

1. Let $X \sim N(37, \sigma)$

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$$P(X > 47) = 0.12$$

$$P\left(Z > \frac{47-37}{\sigma}\right) = 0.12$$

$$1 - \Phi\left(\frac{10}{\sigma}\right) = 0.12$$

$$\Phi\left(\frac{10}{\sigma}\right) = 0.88$$

$$\frac{10}{\sigma} = Z_{0.88} \Rightarrow \sigma$$

$$\frac{10}{\sigma} = 1.17 \Rightarrow \sigma = 8.547$$

$$X \sim N(37, 8.547)$$

$$P(X < 41) = \Phi\left(\frac{41-37}{8.547}\right) = \Phi(0.47) = 0.6808$$

2. Let $Y \sim B(7, 0.6808)$

Let $n = 7$

$$Y \sim B(7, 0.6808)$$

$$P(Y=2) = \binom{7}{2} (0.6808)^2 (0.3122)^5$$
$$= \boxed{0.0323}$$

$$2) \quad X \sim N(-1.5, 4)$$

$$0.522 \text{ is the p-value } 120N = y$$

$$\begin{aligned} P(X > 0) &= P\left(Z > \frac{0 - (-1.5)}{2}\right) \\ &= P(Z > 0.38) = 1 - \Phi(0.38) = 1 - 0.6488 \\ &= 0.352 \end{aligned}$$

$$y \sim B(12, 0.352)$$

$$\begin{aligned} P(y=6) &= \binom{12}{6} (0.352)^6 (0.648)^6 \\ &= \boxed{0.1301} \end{aligned}$$

$$3) \quad P(X=20) = \frac{\binom{5}{3} + \binom{4}{3} + \binom{3}{3}}{\binom{12}{3}}$$

$$\frac{1}{12} \frac{10 + 4 + 1}{220} = \frac{15}{220}$$

$$P(X=30) = \frac{\binom{5}{1} \binom{4}{1} \binom{3}{1}}{\binom{12}{3}} = \frac{60}{220}$$

$$P(X=10) = 1 - \frac{15}{220} - \frac{60}{220} = \frac{145}{220}$$

X	$P(X)$
20	$15/220$
10	$145/220$
-30	$60/220$

$$E(X) = 20\left(\frac{15}{220}\right) + 10\left(\frac{145}{220}\right) - 30\left(\frac{60}{220}\right)$$

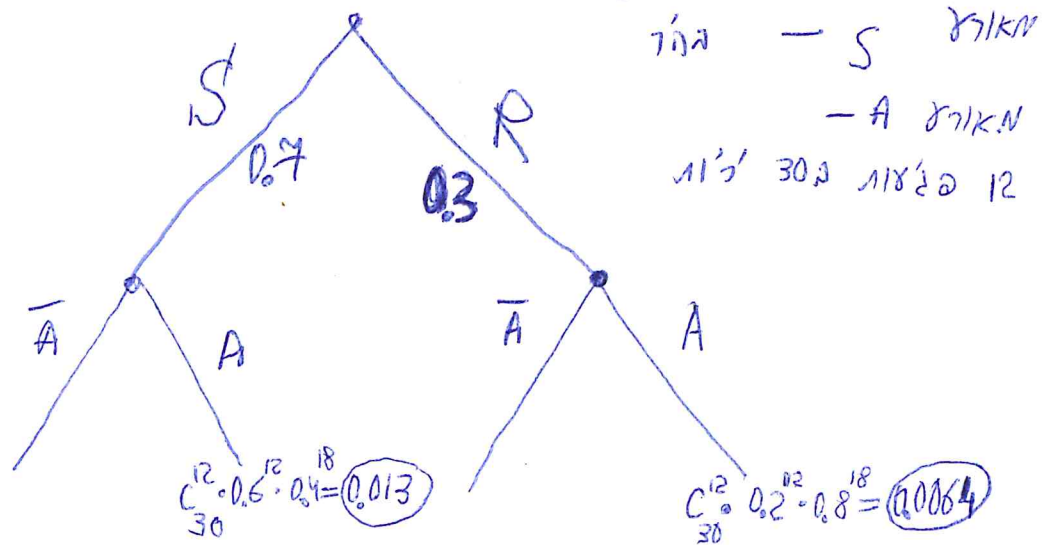
$$= \boxed{-0.2273}$$

$$E(X^2) = 20^2\left(\frac{15}{220}\right) + 10^2\left(\frac{145}{220}\right) + 30^2\left(\frac{60}{220}\right)$$

