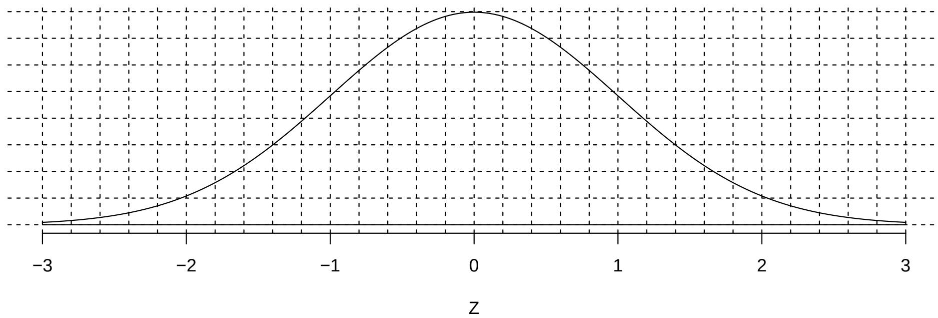
(a) The shaded region is shown below.



When you have shaded 27 squares, starting on the left, you should end around $z = -0.6$.

(b) $z \approx -0.61$

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

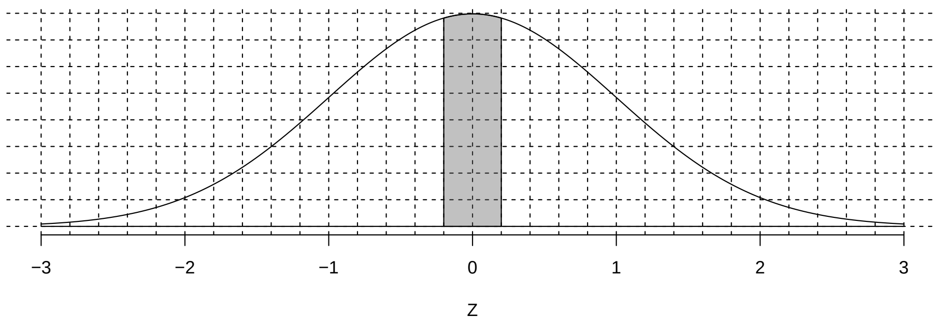


(a) Estimate z such that $P(|Z| < z) = 0.16$ by shading and counting.

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

Solution:

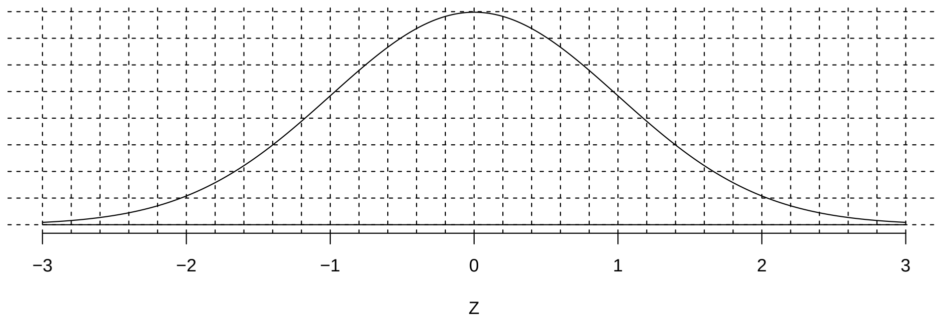
(a) The shaded region is shown below.



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

(b) $z = 0.2$

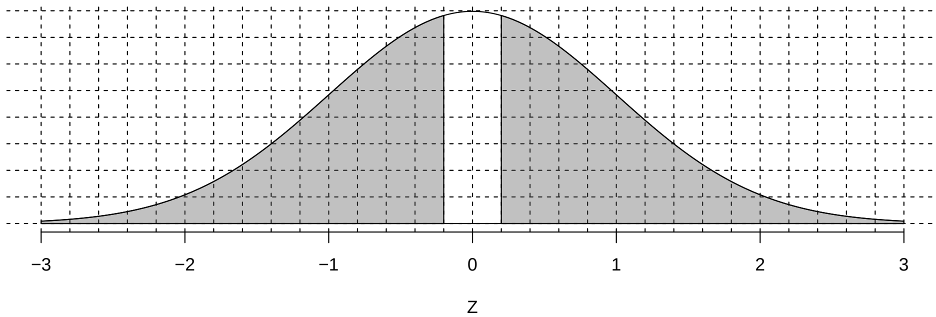
16. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(|Z| > 0.2)$ by shading and counting.
(b) Determine $P(|Z| > 0.2)$ by using the z-table.

Solution:

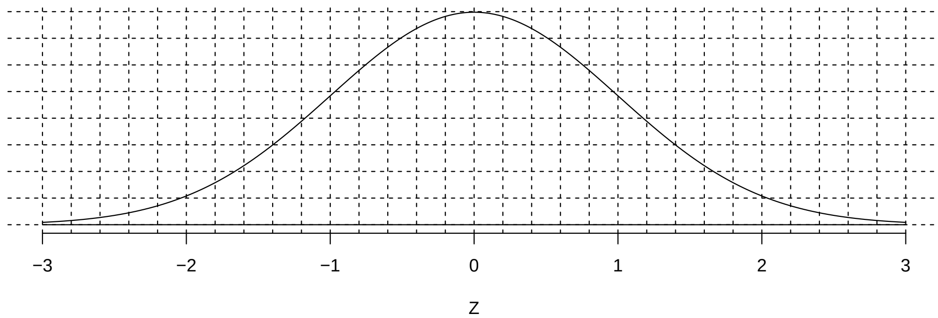
(a) The shaded regions are shown below.



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

(b) The probability is 0.8415.

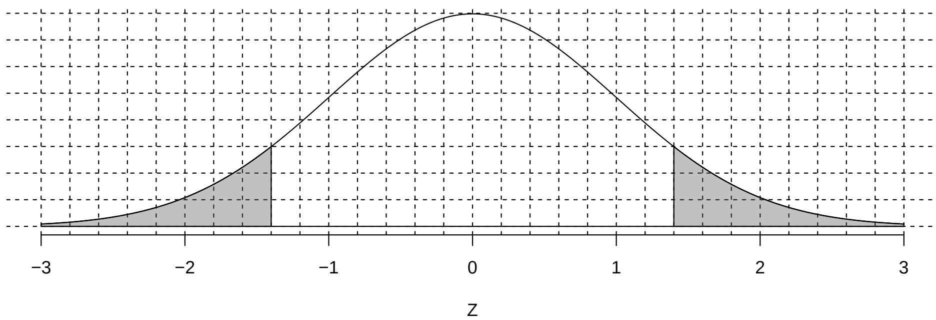
17. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(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.

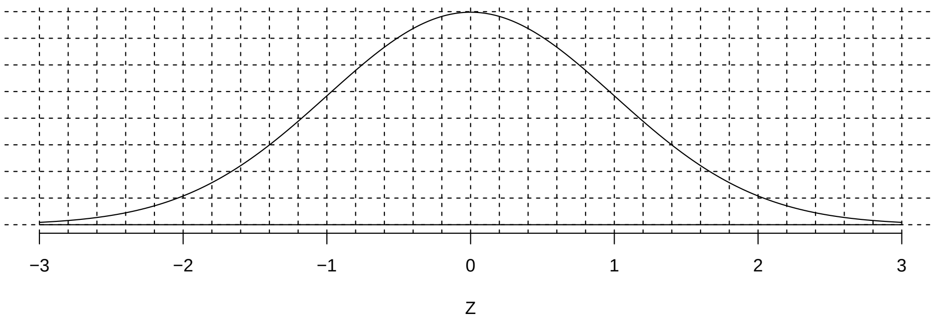
(b) Each tail has half the two-tail area. So each tail has an area of 0.08. We can find the z score with this left area...

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

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

$$z = \boxed{1.41}$$

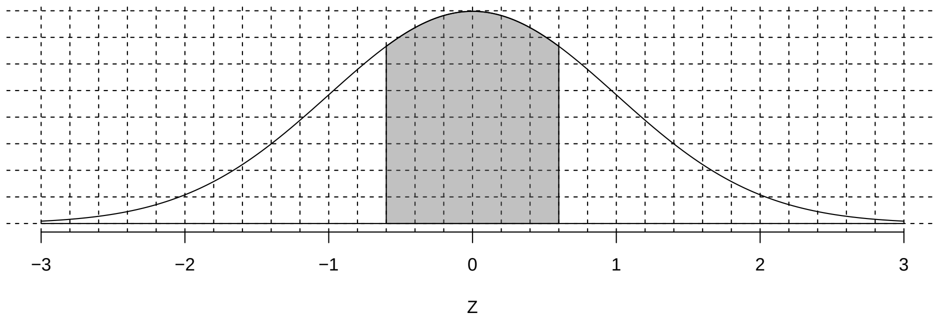
18. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(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:

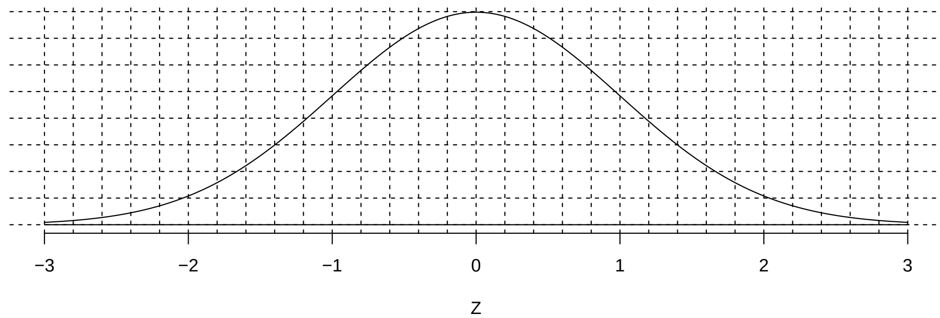
(a) The shaded region is shown below.



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

(b) $z = 0.6$

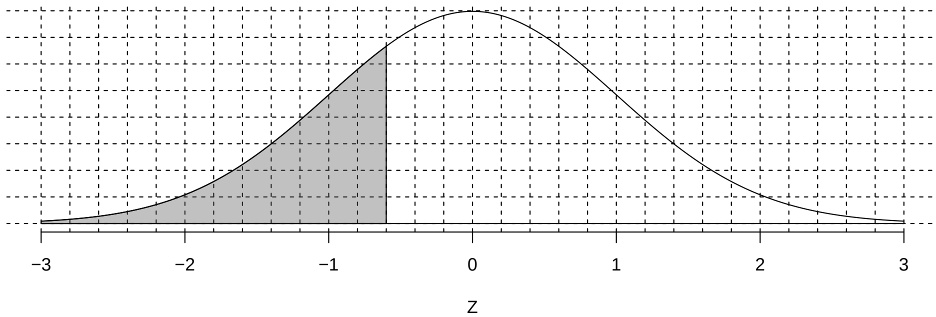
19. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



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

Solution:

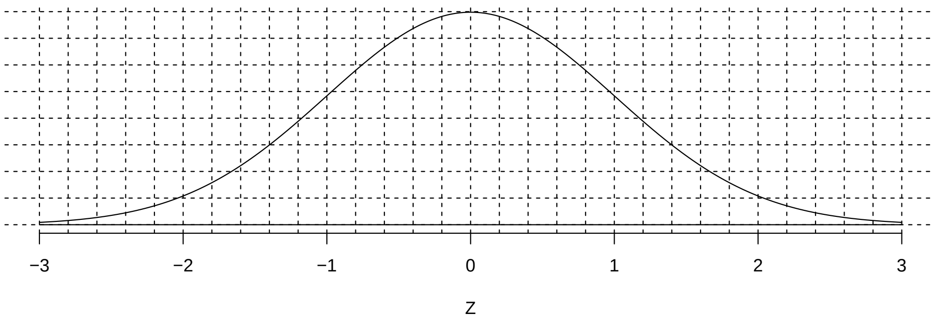
(a) The shaded region is shown below.



