Nôte ashur la recoiler source de sour proposition de soir la soir mont la soir $3ch = \frac{5^2}{n^{-1}} = \sqrt{\frac{x_i}{x_i}} \times \sqrt{\frac{x_i}{x_i}} = \frac{1}{x_i}$ m= 3 bservations. Note Here divided itz by manzille in place jof n because if we divide it by 'n' then sample vaniance will not be unbiased for population variance and we will Loose very important characteristic in statistics bince, it is little bit deep concept so just skip these things and remember the formula of sample-2-1 (40-50.5) + (65-52-5) variance. stefo, 112.5, 312.5, 800J. population Total (seta) of (observations conscollection of) some measurments - B'o known + Fan = population. p (3/=1125) = p(25/10) + p (40/25) = 0.1 +0.1=0.2 Sample: A subset of population is known as sample; and the process of selecting sample from population is known as sample; prof 05 58 52 0 112.5 \$12.5 800 P(52) 0.38 0.2 0.3 0.12 E(32) = 0.38 x0 + 0.2 x 112.5 + 0.3 x 30.5 + 0.12 x 20.0 To calculate of 02= (35-44.5)=x0.2 + (40-44.5) x0.5+ (65-44.5) x0.3 = 212.25, 4

Q. Let XIX2, ... Xm are coid and follow xthe IN (11,62) where m and 62 are characteristic of populations then find the sampling distribution of X. 501° $E(Z) = E(x_1 + x_2 + \dots + x_n) \xrightarrow{f} E(Z) = E(x_1 + x_2 + \dots + x_n)$ $= \pi_1 \in (\chi_1) + \sigma_2 \in (\chi_2) + \cdots ; \chi + \frac{1}{2} \sum_{i=1}^{n} \frac{1}{2} \chi_{i} = 0$ Note: We know that if Xi; i=1,2,...,n. follows the normal distribution then any linear combination

these Xi also refollows the round adist (we prove it)

Now, we have to find the distribution of X $\overline{X} = \frac{1}{N} (X_1 + X_2 + \cdots + X_n) + \cdots + \frac{2}{N} + \frac{2}{N} + \frac{2}{N}) = \overline{X}$

(E(X) E E H(XX+X2+(2+XX)) +) M O S (COMT

 $= \frac{1}{m} E(x_1 + x_2 + \cdots + x_m)$ Mite Each Xo are induspendent and have the same.

(nX)=+ ···+(x2)= n=-

(n-times) the minute of the contradion of the co

Now, variance of X,

$$V(\bar{x}) = V\left(\frac{1}{n}(x_1 + x_2 + \dots + x_n)\right) \begin{cases} V(ax) \\ \frac{1}{n^2} \left(V(x_1) + V(x_2) + \dots + V(x_n)\right) \end{cases} \begin{cases} V(ax) \\ \frac{1}{n^2} \left(V(x_1) + V(x_2) + \dots + V(x_n)\right) \end{cases}$$

$$= \frac{1}{n^2} \left(\sigma^2 + \delta^2 + \dots + \delta^2\right) (n - \text{times})$$

$$V(\bar{X}) = \frac{\gamma/6^2}{N^2} = \frac{6^2}{n}$$

: Thus, $\times \sim N(\mu, \frac{6^2}{n})$

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Resultion If son X: MIN (M, 62) band X: ane cid then
 any the same distin
            the sampling distribution of &
         Consider Z = a1x1+a2x2+···+anxn
         E(Z) = E(a_1x_1 + a_2x_2 + \dots + a_nx_n)^{+1} \times - X
                = a E(x1) + a E(x2) + - + an E(xn)
Mote: We know that M (no first on them any lingur combination) =
(in an X(Z))= + V((a) X10+102 x2++- ---+ (an xn2) 10 3 x 32 91)- +0
           = x a2 v (xp+t; a2 v (x2)++ == + + a2 v (xn) wow
          = (a_1^2 + a_2^2 + \cdots + a_n^2) 6^2 \times (x + x) = x
    Thus; Z~N(Cutation) Moderate it is the indext)
 Note Each X: are independent and have the same
  distribution (icd), then ( Cov(xi, xj) = 0 + c + j.
                                       Now, variance of X.
 V(\vec{x}) = V\left(\frac{1}{n}(x_1 + x_2 + \dots + x_n)\right) \left(\frac{1}{n}(x_n)\right)
= \frac{1}{n} \left[V(x_1) + V(x_2) + \dots + V(x_n)\right] \left(\frac{1}{n} \cdot V(x_n)\right)
             = 12. (02+62+...+62)(11-dimes)
                              N(X) = 3/2 = 65
                    : Thus, X ~ N(M, 02)
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