30/11/2021 [illegible]

יעל הכהן

סטטיסטיקה / מטלה 3

בס"ד

1. א- המספרים הבאים:

2) $\phi(0.25) = \underline{0.5987}$

4) $\phi(-1.9) = 1-0.9713 = \underline{0.0287}$

6) $\phi(1.31) = \underline{0.9049}$

8) $\phi(0.4) = \underline{0.6554}$

ב

2. $Z_{0.05} = -Z(1-0.05) = 0.95 = \underline{-1.645}$

4. $Z_{0.10} = -Z(1-0.10) = 0.9 = \underline{-1.282}$

6. $Z_{0.0125} = -Z(1-0.0125) = 0.9875 = \underline{-2.24}$

8. $Z_{0.2} = -Z(1-0.2) = 0.8 = \underline{-0.842}$

2

$\mu = 8250$

$\sigma = 450$

$X \sim N(8250, 450^2)$

א. $P(X \leq 8100)$

$P\left(Z \leq \frac{8100-8250}{250}\right) =$ [illegible]

$Z \leq 0.6$

$\phi(0.6) = \boxed{0.7257}$

~~$P(7900 \leq X \leq 8100)$~~

~~$P(X \leq 8100) - P(X \leq 7900) =$~~

$Z_{0.1} = -1.282$

ד. $X_{0.1} = 8250 + Z_{0.1} \cdot 450 = 8250(-1.282 \cdot 450)$

$X_{0.1} = 8250 - 576.9 = \boxed{7673.1}$

30/11/2021 - [illegible]

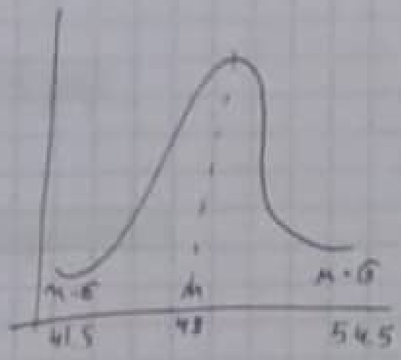
[illegible]

(5)

ממוצע (תוחלת של [illegible]) $\mu=48$

סטיית תקן של [illegible] $\sigma=6.5$

[illegible] $Z\sim N(0,1)$



א. $P(x\le 45)=$

$P\frac{x-\mu}{\sigma}\le\frac{45-48}{6.5}=$

$P(z\le -0.46)=\Phi(-0.46)=$

$1-\Phi(0.46)=1-0.6772=$ **0.3228**

ב. $P(x\ge 39)=$

$P\ge\frac{39-48}{6.5}=$

$P(z\ge -1.38)=1-P(z\le -1.38)=$

$1-(1-\Phi(1.38)=\Phi(1.38))=$ **0.9162**

ג. $P(46\le x\le 50)=P\,\frac{46-48}{6.5}\le\frac{x-\mu}{\sigma}\le\frac{50-48}{6.5}=P(-0.31\le z\le 0.31)=$

$\Phi(0.31)-\Phi(-0.31)=0.6217-(1-\Phi(0.31))=0.6217-(1-0.6217)=$

0.2434

ד. $0.842=Z_{0.8}=\frac{x-\mu}{\sigma}=\frac{x-48}{6.5}$

$\boxed{x=\mu\sigma\cdot z}$

$x=48+6.5\cdot 0.842$ $=53.47$ ← [illegible]

ה. $\frac{\sigma}{\sqrt{n}}=\frac{6.5}{\sqrt{12}}\approx 1.87$

$\frac{x-48}{1.87}\Rightarrow P(\bar{x}_{12}\ge 47)=1-P(\bar{x}_{12}\le 47)=1-P\left(\frac{\bar{x}_{12}-\mu}{1.87}\right)\le\frac{47-48}{1.87}=$

$1-P(z\le -0.53)=1-(1-P(z\le 0.53))=P(z\le 0.53)=$ **0.2019**

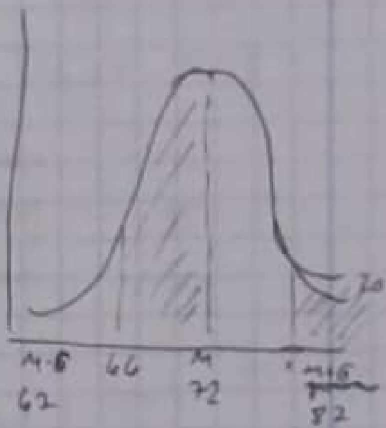
30/11/2021 כפלו ימפה-

יעל הכוכבי

ב

$\mu=72$

$\sigma=\sqrt{100}=10$



א

נבחנו 980 תלמידים

כמה מהם בין 66-72 בטוח:

$66\le x\le 72$

$P=\frac{66-72}{10}\le\frac{x-\mu}{\sigma}\le\frac{72-72}{10}=$

$P=(-0.6\le z\le 0)=\phi(0)-\phi(-0.6)=$

$0.5-(1-\phi(0.6))=0.5-(1-0.7257)=0.2257$

$221.186=\frac{980}{100}\cdot 22.57$ [redacted] ← כמה מהם 22.57%

221.186 תלמידים

ב

$z_{0.8}=0.842$

$x=72+10\cdot 0.842=$ **80.42** [redacted]

30/11/2021

$\mu = 82.5$ $\sigma = 12$

א $x = \mu + \sigma z$

$x = 82.5 + 12 \cdot 1.282$

$x = 97.86$

ב $z_{0.95} = 1.645$

$x = 82.5 + 12 \cdot 1.645 = 102.24$

ג $z_{0.15} = -z_{0.85} = -1.036$

$x = 82.5 + 12 \cdot -1.036 = 70.068$

ד $\frac{\sigma}{\sqrt{n}} = \frac{5}{\sqrt{25}} = \frac{12}{5} = 2.4$

$P(80 \le \bar{X} \le 85) =$

$P\left(\frac{80-82.5}{2.4} \le \frac{\bar{X}_{25} - \mu}{\left(\frac{\sigma}{\sqrt{25}}\right)} \le \frac{85-82.5}{2.4}\right) = P(-1.04 \le Z \le 1.04) =$

$P(1.04) - P(-1.04) = P(1.04) - (1 - P(1.04)) = 0.8508 - (1 - 0.8508) =$

0.7016

$\mu = 11.2$ $\sigma = 0.6$

ה $z_{0.2} = -z_{0.8} = -0.842$

$x = 11.2 + 0.6 \cdot -0.842 = 10.69$