

## RECITATION PROBABILITY DISTRIBUTIONS

First:

Collect homework due today.

Handout homework solutions.

Review one or more homework problems, as needed.

Then:

Explain difficult concepts from the lecture and do problems in this set of notes.

Example:

In the following game, there is a one in 4 chance of winning \$80; a one in 4 chance of losing \$100; and a one-half chance of coming out even. How much would you be willing to pay to play?

| $V_i$ (Dollar Value) | $P(V_i)$ |
|----------------------|----------|
| -\$100               | 1/4      |
| 0                    | 1/2      |
| +\$80                | 1/4      |

$$E(V) = -\$5 [-\$100 (1/4) + \$0 (1/2) + \$80 (1/4)]$$

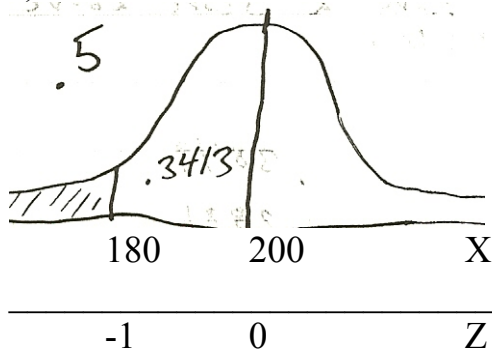
Exercise:

Chains have a mean breaking strength of 200 lbs,  $\sigma=20$  lbs.

(a) What proportion of chains will have a breaking strength below 180 lbs?

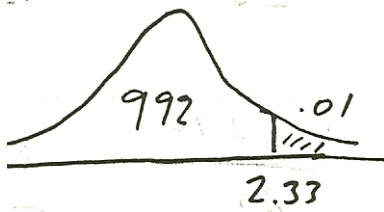
(b) 99% of chains have breaking points below \_\_\_\_\_?

a)



$$Z = \frac{180 - 200}{20} = -1 \quad .5 - .3413 = \boxed{.1587}$$

b)



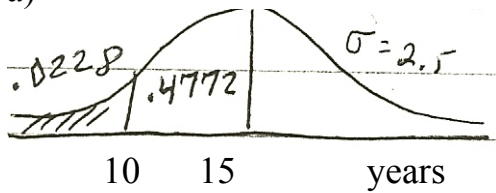
$$2.33 = \frac{X - 200}{20} \quad \text{so} \quad X = 246.60 \text{ lbs.}$$

Exercise:

The average life of a stove manufactured by GE is 15 years with a s.d. of 2.5 years.

- (a) What percentage of stoves will last 10 years or less?
- (b) What percentage of stoves will last 18 years or more?
- (c) Calculate the 1<sup>st</sup> percentile.
- (d) Calculate the 96<sup>th</sup> percentile
- (e) What percentage of stoves will last between 16 and 20 years?

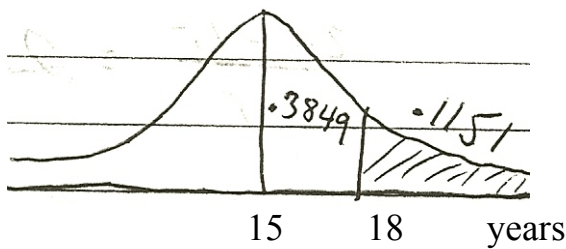
a)



$$Z = (10 - 15) / 2.5 = -2.00$$

$$\text{ANS: } .5 - .4772 = \boxed{.0228}$$

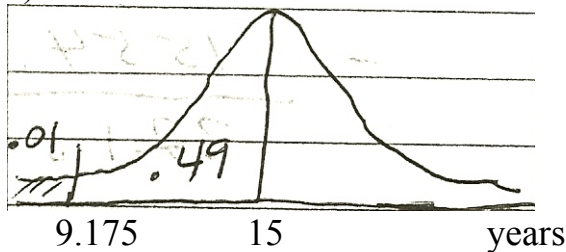
b)



$$Z = (18 - 15) / 2.5 = 1.20$$

$$\text{ANS: } .5 - .3849 = \boxed{.1151}$$

c)

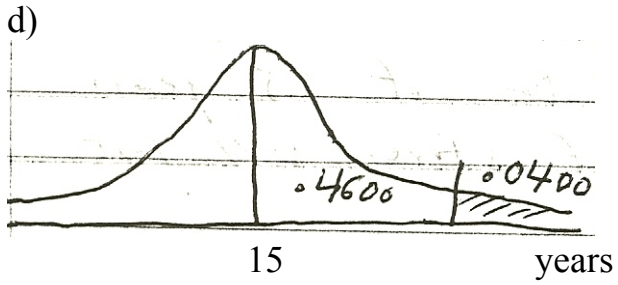


-2.33

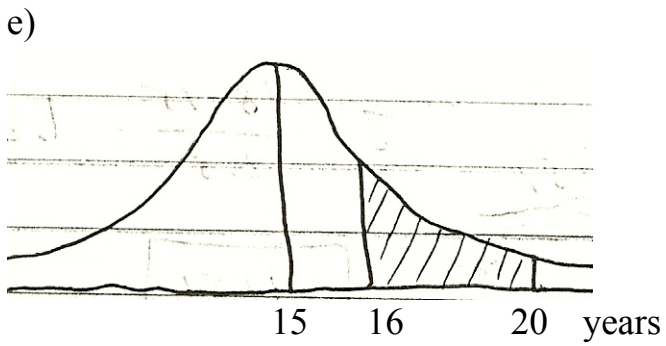
0

Z

$$Z = -2.33 = (X - 15) / 2.5 \quad X = 9.175 \text{ years}$$



$$Z = 1.75 = (X - 15) / 2.5 \quad X = 19.375 \text{ years}$$



$$Z = (20 - 15) / 2.5 = 2.00$$

$$Z = (16 - 15) / 2.5 = 0.40$$

$$.4772 - .1554 = \boxed{.3218}$$