You should count about 27 shaded squares, giving a probability of about 0.27.

(b) The probability is 0.2743.

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

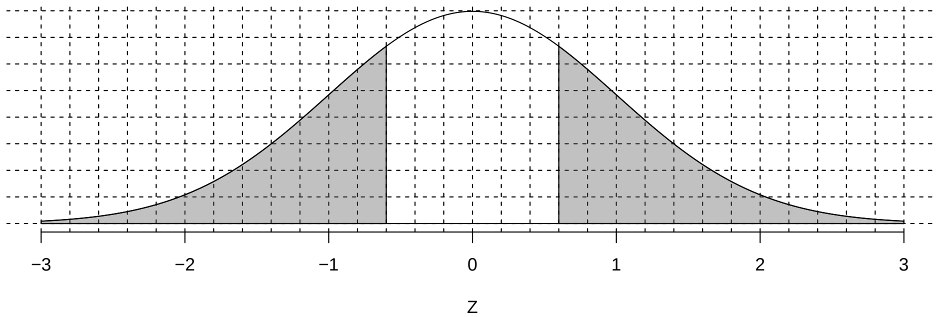


(a) Estimate z such that $P(|Z| > z) = 0.55$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.55$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 55 squares, starting at both tails, you should end near $z = 0.6$. Really, you want to shade 27.5 squares starting from the left and also 27.5 squares starting from the right.

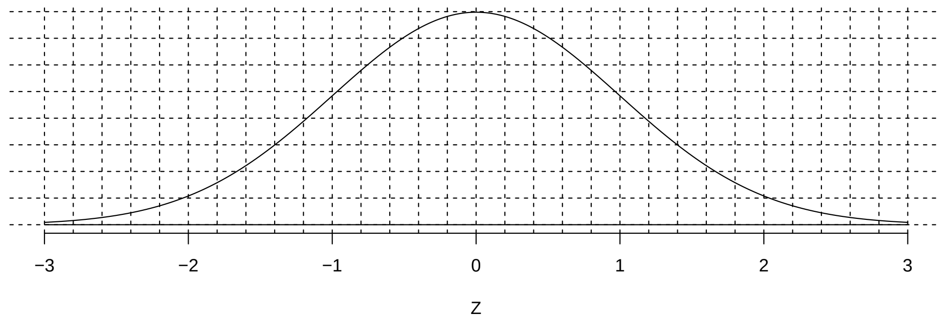
(b) Each tail has half the two-tail area. So each tail has an area of 0.275. We can find the z score with this left area...

$$z_{\text{left tail}} = -0.6$$

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

$$z = \boxed{0.6}$$

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

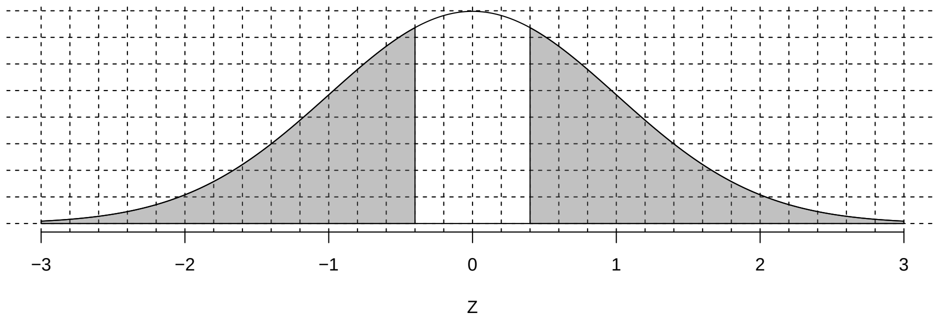


(a) Estimate z such that $P(|Z| > z) = 0.69$ by shading and counting.

(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.

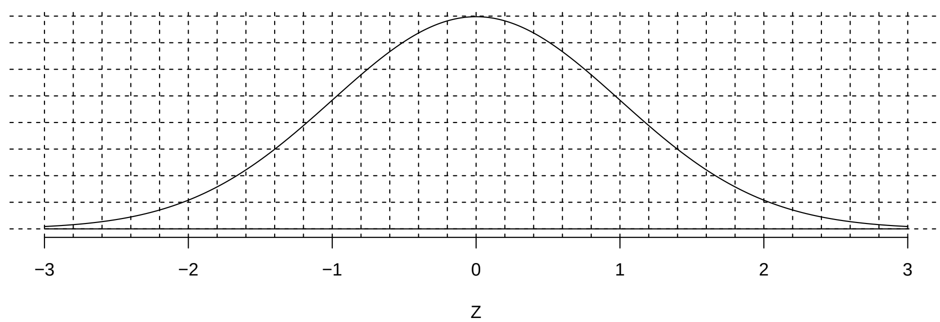
(b) Each tail has half the two-tail area. So each tail has an area of 0.345. We can find the z score with this left area...

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

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

$$z = \boxed{0.4}$$

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

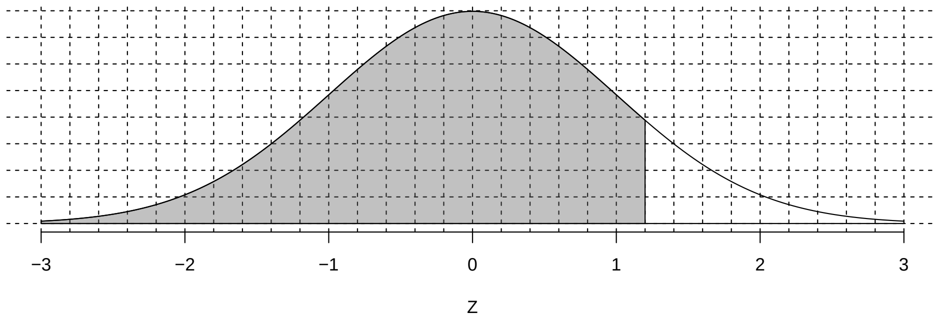


(a) Estimate z such that $P(Z < z) = 0.88$ by shading and counting.

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

Solution:

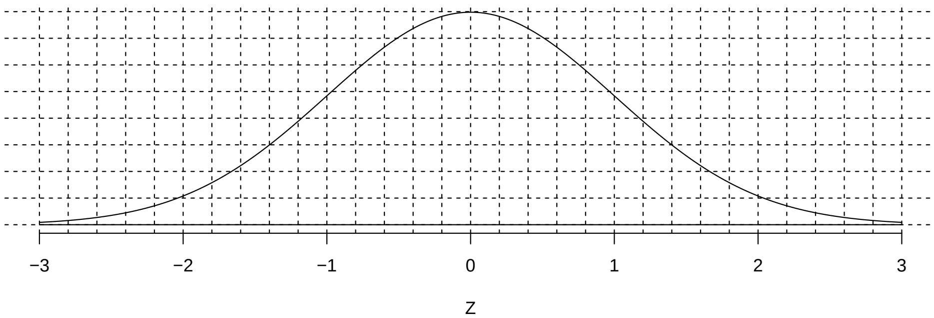
(a) The shaded region is shown below.



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

(b) $z \approx 1.17$

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

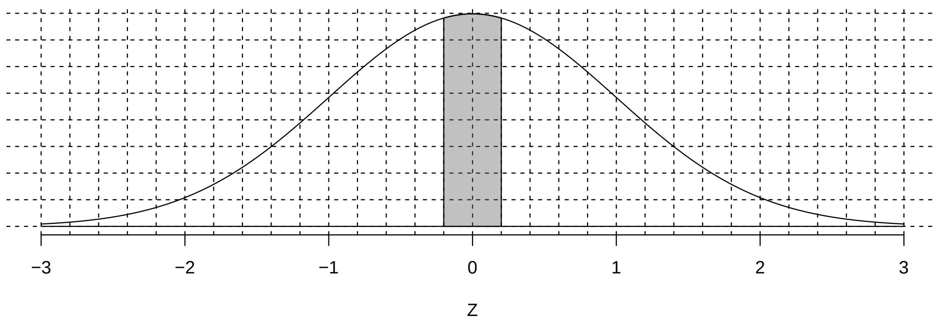


(a) Estimate z such that $P(|Z| < z) = 0.16$ by shading and counting.

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

Solution:

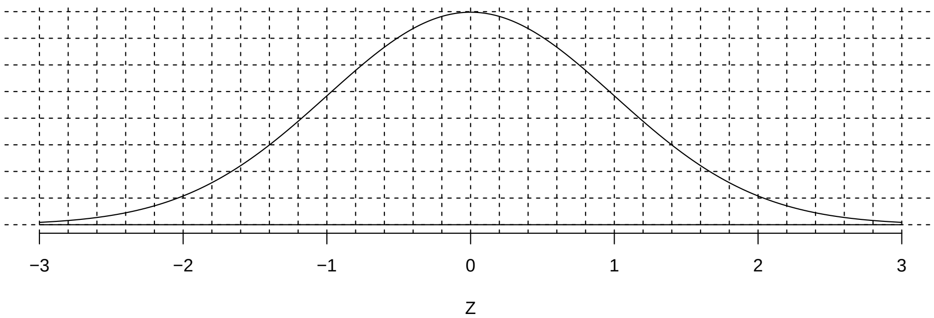
(a) The shaded region is shown below.



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

(b) $z = 0.2$

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

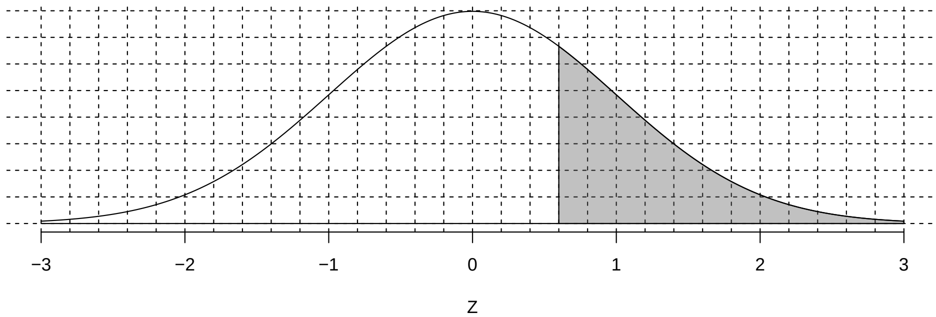


(a) Estimate $P(Z > 0.6)$ by shading and counting.

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

Solution:

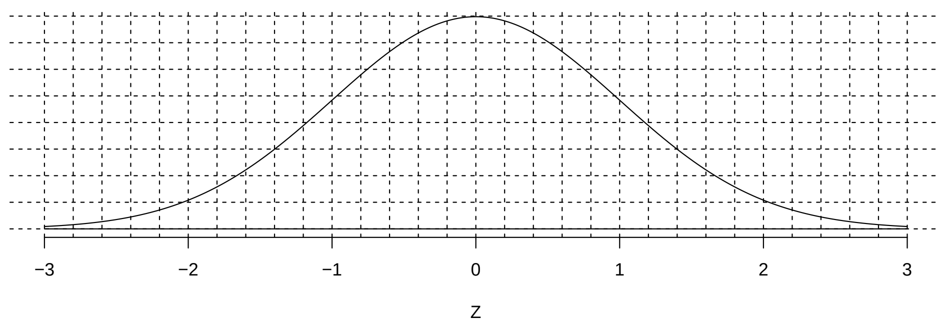
(a) The shaded region is shown below.



You should count about 27 shaded squares, giving a probability of about 0.27.

