ASSIGNMENT 1

CCS226-18

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2BSCS-1

1. FIND THE PROBABILITY OF GUESSING CORRECTLY AT LEAST 6 OF THE 10 ANSWERS ON A TRUE-FALSE EXAMINATION.

Given:

n = 10

r success = 6

p = 1/2 = 0.5

q = 1/2 = 0.5

$P(r\ success) = C_{n,r}\ p^{r}\ q^{n-r}$

$P(6) = C_{10,6}\ (0.5)^{6}\ (0.5)^{10-6}$

$P(6) = 210\ (0.5)^{6}\ (0.5)^{4}$

$P(6) = 0.2051$

There is a 20.51% chance of guessing 6 correct answers from a 10 item true or false examination.

2. THE PROBABILITY OF WINNING THE PRIZE AT A FAIR IS ONCE IN EACH 8 TRIES, ON THE AVERAGE. DETERMINE THE PROBABILITY OF WINNING 3 PRIZES IN 9 TRIES.

Given:

n = 9

r success = 3

p = 1/8 = 0.125

q = 7/8 = 0.875

$P(r\ success) = C_{n,r}\ p^{r}\ q^{n-r}$

$P(3) = C_{9,3}\ (0.125)^{3}\ (0.875)^{9-3}$

$P(3) = 84\ (0.125)^{3}\ (0.875)^{6}$

$P(3) = 0.0736$

There is a 7.36% chance of winning 3 prizes in 9 tries.

3. IN AN EFFORT TO REDUCE COSTS, A POPULAR FAST-FOOD RESTAURANT EXAMINED THE TENDENCY FOR ITS AUTOMATIC PROCESSORS TO DETERMINE THE WEIGHTS OF HAMBURGERS IN THEIR QUARTER-POUND BURGERS. IT WAS FOUND THAT THE WEIGHTS RANGED FROM 0.2 OUNCES TO 4.9 OUNCES. WHAT PERCENTAGE OF THE BURGERS ARE MORE THAN ONE-QUARTER OF A POUND?

Given:

range = 0.2 – 4.9 ounces

hamburgers weighs quarter-pound

$\mu = 4$ ounces

Getting the standard deviation
(when range is given):

