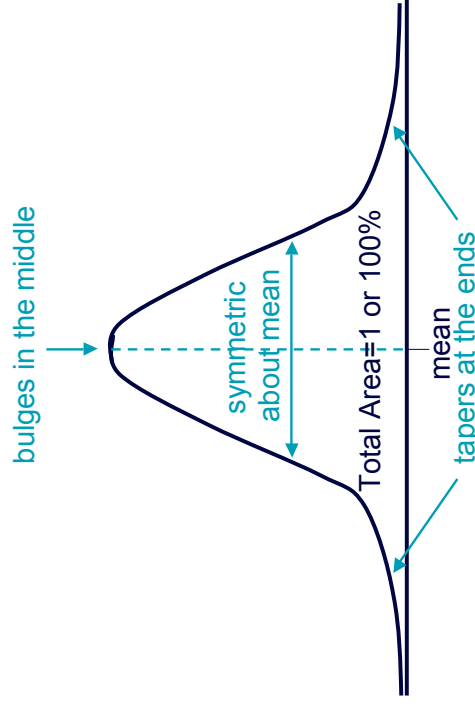


Lecture 11/Review Chapter 8 Normal Practice Exercises

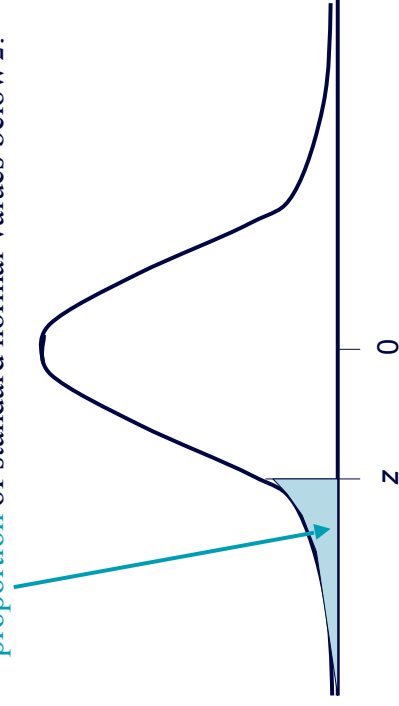
- Strategies to Solve 2 Types of Problem
- Examples

Properties of Normal Curve (Review)



Using Table 8.1 page 157

- For a given standard score z , the table shows the proportion of standard normal values below z .



Standardizing Values of Normal Distribution

Put a value of a normal distribution into perspective by **standardizing** to its z -score:

$$z = \frac{\text{observed value} - \text{mean}}{\text{standard deviation}}$$

If we know the z -score, we can convert back:

$$\text{observed value} = \text{mean} + z \times \text{standard deviation}$$

Strategies for 2 Types of Problem

- A. Given normal value, find proportion or %:
- Calculate $z = (\text{observed-mean})/\text{sd}$ [sign + or -?]
 - Look up proportion in Table [adjust if asked for proportion *above* or *between*, not *below*]
- B. Given proportion or %, find normal value:
- [adjust if asked for proportion *above* or *between*] Locate proportion in Table, find z .
 - Unstandardize: $\text{observed} = \text{mean} + z \times \text{sd}$

SKETCH! We'll assume all examples today follow a normal curve...

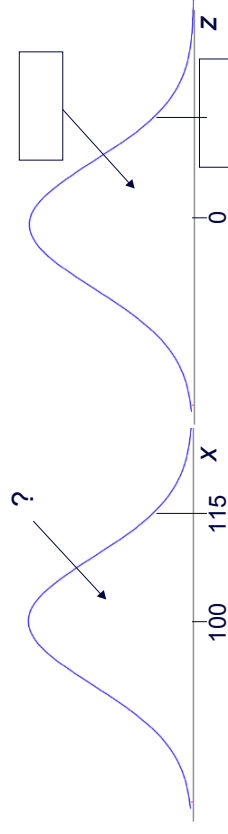
Example: Normal Exercise #1A

- **Background:** Scores x have mean 100 pts, sd 10 pts.
- **Question:** What % are below 115 pts?

□ **Response:**

Table→

Answer: _____ % are below 115 pts.