(b) The probability is 0.2743.

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

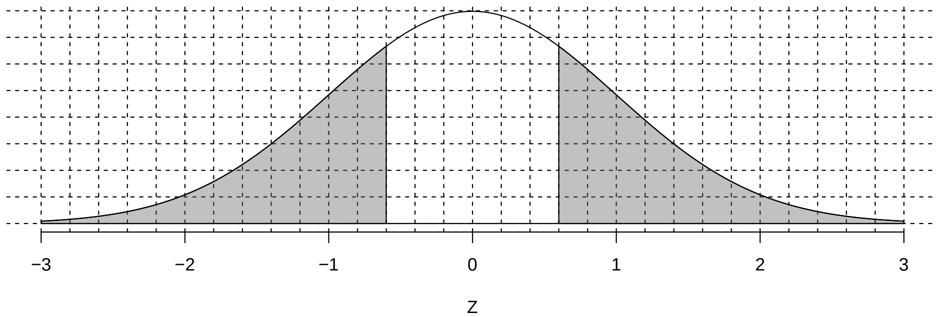


(a) Estimate z such that $P(|Z| > z) = 0.55$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.55$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 55 squares, starting at both tails, you should end near $z = 0.6$. Really, you want to shade 27.5 squares starting from the left and also 27.5 squares starting from the right.

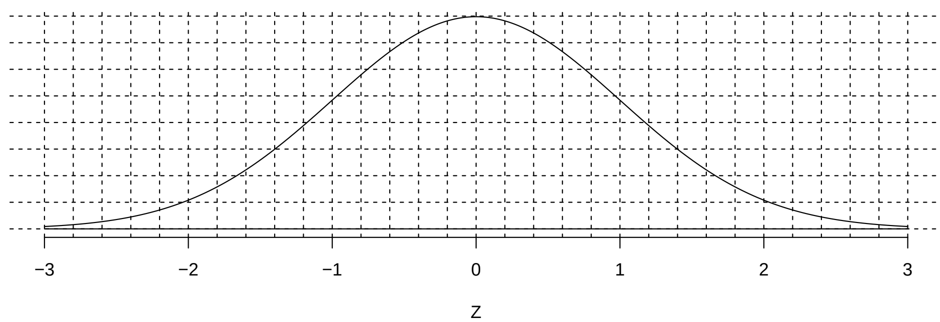
(b) Each tail has half the two-tail area. So each tail has an area of 0.275. We can find the z score with this left area...

$$z_{\text{left tail}} = -0.6$$

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

$$z = \boxed{0.6}$$

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

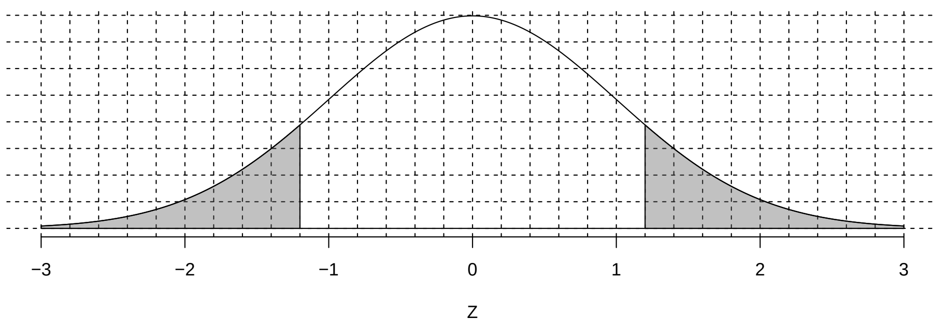


(a) Estimate $P(|Z| > 1.2)$ by shading and counting.

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

Solution:

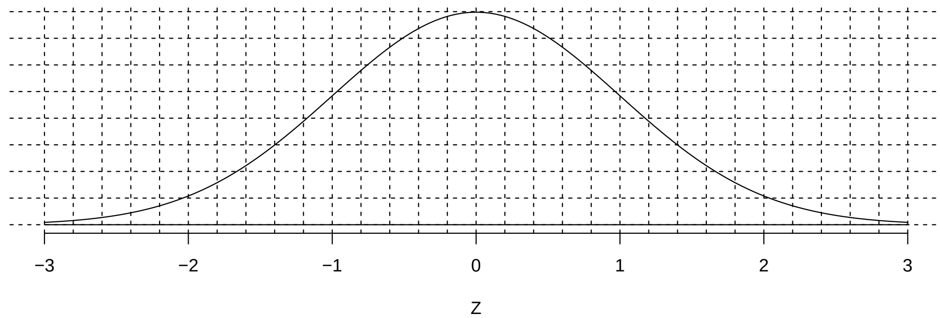
(a) The shaded regions are shown below.



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.

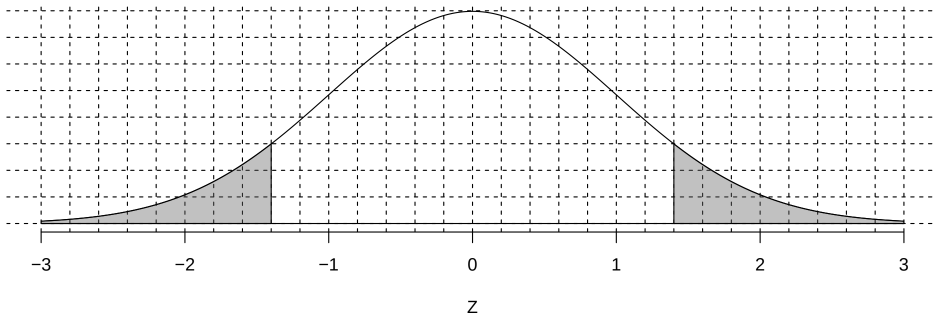


(a) Estimate $P(|Z| > 1.4)$ by shading and counting.

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

Solution:

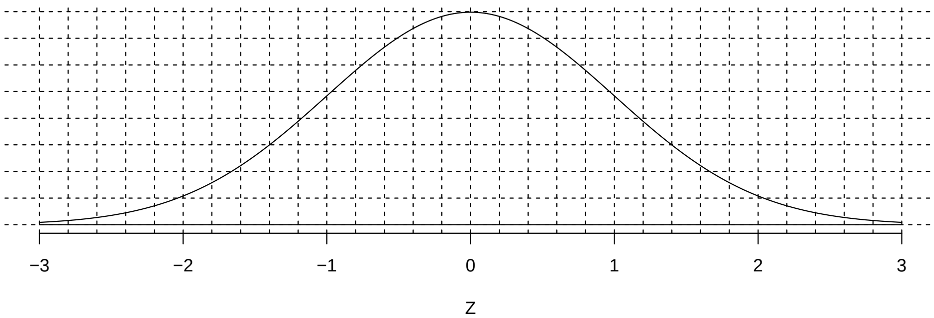
(a) The shaded regions are shown below.



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

(b) The probability is 0.1615.

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

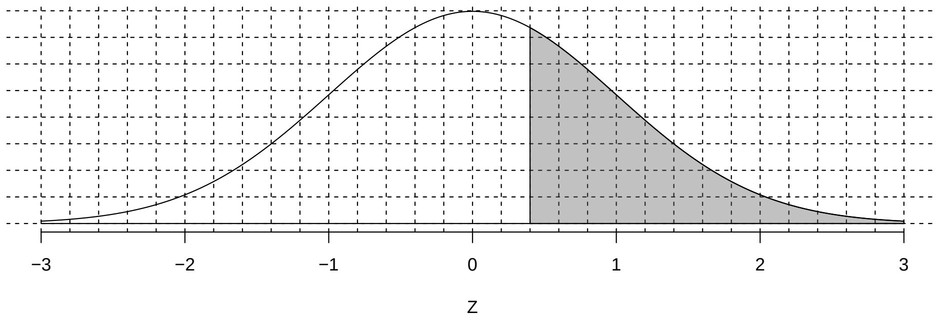


(a) Estimate $P(Z > 0.4)$ by shading and counting.

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

Solution:

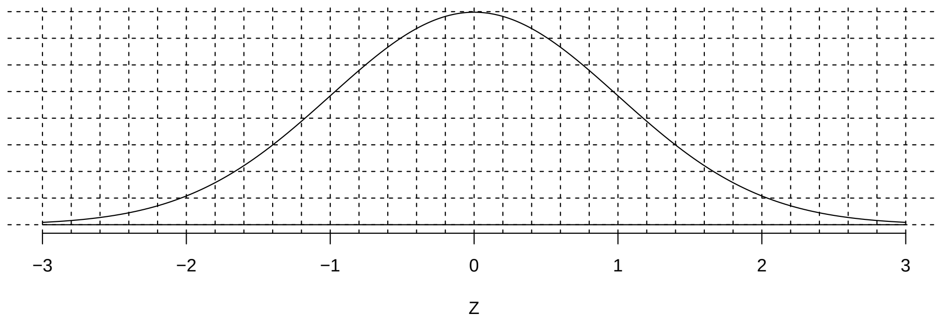
(a) The shaded region is shown below.



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

(b) The probability is 0.3446.

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

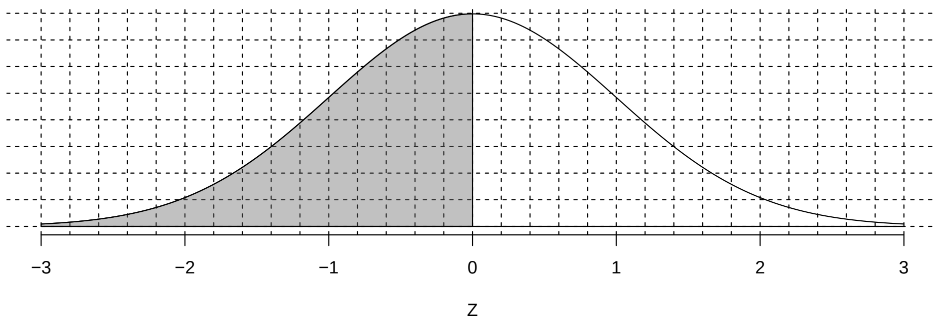


(a) Estimate z such that $P(Z < z) = 0.5$ by shading and counting.

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

Solution:

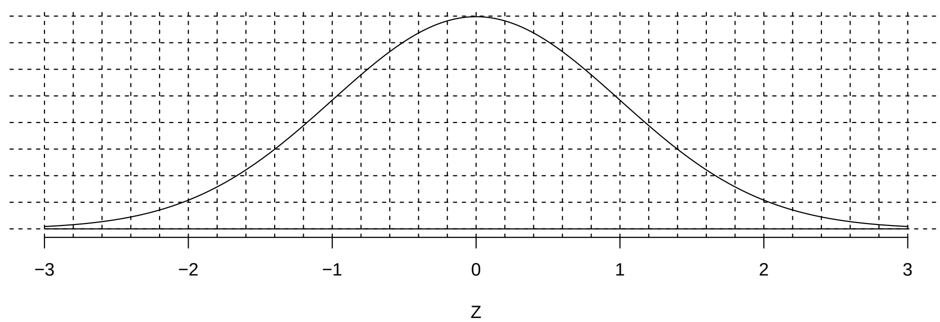
(a) The shaded region is shown below.



