Hw 6.2 Part B 49, 51, 57-59, 63

(49) a) Dependent. Since cards are dealt without replacement, the outcome of the 3rd card will depend on the outcomes of the 1st 2 cards that were drawn.

b) Independent. X relates to the sum of the outcome of the 1st roll, and Y to the sum of the outcome of the second roll, and dice rolls are independent of each other.

(51) X: income of Husband   Y: income of Y

a) Is it reasonable mean of $X+Y = \mu_X + \mu_Y$?

Yes, the mean of a sum is always equal to the sum of the means.

b) Is it reasonable for total variance $= \sigma^2_X + \sigma^2_Y$?

No, It is not reasonable to assume X and Y are independent, ∴ the variance of the sum ≠ to the sum of the variances.

(57) X: amt a life insurance company earns on a 5 year term life policy

$\mu_X = \$303.35$ $\sigma_X = \$9707.57$

$$W = \frac{X_1 + X_2}{2} = 0.5x_1 + 0.5x_2$$

$$\mu_W = .5(303.35) + .5(303.35) = \underline{\$303.35}$$

$$\sigma_W = \sqrt{(.5 \cdot 9707.57)^2 + (.5 \cdot 9707.57)^2} \approx \$6864.29$$

$$\sigma_W = \sqrt{2(.5 \cdot 9707.57)^2}$$

$\mu_x = 303.35$ $\sigma_x = \$9707.57$

(58) $V = .25X_1 + .25X_2 + .25X_3 + .25X_4$

$\mu_V = .25(303.35) + .25(303.25) + .25(303.25) + .25(303.25)$

$\mu_V = \$303.35$ (which is the same for one and two policies)

$\sigma_V = \sqrt{(.25 \cdot \$9707.57)^2 + (.25 \cdot 9707.57)^2 + (.25 \cdot 9707.57)^2 + (.25 \cdot 9707.57)^2}$

$\sigma_V = \sqrt{4(.25 \cdot 9707.57)^2}$

$\sigma_V = \$4853.79$

(59) $\mu_T = 11$ sec $\sigma_T = 2$ sec , T = Time required to bring a part from a bin to its position on an automobile

$\mu_C = 20$ sec $\sigma_C = 4$ C = Time required to attach the part to the chassis

Steps are Independent

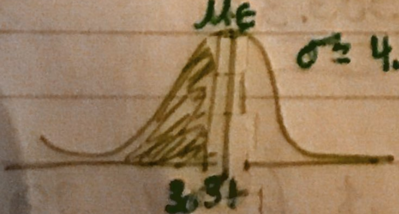
a) E = time for entire operation

$E = T + C$

$\mu_E = 11 + 20 = 31$ sec

$\sigma_E = \sqrt{(2)^2 + (4)^2} = \sqrt{20} \approx 4.472$ seconds

b) $P(E < 30)$ $N_E(31, 4.472)$



normalcdf(-10,000, 30, 31, 4.472)

$\approx .41$

about 41 % of the time the entire process will take less than 30 seconds

(63) State: what is the probability that the total team time is less than 220 seconds?

Plan: Let T = total team swim time
X_1 = Wendy's time X_2 = Jill's time X_3 = Carmen's time X_4 = Latrice's time

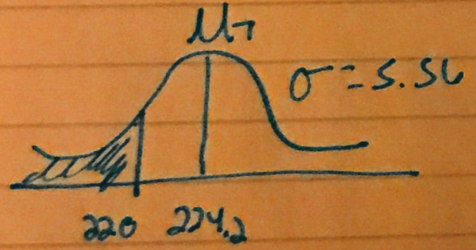
$$T = X_1 + X_2 + X_3 + X_4$$

$$\mu_T = \mu_{X_1} + \mu_{X_2} + \mu_{X_3} + \mu_{X_4} = 55.2 + 58.0 + 56.3 + 54.7 = 224.2 \text{ sec}$$

$$\sigma_T = \sqrt{(2.8)^2 + (3.0)^2 + (2.6)^2 + (2.7)^2}$$
$$\sigma_T \approx 5.56 \text{ sec}$$

$P(T < 220)$ $N(224.2, 5.56)$

Do:



normalcdf $(-10{,}000, 224.2, 224.2, 5.56)$
$\approx .22$

Conclude: There is about a 22 % chance that the teams swim time will be less than 220 seconds.