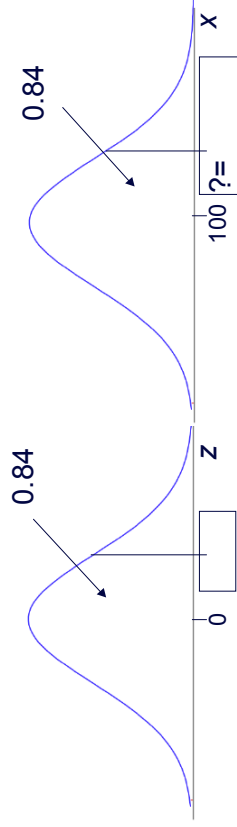


Example: Normal Exercise #1B

- **Background:** Scores x have mean 100 pts, sd 10 pts.
- **Question:** The lowest 84% are below how many pts?
- **Response:** Table→

Unstandardize to $x =$

Answer: The lowest 84% are below _____ pts.



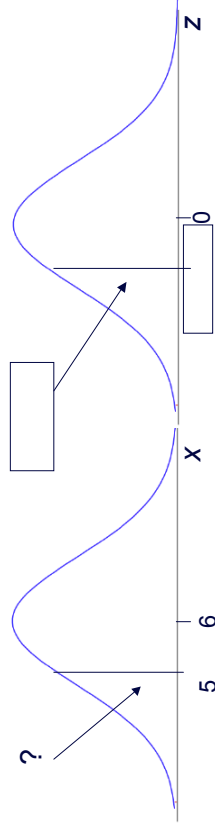
Example: Normal Exercise #2A

- **Background:** Sizes x have mean 6 inches, sd 1.5 inch
- **Question:** What % are below 5 inches?

□ **Response:**

Table→

Answer: _____ % are below 5 inches.



Properties of Normal Curve (Review)

bulges in the middle

We use the fact that

Total Area = 1 to claim

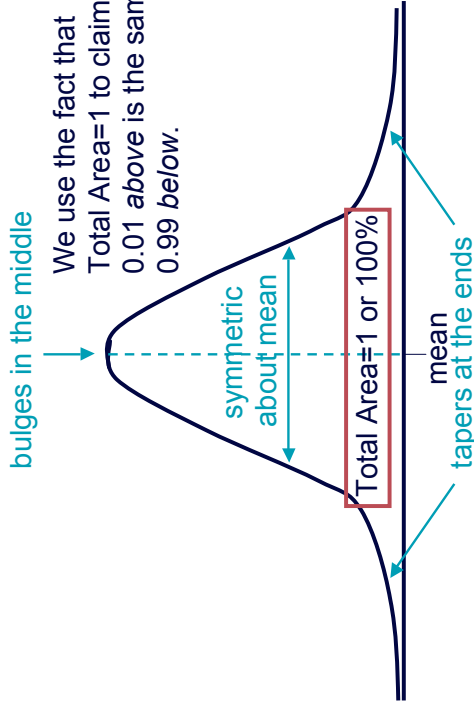
0.01 above is the same as
0.99 below.

symmetric
about mean

Total Area = 1 or 100%

mean

tapers at the ends

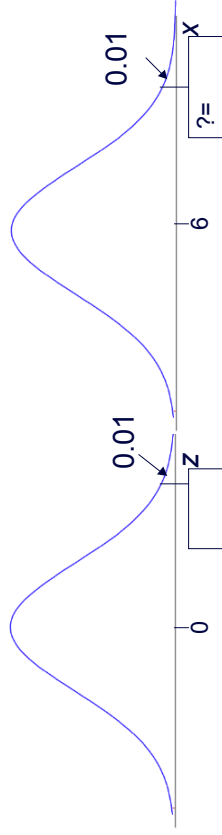


Example: Normal Exercise #2B

- **Background:** Sizes x have mean 6 inches, sd 1.5 inch
- **Question:** The tallest 1% are above how many inches?
- **Response:** 0.01 above ↔

Unstandardize to

Answer: The tallest 1% are above ____ inches.