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

(b) $z \approx 0$

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

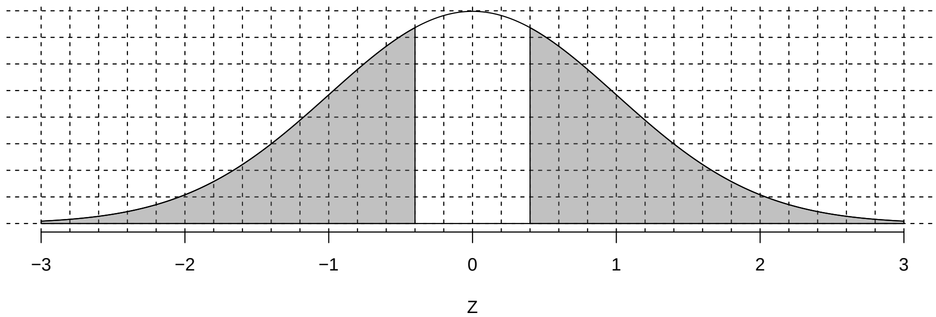


(a) Estimate $P(|Z| > 0.4)$ by shading and counting.

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

Solution:

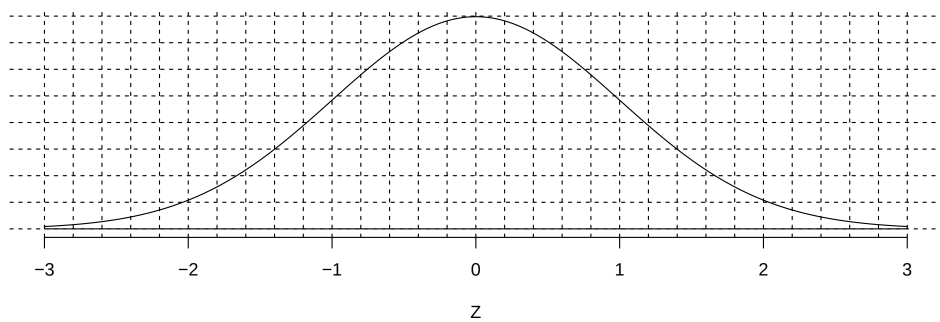
(a) The shaded regions are shown below.



You should count about 69 shaded squares, giving a probability of about 0.69.

(b) The probability is 0.6892.

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

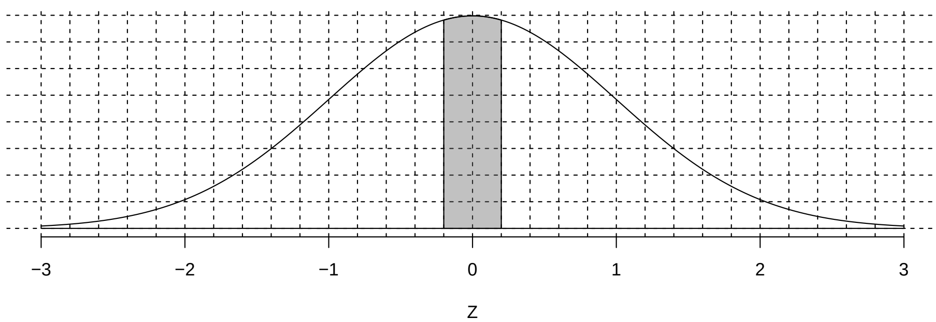


(a) Estimate z such that $P(|Z| < z) = 0.16$ by shading and counting.

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

Solution:

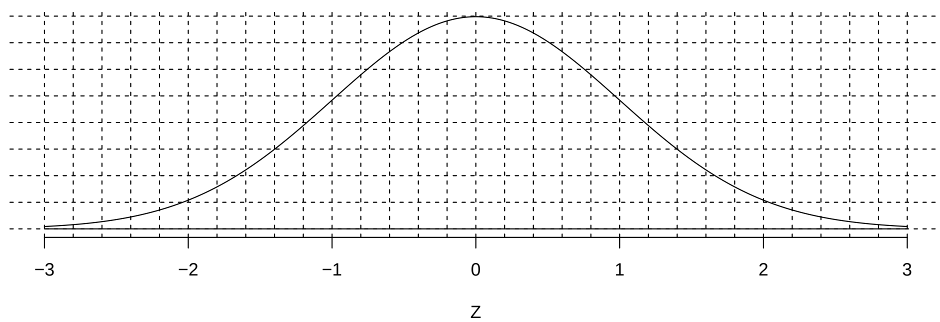
(a) The shaded region is shown below.



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

(b) $z = 0.2$

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

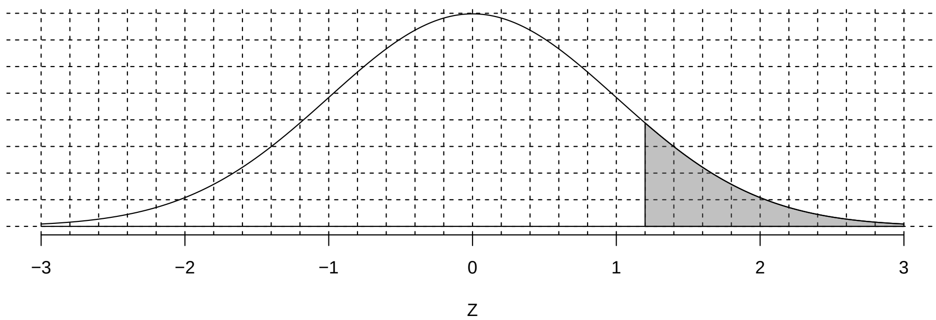


(a) Estimate z such that $P(Z > z) = 0.12$ by shading and counting.

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

Solution:

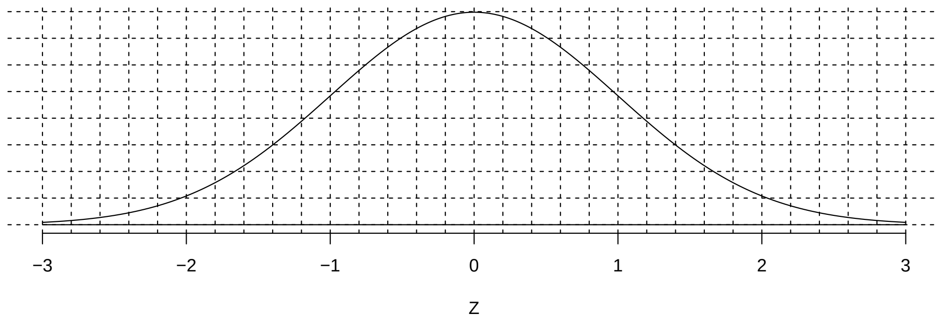
(a) The shaded region is shown below.



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.

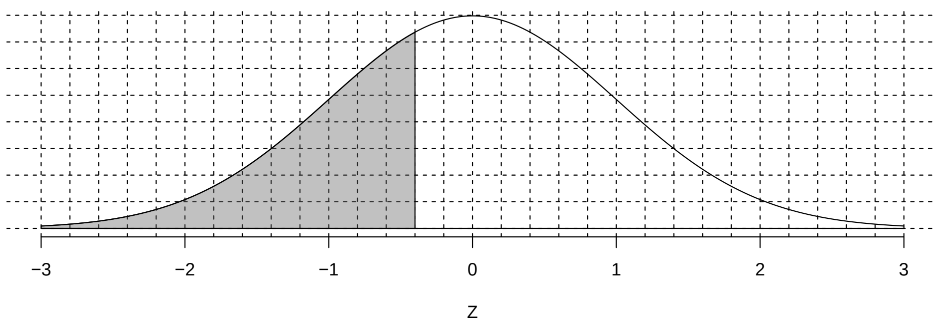


(a) Estimate $P(Z < -0.4)$ by shading and counting.

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

Solution:

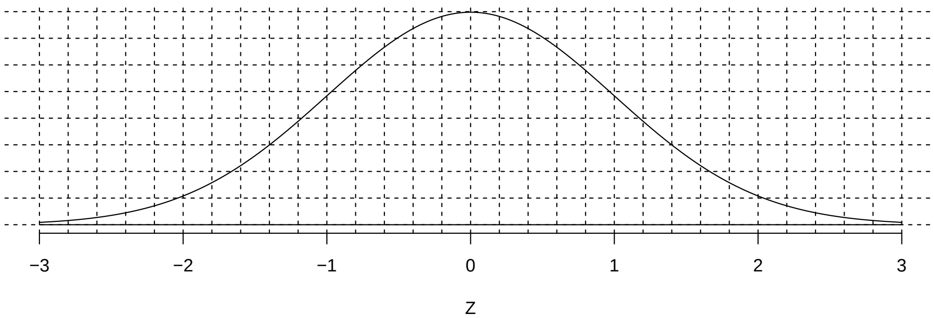
(a) The shaded region is shown below.



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

(b) The probability is 0.3446.

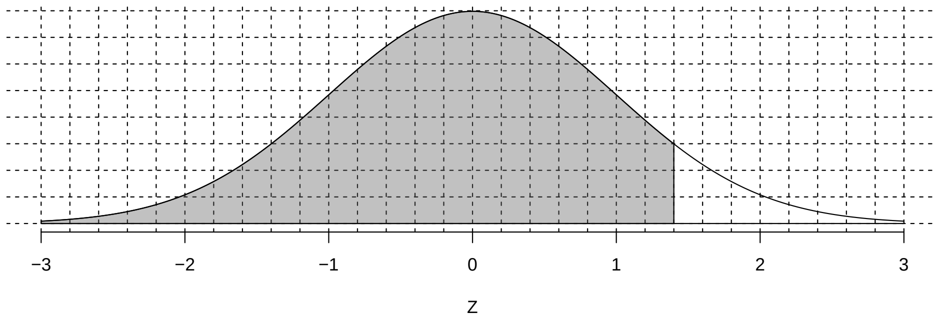
34. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(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:

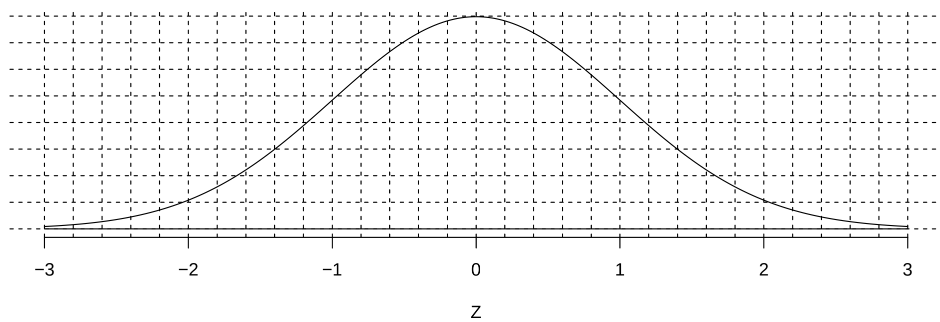
(a) The shaded region is shown below.



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

(b) $z \approx 1.41$

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

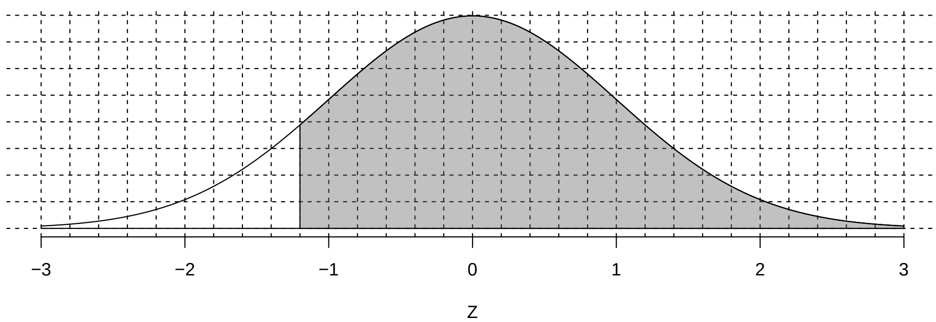


(a) Estimate z such that $P(Z > z) = 0.88$ by shading and counting.