$$\sigma = \frac{max - min}{\mu}$$

$$\sigma = \frac{4.9 - 0.2}{4}$$

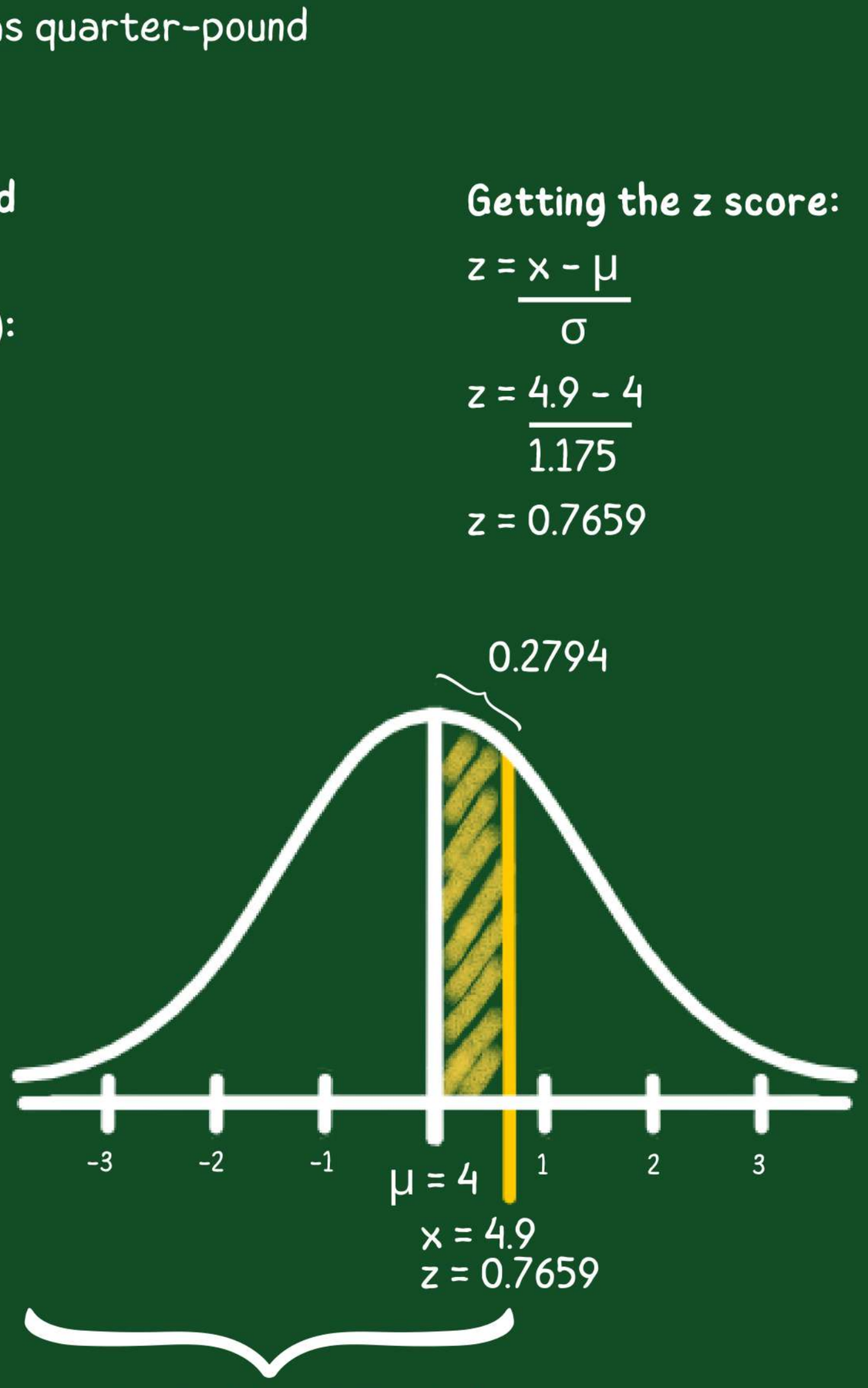
$$\sigma = 1.175$$

Getting the z score:

$$z = \frac{x - \mu}{\sigma}$$

$$z = \frac{4.9 - 4}{1.175}$$

$$z = 0.7659$$



Based on Z table of $P(Z < z)$, the area is **0.7794**

Since we are getting the percentage of burgers of only those greater than 4 ounces...