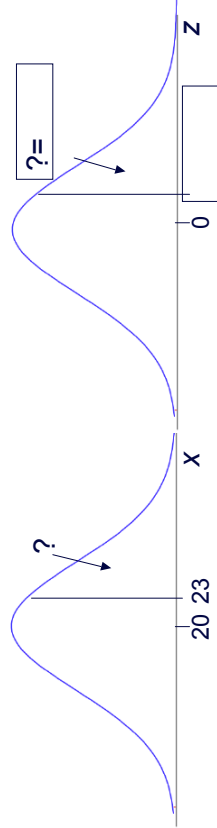


Example: Normal Exercise #3A

- **Background:** No. of cigarettes x has mean 20, sd 6.
- **Question:** What % are more than 23 cigarettes?
- **Response:** $z =$

Table →

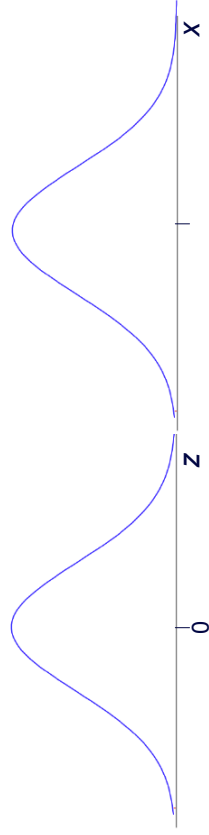
Answer: ____ % are more than 23 cigarettes.



Example: Normal Exercise #3B

- **Background:** No. of cigarettes x has mean 20, sd 6.
- **Question:** 90% are more than how many cigs?
- **Response:**

Answer: 90% are above ____ cigarettes.

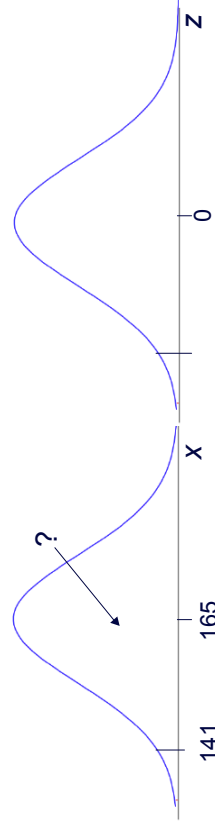


Example: Normal Exercise #4A

- Background:** Wts x have mean 165 lbs, sd 12 lbs.
- Question:** What % are more than 141 lbs?
- Response:** $z =$

Table→

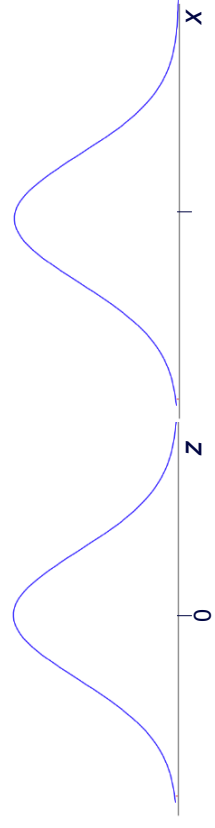
Answer: _____ % are more than 141 lbs.



Example: Normal Exercise #4B

- Background:** Weights x have mean 165 lbs, sd 12 lbs.
- Question:** The lightest 2% are below how many lbs?
- Response:**

Answer: The lightest 2% are below _____ lbs.



Example: Normal Exercise #5

- Background:** No. of people x has mean 4, sd 1.3.
- Question:** What % of the time is x between 2 and 6?
- Response:**

Example: Normal Exercise #6

- Background:** Duration x has mean 11 years, sd 2 years
- Question:** What % of the time is x between 14 and 17?
- Response:**

Example: Normal Exercise #7

- **Background:** Earnings x have mean \$30K, sd \$8K
- **Question:** What % of the time is x bet. \$20K and \$22K?
- **Response:**

“Off the Chart”

For extreme negative z values, proportion below is approx. 0, proportion above is approx. 1.
For extreme positive z values, proportion below is approx. 1, proportion above is approx. 0.

Example: Normal Exercise #8

- **Background:** Amts. x have mean 300 ml, sd 3 ml.
- **Question:** What % of the time is x ...?
- (a) < 280 ml (b) > 280 ml (c) < 315 ml (d) > 315 ml
- **Response:**
- (a)
- (b)
- (c)
- (d)

Example: Normal Exercise #9

- **Background:** Consider Examples 1(b), 4(a).
- **Question:** What does Empirical Rule tell us?
- **Response:**
- 1(b) mean=100, sd=10.
- 4(a) mean=165, sd=12.