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

Solution:

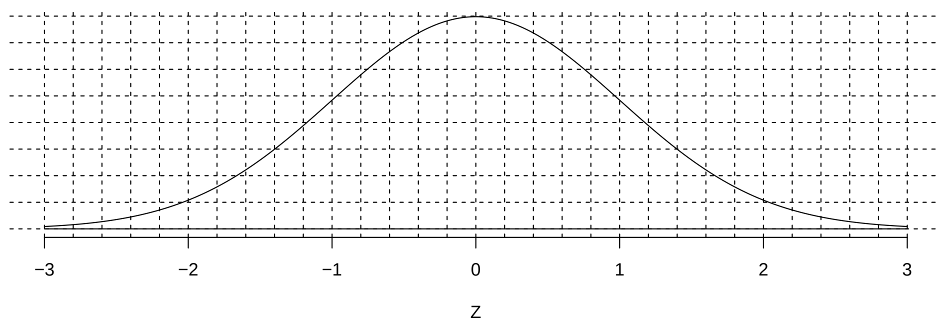
(a) The shaded region is shown below.



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

(b) $z = 1.17$

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

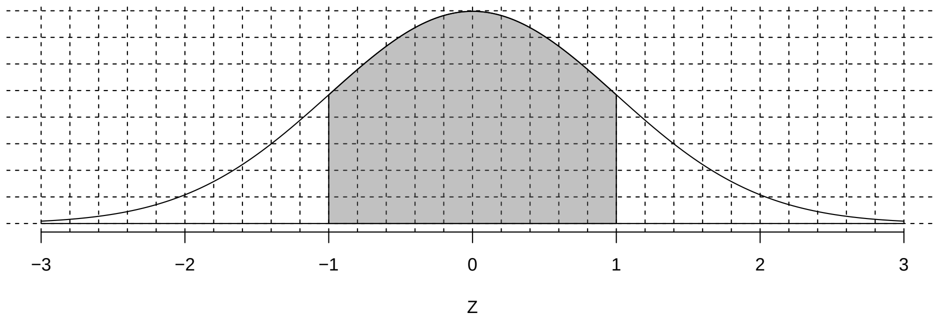


(a) Estimate z such that $P(|Z| < z) = 0.68$ by shading and counting.

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

Solution:

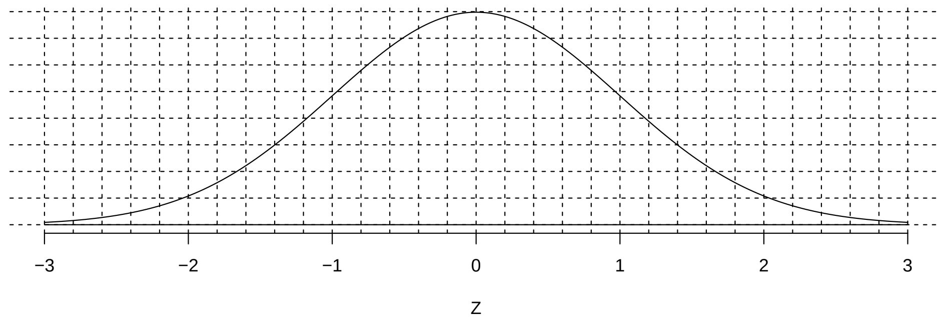
(a) The shaded region is shown below.



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

(b) $z = 0.99$

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

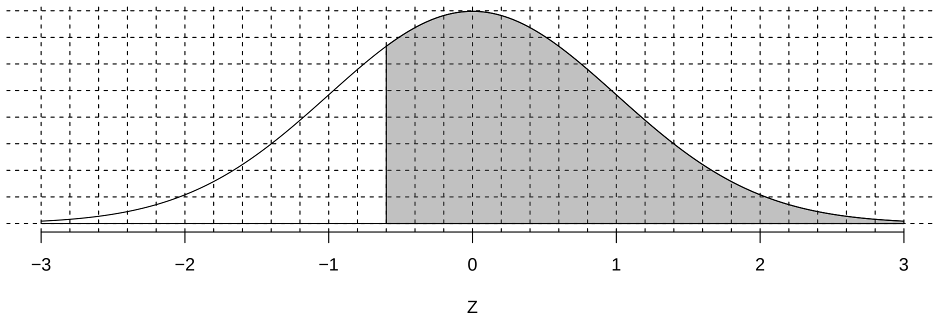


(a) Estimate $P(Z > -0.6)$ by shading and counting.

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

Solution:

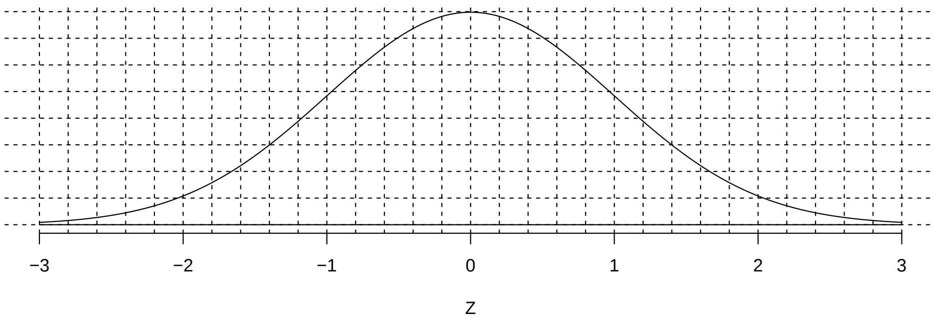
(a) The shaded region is shown below.



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

(b) The probability is 0.7257.

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

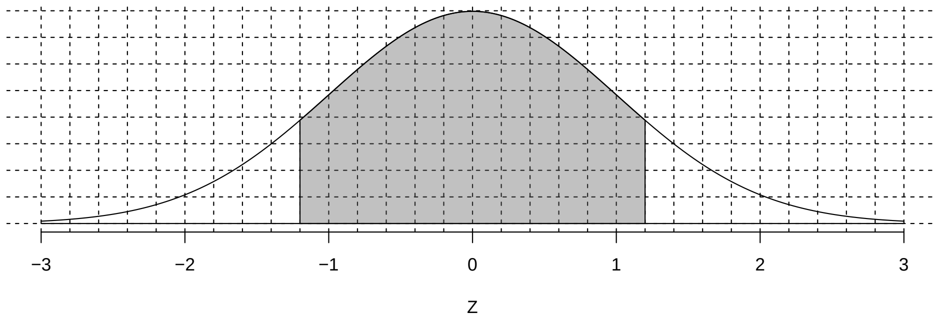


(a) Estimate $P(|Z| < 1.2)$ by shading and counting.

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

Solution:

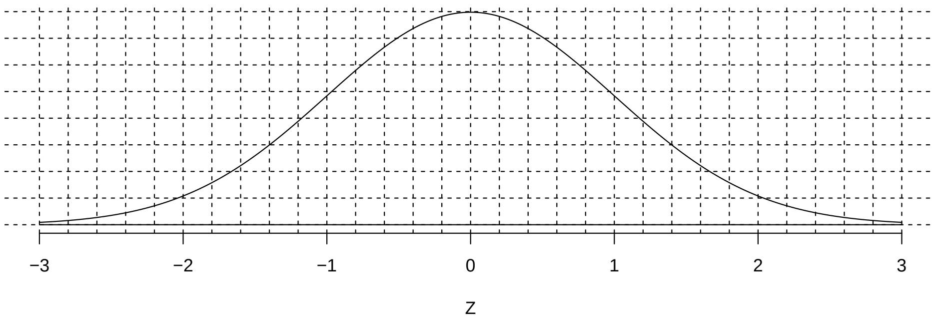
(a) The shaded region is shown below.



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

(b) The probability is 0.7699.

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

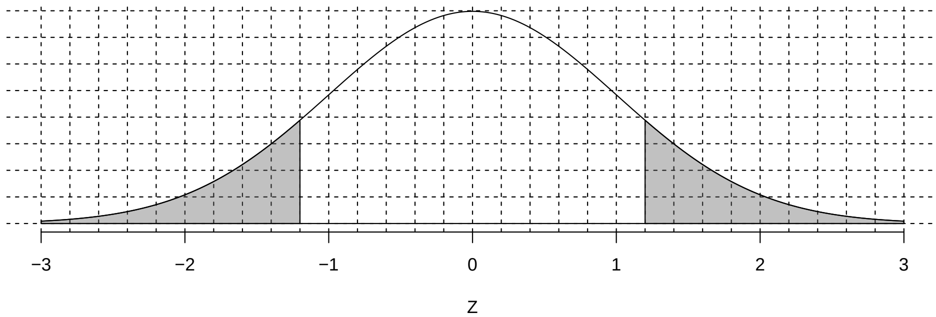


(a) Estimate z such that $P(|Z| > z) = 0.23$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.23$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 23 squares, starting at both tails, you should end near $z = 1.2$. Really, you want to shade 11.5 squares starting from the left and also 11.5 squares starting from the right.

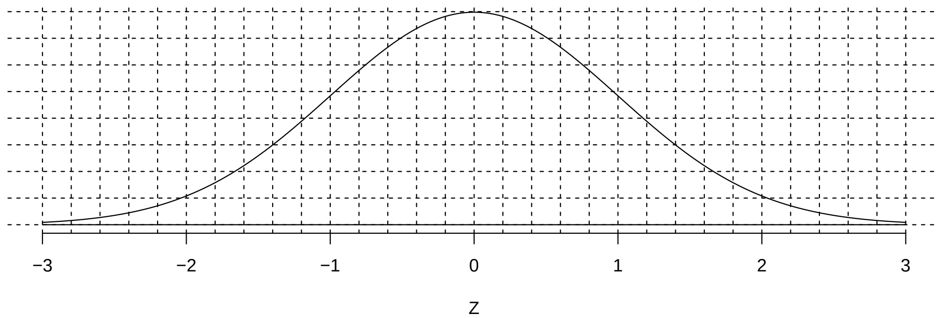
(b) Each tail has half the two-tail area. So each tail has an area of 0.115. We can find the z score with this left area...

$$z_{\text{left tail}} = -1.2$$

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

$$z = \boxed{1.2}$$

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

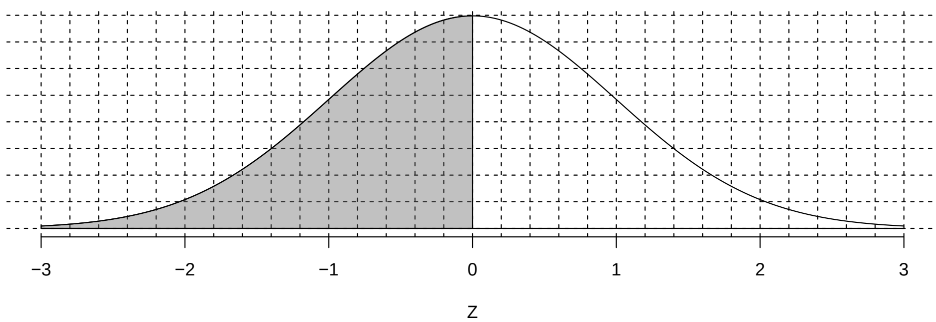


(a) Estimate z such that $P(Z < z) = 0.5$ by shading and counting.

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

Solution:

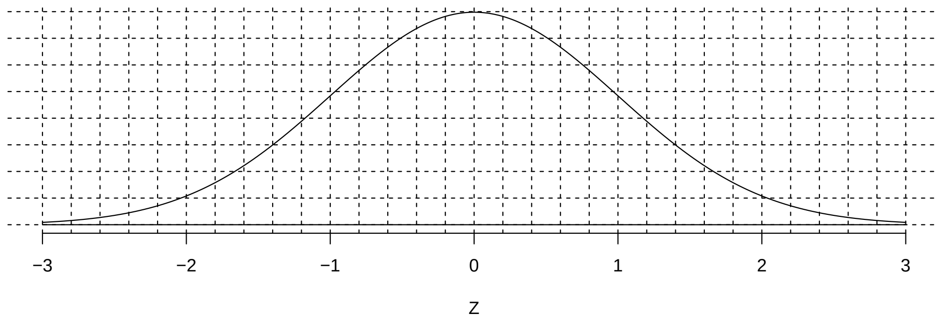
(a) The shaded region is shown below.