0.7794 - 0.5 = 0.2794

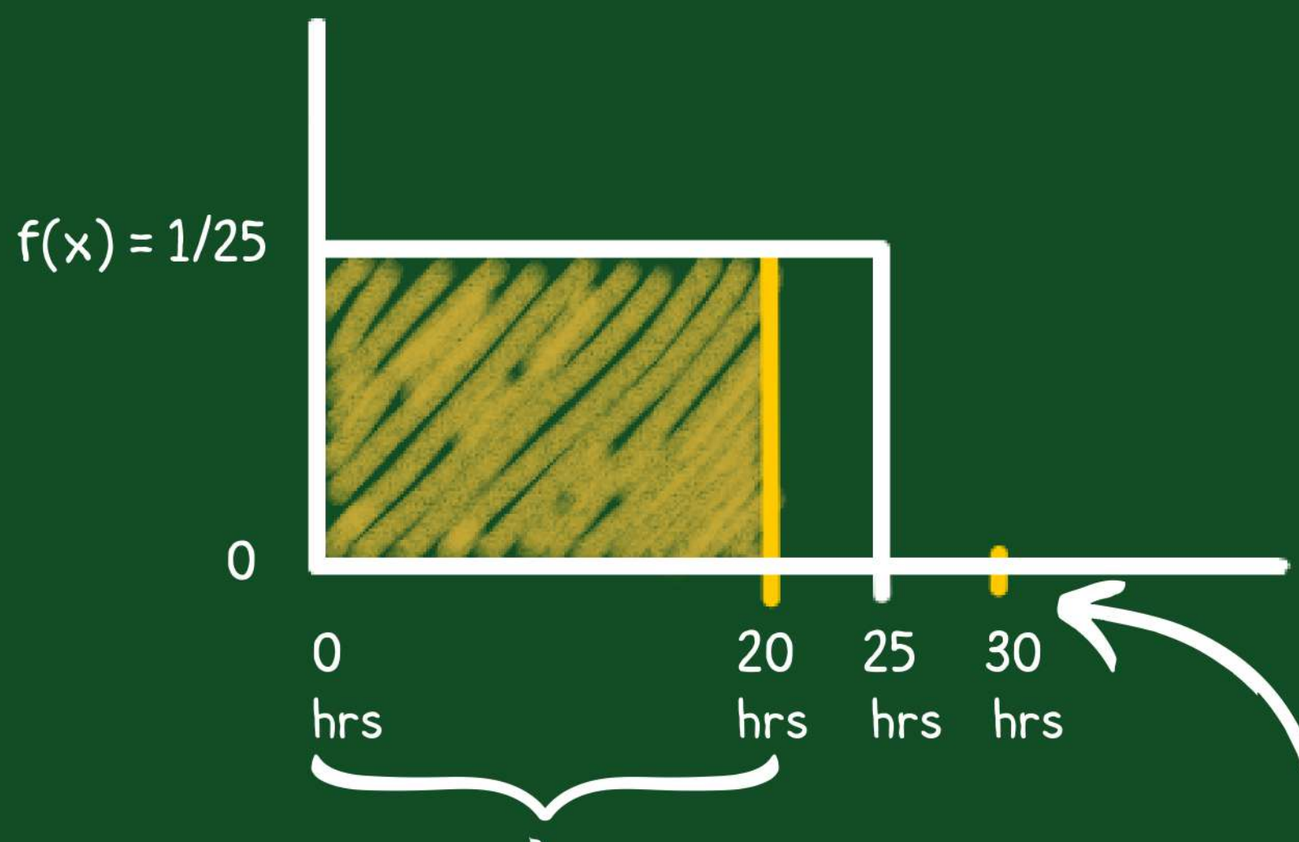
Approximiately 27.94% of the burgers are more than a quarter-pound.

4. BATTERIES PRODUCED BY A CERTAIN COMPANY HAVE A MEAN LIFETIME OF 25 HOURS WHICH IS THE MEAN TIME BETWEEN FAILURES IS 25 HOURS. THE ELECTRONIC TESTING MACHINE FOR THE BATTERIES WAS ASSIGNED BY THE COMPUTER ANALYST WHO IS THE OWNER OF THE COMPANY. THE PURCHASING OFFICER OF THE CUSTOMER COMPANY PURCHASED 1000 OF THESE BATTERIES. WHAT IS THE PROBABILITY THAT A SINGLE BATTERY WILL LAST MORE THAN 30 HOURS? HOW MANY OF THESE BATTERIES WILL LAST AT MOST 20 HOURS?

since the batteries expires within 25 hours and has a mean life time of 25 hrs, we can assume uniform distribution...

$$f(x) = \frac{1}{b - a}$$

$$f(x) = \frac{1}{25 - 0}$$



Based on the data from the graph, there is 0% possibility for a battery to last 30 hrs.

Probability of a battery to last at most 20 hrs is:

$P(X \leqslant 20hrs) = 20 \times (1/25) = 0.8 = 80\%$

Batteries = 1000

$1000 \times 0.8 = 800$ batteries

Therefore, 800 batteries is likely to last at most 20 hours among the 1000 batteries that was bought.