$$= 338.64$$

$$\text{Var}(X) = 338.64 - (0.2273)^2 = \boxed{338.58}$$

2 4 nake



$$P(R/A) = \frac{P(A \cap R)}{P(A)} = \frac{0.00192}{0.00192 + 0.7 \cdot 0.013} = \boxed{0.174}$$

$$1 - 0.8^n > 0.99$$

$$0.8^n < 0.01$$

$$\ln 0.8^n < \ln 0.01 \quad n(-0.223) < (-4.6)$$

$$n > \frac{-4.6}{-0.223} = 20.6$$

$$\boxed{n \geq 21}$$

$$X/R \sim B(100, 0.2)$$

$$X/S \sim B(100, 0.6)$$

$$E(X) = 100 \cdot 0.2 \cdot 0.3 + 100 \cdot 0.6 \cdot 0.7 = \boxed{48}$$

$$M_2(X/R) = npq + (np)^2 = 100 \cdot 0.2 \cdot 0.8 + 20^2 = 416$$

$$M_2(X/S) = 100 \cdot 0.6 \cdot 0.4 + 60^2 = 3624$$

$$M_2(X) = 416 \cdot 0.3 + 3624 \cdot 0.7 = 2662$$

$$\text{Var}(X) = 2662 - 48^2 = \boxed{358}$$

5 nisce

הסתברות / מס - W
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$$f_W(t) = 3t^{-4}, t \geq 1$$

$$E(W) = \int_1^{\infty} t \cdot 3t^{-4} dt = \int_1^{\infty} 3t^{-3} dt = \left[-\frac{3}{2}t^{-2} \right]_1^{\infty} = \left[\frac{3}{2} \right]$$

$$\begin{aligned} \text{Var}(W) &= \int_1^{\infty} t^2 \cdot 3t^{-4} dt - \left(\frac{3}{2}\right)^2 = \int_1^{\infty} 3t^{-2} dt - \left(\frac{3}{2}\right)^2 = \\ &= \left[-3t^{-1} \right]_1^{\infty} - \left(\frac{3}{2}\right)^2 = 3 - 2.25 = \boxed{0.75} \end{aligned}$$

הסתברות / מס - C

C	0.1	0.5	1
P	1/3	0.5	1/6

$$E(C) = 0.1 \cdot \frac{1}{3} + 0.5 \cdot 0.5 + 1 \cdot \frac{1}{6} = \boxed{0.45}$$

$$\begin{aligned} \text{Var}(C) &= 0.1^2 \cdot \frac{1}{3} + 0.5^2 \cdot 0.5 + 1^2 \cdot \frac{1}{6} - 0.45^2 = \\ &= \boxed{0.0925} \end{aligned}$$

הסתברות / מס - X = W + C

$$E(X) = E(W) + E(C) = \boxed{1.95}$$

$$\text{Var}(X) = \text{Var}(W) + \text{Var}(C) = \boxed{0.8425}$$

6. $\frac{1}{2}k e$

(K) מוסר אכסר' / ו' סמח' 4 אכס' ו'
 ס' אכס' מוס' ה'א ד' 3' אכס' ו' מוס' ו'

4 קצוות / 8 קצוות / 16 קצוות
 $C_8^4 = 70$ 8 קצוות / 16 קצוות
 $\frac{16}{70} = 0.2286$: 8 קצוות

2) $\frac{1}{2} \frac{d}{dt} \left(\frac{1}{2} m v^2 \right) = \frac{1}{2} m v \frac{dv}{dt}$
 $\frac{1}{2} m v \frac{dv}{dt} = \frac{1}{2} m v \frac{dv}{dt}$

$4 \cdot 3 \cdot 4 = 48$
 720N
 720N
 720N
 720N

אוסט
אוסט / א
אקט 2 זונדאג
אפ'רעט ע"ס
ע"ס האזער

7200M
 אדסכר'ו/ו
 פ'חור
 אר הנ'ד
 אכח
 712/57 - 2N

$\frac{48}{70} = 0.6857$