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

(b) $z \approx 0$

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

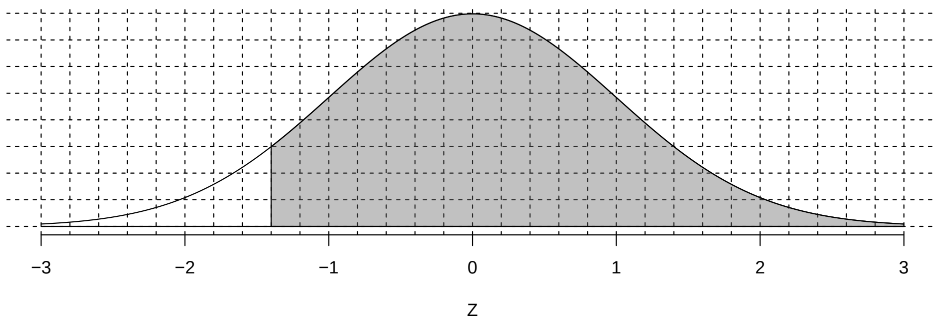


(a) Estimate $P(Z > -1.4)$ by shading and counting.

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

Solution:

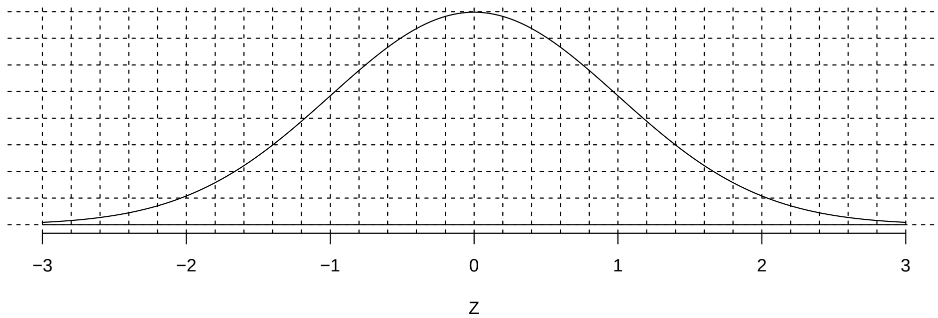
(a) The shaded region is shown below.



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

(b) The probability is 0.9192.

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

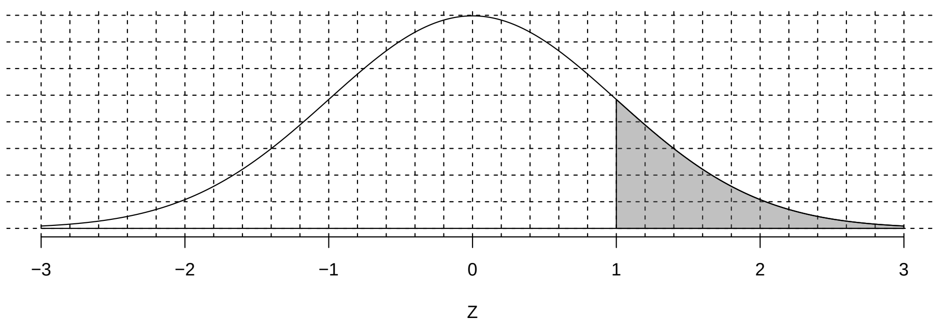


(a) Estimate z such that $P(Z > z) = 0.16$ by shading and counting.

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

Solution:

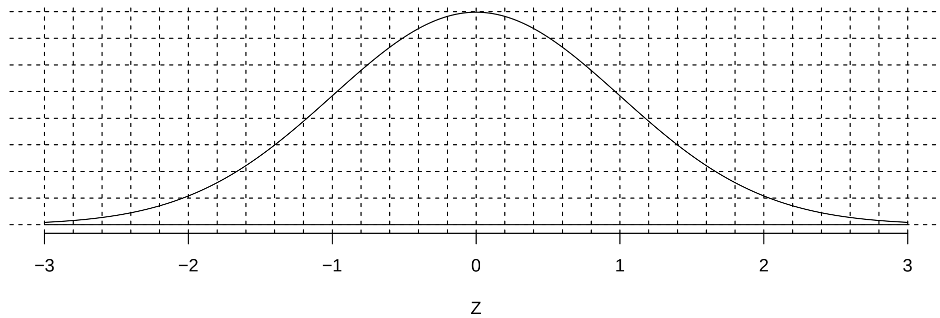
(a) The shaded region is shown below.



When you have shaded 16 squares, starting on the right, you should end around $z = 1$.

(b) $z = -0.99$

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

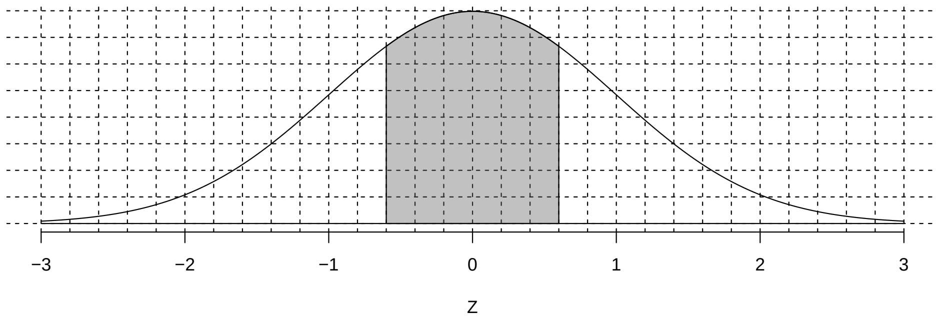


(a) Estimate $P(|Z| < 0.6)$ by shading and counting.

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

Solution:

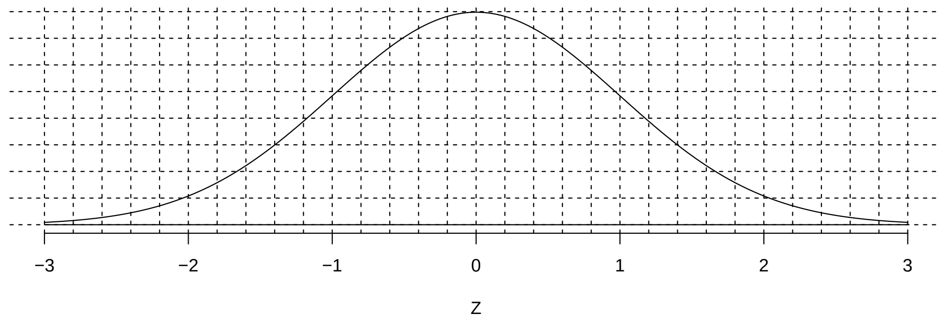
(a) The shaded region is shown below.



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

(b) The probability is 0.4515.

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

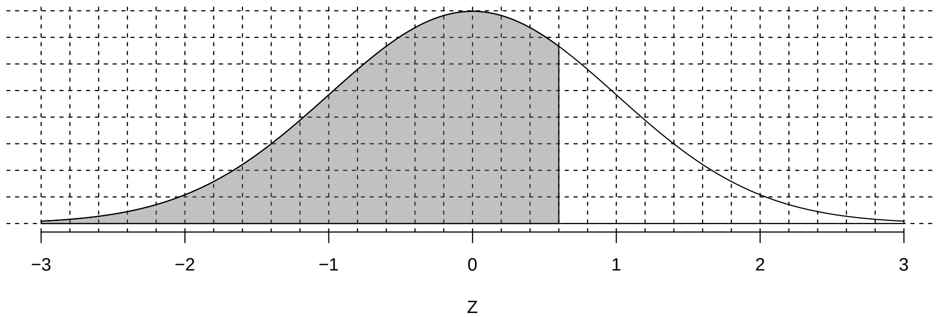


(a) Estimate $P(Z < 0.6)$ by shading and counting.

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

Solution:

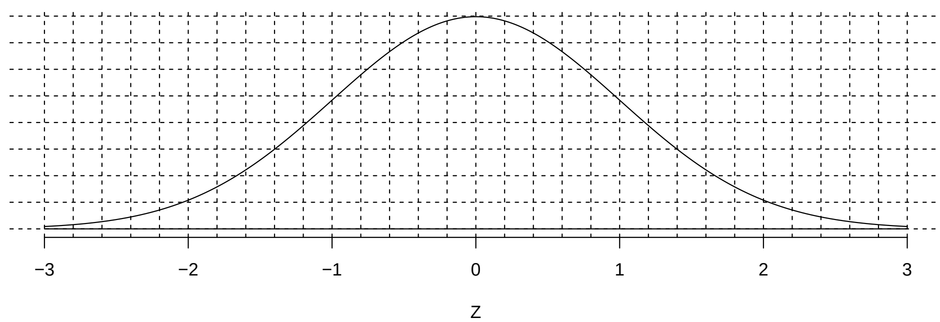
(a) The shaded region is shown below.



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

(b) The probability is 0.7257.

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

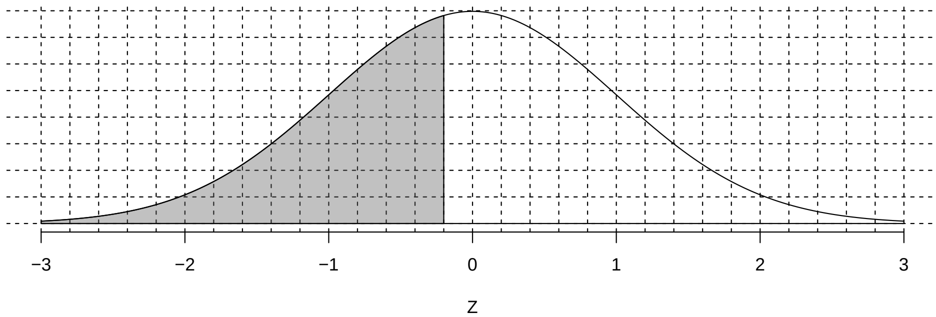


(a) Estimate z such that $P(Z < z) = 0.42$ by shading and counting.

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

Solution:

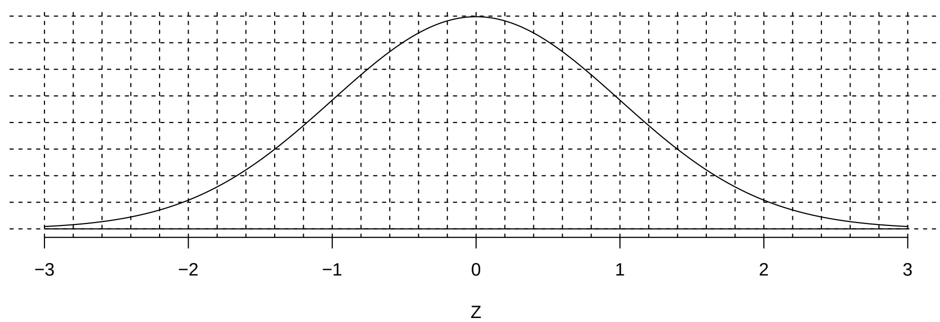
(a) The shaded region is shown below.



