SUMMARY OF CHAPTERS 1-7 (EMPHASIZING CALCULATOR-RELATED FORMULAS)

FOR SAMPLE RAW DATA (E.G. 4, 12, 7, 5, 11, 6, 9, 7, 11, 5, 4, 7) BE ABLE TO COMPUTE

 $MEAN \qquad G x / n$

STANDARD DEVIATION

 $\frac{\left|\frac{\Sigma x^2 - (\Sigma x)^2 / n}{n-1}\right|}{n-1}$

MEDIAN

QUARTILES

MODE

RANGE

AND RELATED QUANTITIES (VARIANCE, IQR, COEFFICIENT OF VARIATION)

GROUPED DATA E.G.

AGE	FREQ.		
0 - 9	53		
10 - 19	42		
80 - 89	2		

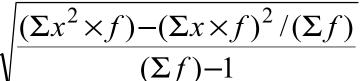
BE ABLE TO FIND (AN EXTRA COLUMN FOR EACH): CLASS MIDPOINT VALUES (MARKS), BOUNDARIES, RELATIVE FREQUENCIES, CUMULATIVE FREQUENCIES, RELATIVE CUMULATIVE FREQUENCIES,

DISPLAY THE RESULTS IN HISTOGRAM, FREQUENCY POLYGON, OR OGIVE, AND COMPUTE THE CORRESPONDING

MEAN

$$(\Sigma x \times f)/(\Sigma f)$$

STANDARD DEVIATION



MEDIAN AND QUARTILES (GRAPHICALLY -FROM OGIVE)

MODE (HIGHEST-FREQUENCY CLASS MIDPOINT VALUE)

PROBABILITY

FOR A GIVEN RANDOM EXPERIMENT, UNDERSTAND THE NOTIONS OF

SAMPLE SPACE (LIST OF ALL POSSIBLE OUTCOMES)

TREE DIAGRAM - BE ABLE TO DRAW IT, WITH CORRESPONDING PROBABILITIES

EVENTS - BE ABLE TO TELL WHEN THEY ARE INDEPENDENT, WHEN EXCLUSIVE

PROBABILITY OF AN EVENT, AND RULES FOR ESTABLISHING IT

COMPLEMENT, INTERSECTION AND UNION OF EVENTS - PROBABILITY RULES

CONDITIONAL PROBABILITY (GIVEN, KNOWING THAT)

WHEN SELECTING A RANDOM STUDENT FROM A TABLE LIKE:

	FRESHMEN	SOPHOMORE	JUN.	SENIOR
MALE	214	197	171	156
FEMALE	255	203	180	169

BE ABLE TO ANSWER ANY PROBABILITY QUESTION (INCLUDING CONDITIONAL), E.G. PROBABILITY OF: MALE, JUNIOR, FEMALE GIVEN SOPHOMORE, JUNIOR OR SENIOR GIVEN FEMALE, NOT SENIOR GIVEN MALE, ETC. ALSO: ARE THE 'SENIOR' AND 'FEMALE' EVENTS INDEPENDENT? 325/1545 × 807/1545 = 0.1099, 169/1545 = 0.1094 (NO)

UNDERSTAND AND BE ABLE TO EVALUATE COUNTING FORMULAS: $n !, P_{n,r}$ AND $C_{n,r}$.

A RANDOM VARIABLE AND ITS DISTRIBUTION, E.G.

X =	-2	-1	0	1	2
Pr:	0.13	0.19	0.23	0.27	0.18

COMPUTE:

 $MEAN := E x \times p$

STANDARD DEVIATION $F = \sqrt{(\Sigma x^2 p) - \mu^2}$

ANY **PROBABILITY**, E.G. Pr(-1 < X < 2)

'COMMON' DISTRIBUTIONS

BINOMIAL

$$Pr(X=i) = C_{n,i} \times p^i \times q^{n-i}$$

MEAN: *n×p*

STANDARD DEVIATION: $\sqrt{n \times p \times q}$

POISSON

 $8 = t \times r$

 $\Pr(X=i) = \frac{\lambda^i}{i!} \times e^{-\lambda}$

MEAN: 8

STANDARD DEVIATION: $\sqrt{\lambda}$

NORMAL DISTRIBUTION

HAS TWO PARAMETERS: MEAN : (ANY NUMBER) AND STANDARD DEVIATION F (ANY POSITIVE NUMBER)

SPECIAL CASE: STANDARD NORMAL, DENOTED Z - HAVE TABLES OF PROBABILITIES.

ANY OTHER NORMAL RANDOM VARIABLE X CAN BE CONVERTED TO THIS Z BY



BE ABLE TO FIND ANY PROBABILITY OF THE TYPE: Pr(Z < 3.02), Pr(|Z-1| < 1.3),Pr(X > 327), Pr(-14 < X < 26), ETC.

AND REVERSE:

FIND z SUCH THAT Pr(Z < z) = 95%OR Pr(|Z| < z) / Pr(-z < Z < z) = 99%, ETC.

ALSO: FIND x SUCH THAT Pr(X < x) = 90%OR Pr(X > x) = 30%, ETC.

> NORMAL APPROXIMATION TO BINOMIAL DISTRIBUTION

WHEN *np* AND *nq* ARE BOTH BIGGER THAN 5 (CONTINUITY CORRECTION).

CENTRAL LIMIT THEOREM

SAMPLING DISTRIBUTION OF \overline{x} IS APPROXIMATELY NORMAL, WHEN n > 30 ITS MEAN IS : , ITS STANDARD DEVIATION (ERROR) EQUALS σ/\sqrt{n}

WE CAN COMPUTE: $Pr(\overline{x} < 136.4)$ ETC.

(SAMPLE TOTAL = $n \times \overline{x}$)

WHEN POPULATION IS NORMAL, \overline{x} IS EXACTLY NORMAL FOR ANY *n*

SAMPLE PROPORTION \hat{p}

(= RELATIVE FREQUENCY OF OBSERVED 'SUCCESSES') IS, WHEN np > 5 AND nq > 5, APPROXIMATELY NORMAL, WITH THE MEAN OF p AND STANDARD DEVIATION (ERROR) EQUAL TO $\sqrt{\frac{pq}{n}}$