2.1 (Part II) Transforming Data & Density Curves

LINEAR TRANSFORMATIONS OF A DISTRIBUTION:

Ex. 1 The following table gives the base salaries of the 14 members of the LA Lakers for the year 2000.

TABLE 1.8 Year 2000 salaries for the Los Angeles Lakers

Player	Salary	Player	Salary
Shaquille O'Neal	$17.1 million	Ron Harper	$2.1 million
Kobe Bryant	$11.8 million	A. C. Green	$2.0 million
Robert Horry	$5.0 million	Devean George	$1.0 million
Glen Rice	$4.5 million	Brian Shaw	$1.0 million
Derek Fisher	$4.3 million	John Salley	$0.8 million
Rick Fox	$4.2 million	Tyronne Lue	$0.7 million
Travis Knight	$3.1 million	John Celestand	$0.3 million

a) Plot your data.
b) Describe the SOCS — 1 VARSTATS L_1
c) Choose a numerical summary

USE L_1 IN CALC

Skewed Right
Outliers : Shaq, Kobe
Center : Med. 2.6
Spread : 0.3 1 2.6 4.5 17.1
Min Q_1 Med Q_3 max

STORE ON CALC.

$L_1 + 100\,000 \rightarrow L_2$

d) If each player was awarded a $100,000 bonus for winning the NBA Championship, how will this affect the SOCS of the distribution? 1 VAR STATS L_2

Graph moves over

Still skewed
No change to Outliers
Centre : INCREASE by 0.1 (Add)
5 Number all increase by 0.1 ... No overall effect to Spread

e) What if instead each player was awarded a 10% bonus for winning the NBA Championship, how will this affect the SOCS of the distribution? 1 VAR STATS L_3

Graph is stretched

Skewed even more
Still outliers
Center : Multiplied by 1.1
Spread : Multiplied by 1.1

$L_1 \times 1.10 \rightarrow L_3$

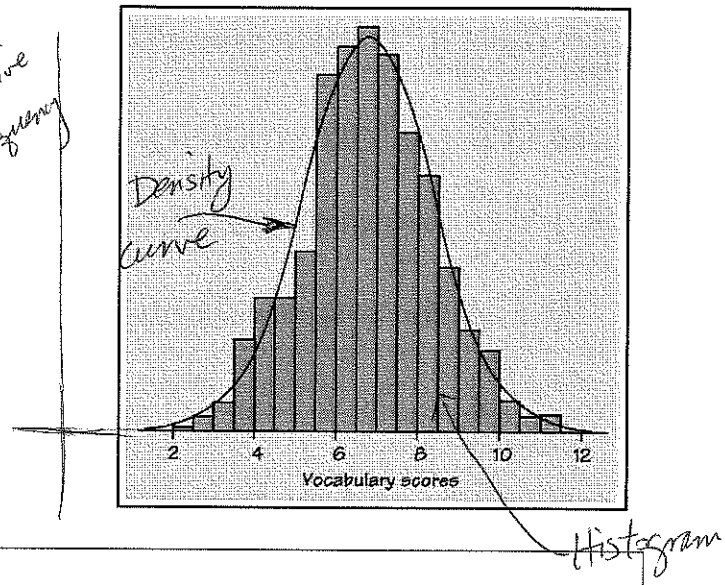
Summary:

1. Adding (or subtracting) the same number, *a*, to each observation...
   Mean : $+a$ Median : $+a$
   SD : No change 5 # difference : No change
2. Multiplying (or dividing) each observation by a positive number, *b*,...
   Mean : $\times b$ Median : $\times b$
   SD : $\times b$ 5 # : $\times b$

DENSITY CURVES:

Definition: A density curve is...

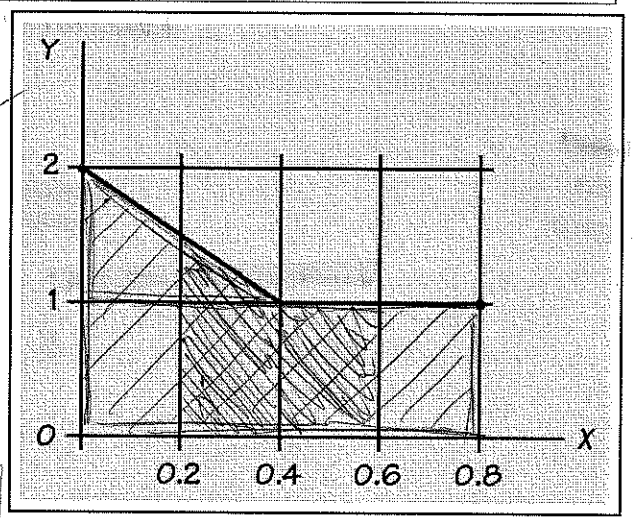
A smooth curve that describes the overall pattern of a distribution



A Density Curve must have:

1. an AREA of 1 underneath it
2. must lie above the x-axis

Ex. 2 Given the following curve:



a. Verify that it is a density curve.

$A_{rect} = 0.8 + A_{Tri} = 0.2 = A = 1.0$

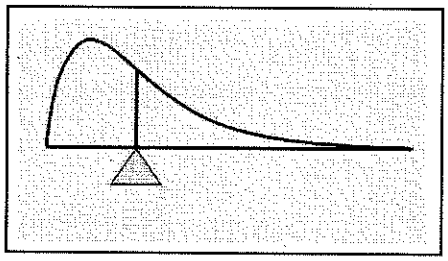
curve is above the x-axis

b. What % of the observations lie between 0.2 and 0.6?

Find the area underneath from 0.2 – 0.6

$\triangle : \frac{0.5 \times 0.2}{2} + \square : 1(0.4) = 0.45 \Rightarrow \boxed{45\%}$

The Mean and Median of a Density Curve:

The Median is the point with half the observations on either side or the point with half the area under the curve to the left and half the area on the right. Areas are 50% on either side

The Mean of a density curve is the balance point. This is the point where the curve would balance if it were made of solid material.