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

(b) $z \approx -0.2$

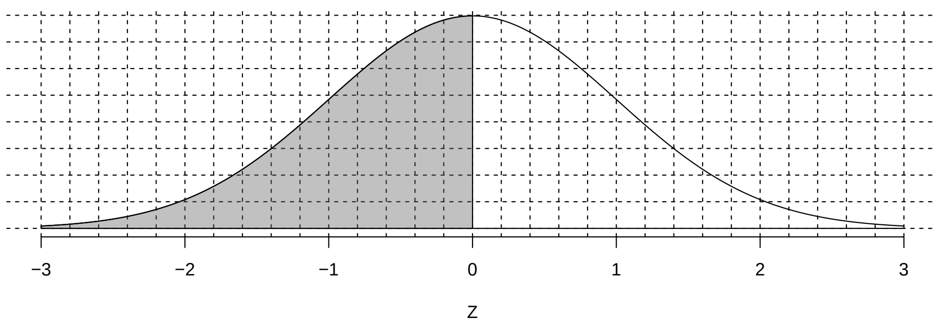
46. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(Z < 0)$ by shading and counting.
(b) Determine $P(Z < 0)$ by using the z-table.

Solution:

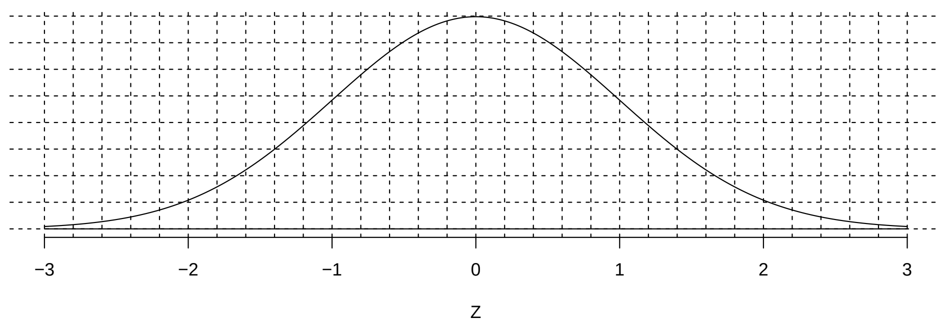
(a) The shaded region is shown below.



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

(b) The probability is 0.5.

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

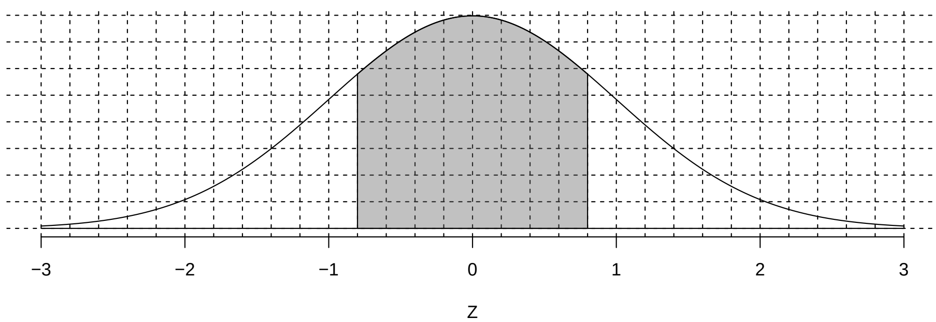


(a) Estimate z such that $P(|Z| < z) = 0.58$ by shading and counting.

(b) Determine z such that $P(|Z| < z) = 0.58$ by using the z-table.

Solution:

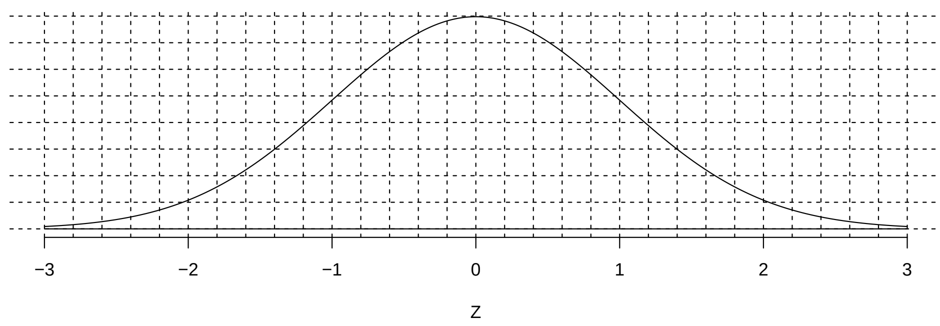
(a) The shaded region is shown below.



When you have shaded 58 squares, starting in the middle, you should end near $z = 0.8$.

(b) $z = 0.81$

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

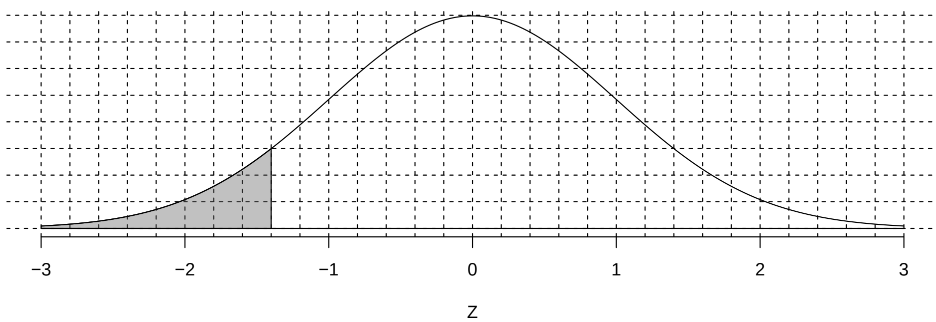


(a) Estimate $P(Z < -1.4)$ by shading and counting.

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

Solution:

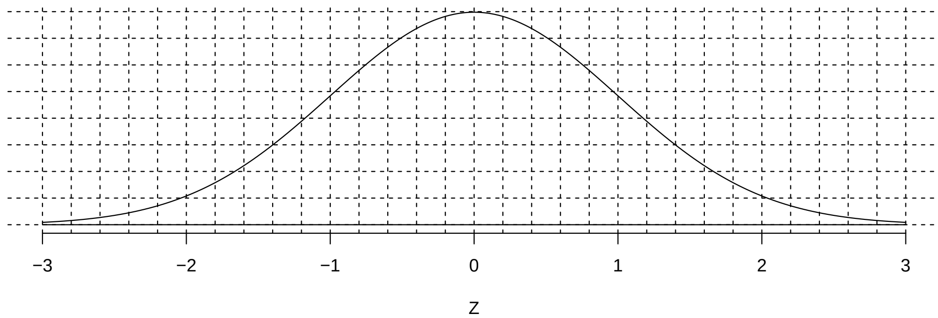
(a) The shaded region is shown below.



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

(b) The probability is 0.0808.

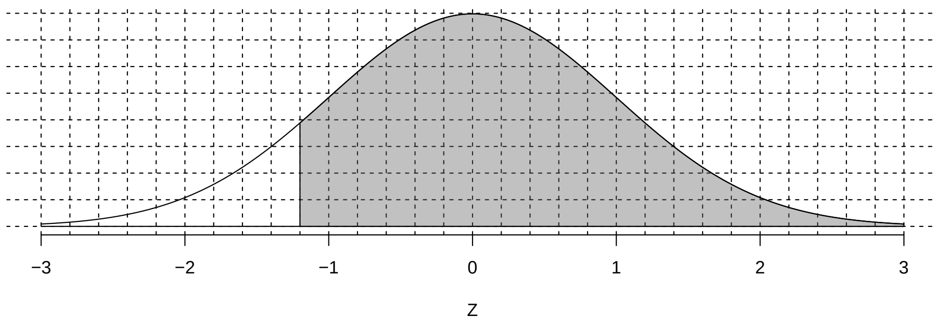
49. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(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:

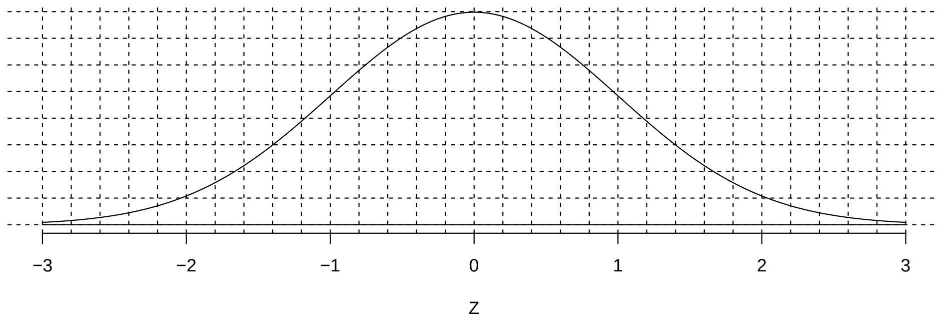
(a) The shaded region is shown below.



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

(b) $z = 1.17$

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

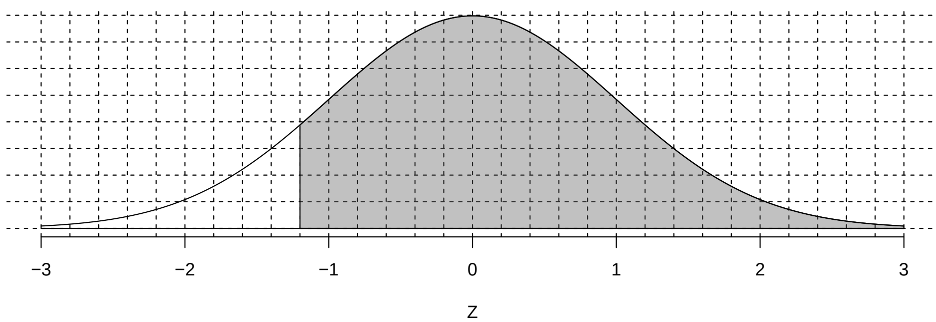


(a) Estimate $P(Z > -1.2)$ by shading and counting.

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

Solution:

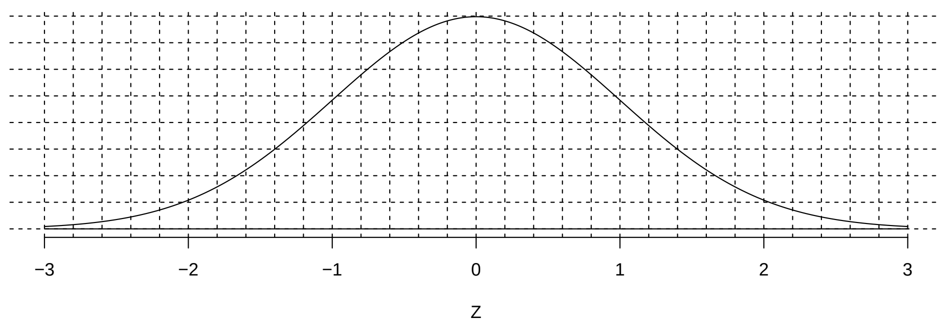
(a) The shaded region is shown below.



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

(b) The probability is 0.8849.

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

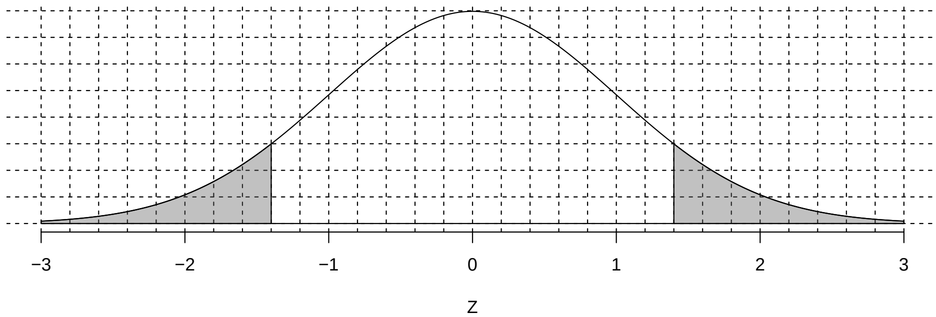


(a) Estimate $P(|Z| > 1.4)$ by shading and counting.

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

Solution:

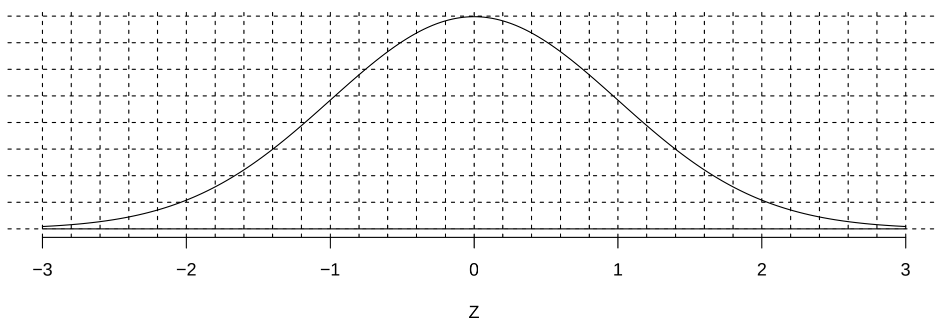
(a) The shaded regions are shown below.



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

(b) The probability is 0.1615.

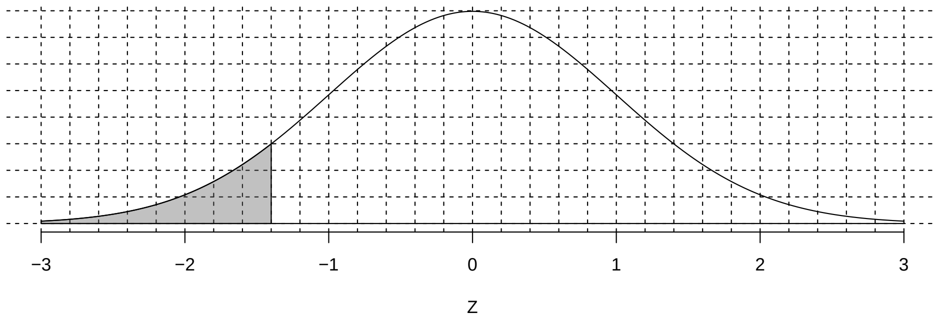
52. **Problem:**
The figure below shows the standard normal density. Each grid square represents 1% of probability.



(a) Estimate $P(Z < -1.4)$ by shading and counting.
(b) Determine $P(Z < -1.4)$ by using the z-table.

Solution:

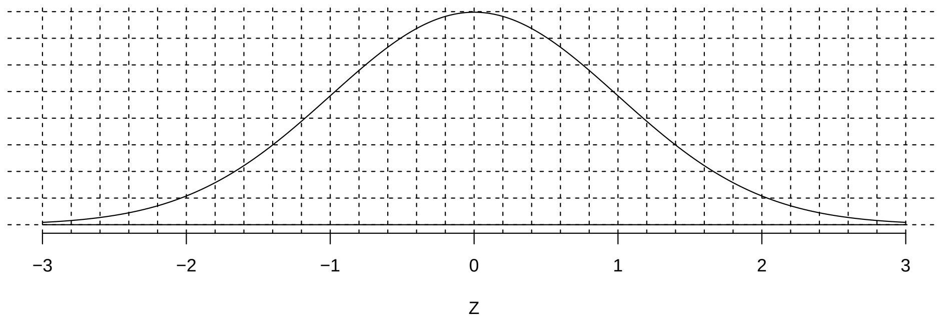
(a) The shaded region is shown below.



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

(b) The probability is 0.0808.

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

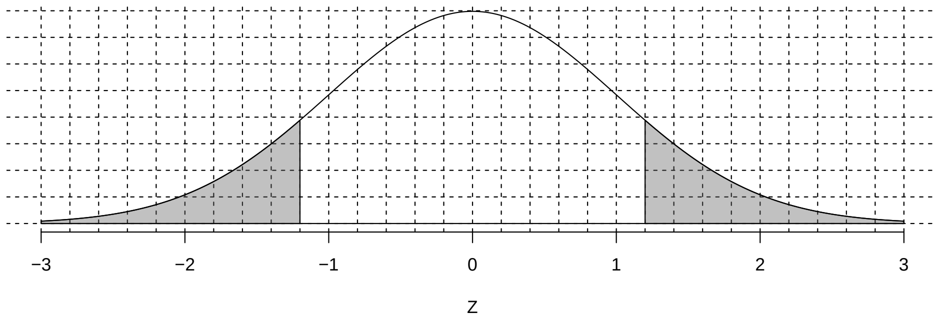


(a) Estimate z such that $P(|Z| > z) = 0.23$ by shading and counting.

(b) Determine z such that $P(|Z| > z) = 0.23$ by using the z-table.

Solution:

(a) The shaded regions are shown below.



When you have shaded 23 squares, starting at both tails, you should end near $z = 1.2$. Really, you want to shade 11.5 squares starting from the left and also 11.5 squares starting from the right.

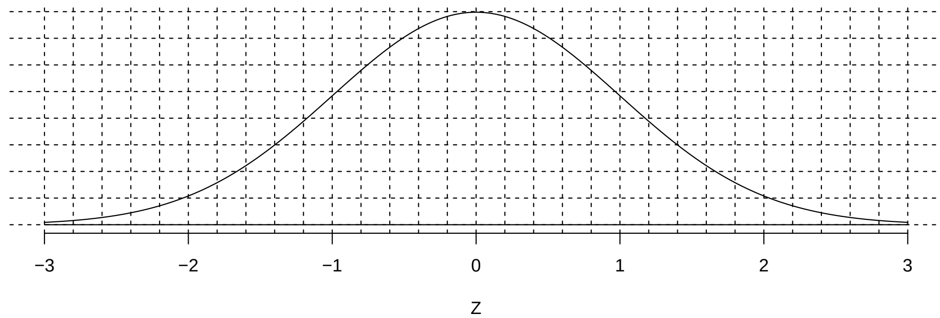
(b) Each tail has half the two-tail area. So each tail has an area of 0.115. We can find the z score with this left area...

$$z_{\text{left tail}} = -1.2$$

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

$$z = \boxed{1.2}$$

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

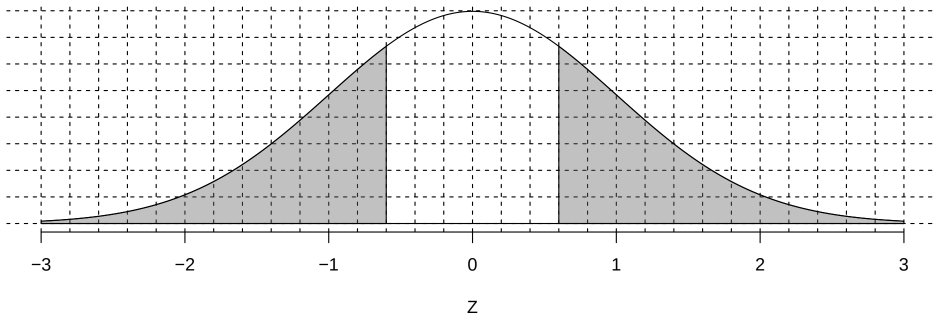


(a) Estimate $P(|Z| > 0.6)$ by shading and counting.

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

Solution:

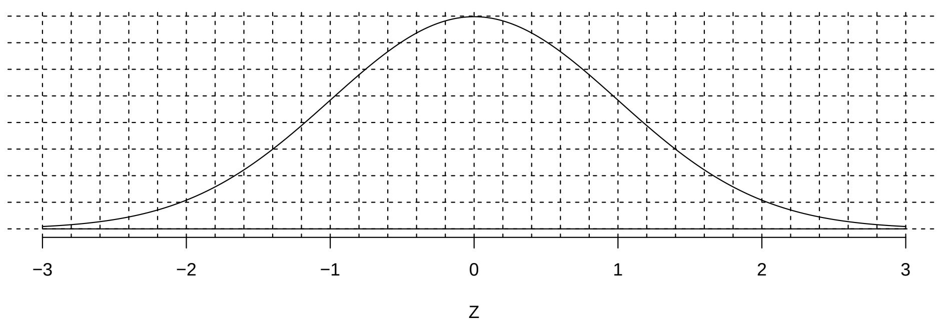
(a) The shaded regions are shown below.



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

(b) The probability is 0.5485.

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

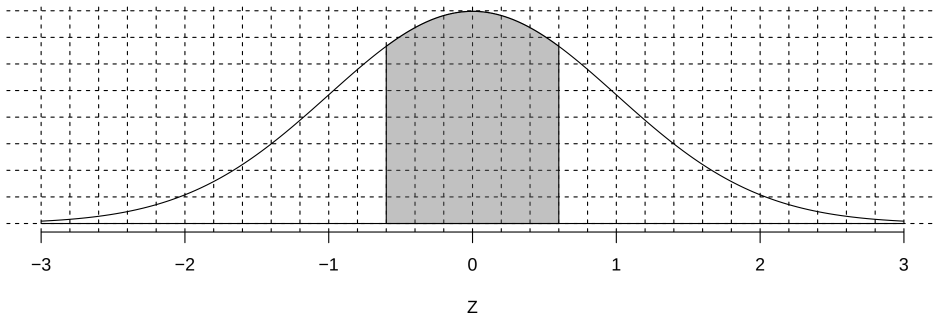


(a) Estimate $P(|Z| < 0.6)$ by shading and counting.

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

Solution:

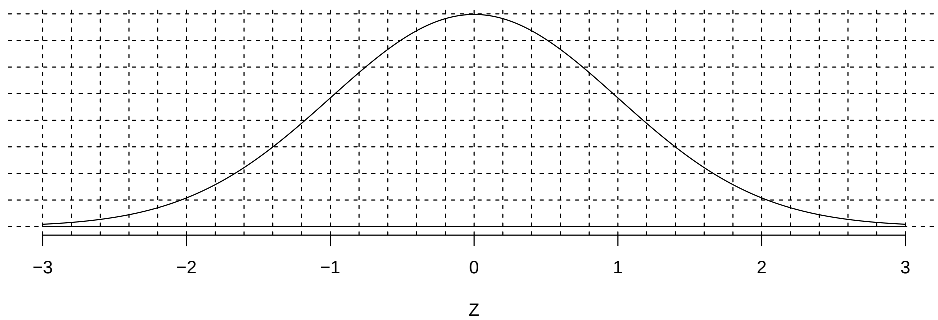
(a) The shaded region is shown below.



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

(b) The probability is 0.4515.

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

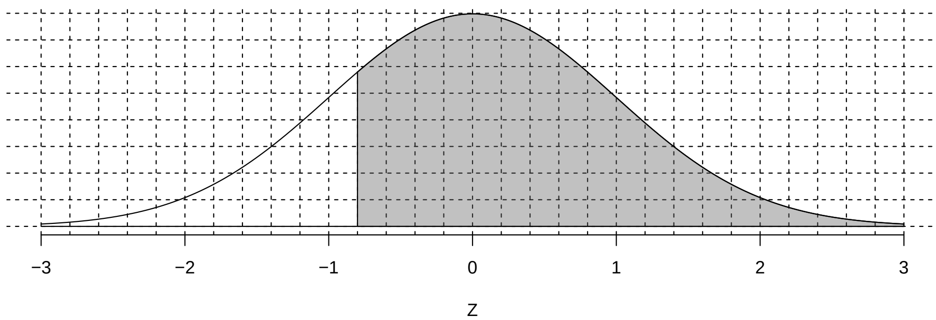


(a) Estimate z such that $P(Z > z) = 0.79$ by shading and counting.

(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) $z = 0.81$