Math

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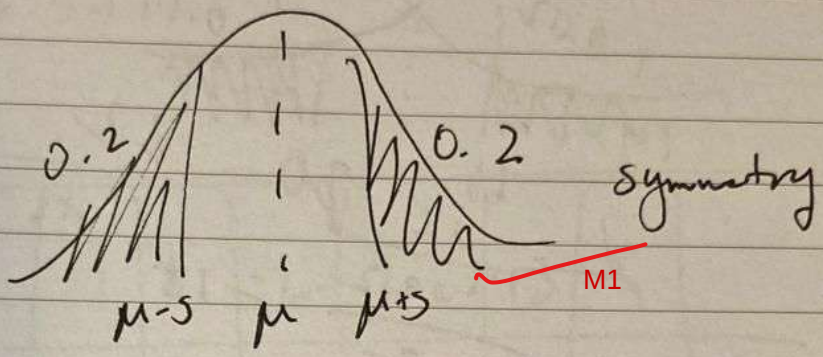
Name: Maanya
Start : 08:02
End : 09:00

Q1)

a)



M1

$P(X > \mu + 5) = 0.2$ A1

b) conditional probability

$\cdot P(X < \mu + 5 \mid X > \mu - 5)$ M1

$= \dfrac{P(X < \mu + 5 \cap x > \mu - 5)}{x > \mu - 5}$ A1

$= \dfrac{0.6}{0.8}$ A1A1

$= \dfrac{3}{4}$ or 0.75 A1

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Q2)

a) $y = -0.6(25)^2 + 23(25) + 110$ M1

$y = 310$ A1

310 children are estimated to visit the park when the temperature is 25°C using the model above.

b) ~~$x = 0.0935x$~~

$x = 0.0935y + 7.43$ M1A1

c) when temp = 25°C, number of children = 310

$x = 0.0935(310) + 7.43$ M1

$x = 36.4190808$

$\simeq 36$ icecreams A1

Q3)

a) $1.5 \times 20 + U = 75$ M1

$30 + U = 75$ A1

$U = 45$ A1

b) $45 - 20 = 25$ M1

$L = 25$ A1

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Q4)

a) $1 - (0.288 + 0.434) = P(94.6 < x < 98.1)$ M1

$= 0.278$ A1

b)

$$z = \frac{94.6 - \mu}{\sigma} = -0.5592369$$ M1

$$z = \frac{98.1 - \mu}{\sigma} = 0.1661944$$ A1A1

~~$\mu - 0.960\sigma$~~

$\mu - 0.559\sigma = 94.6$ (1)

M1

$\mu + 0.166\sigma = 98.1$ (2)

$\mu = 97.298 \approx 97.3$ $\sigma = 4.8246 \approx 4.82$ A1

c)

(i) $X \sim B(100, 0.434)$ M1

$P(X=34) = 0.0133$ A1

(ii) conditional probability M1

$$P(X=34 \mid X<49)$$

$$= \frac{P(X=34 \cap X<49)}{P(X<49)}$$

$$= \frac{P(X=34)}{P(X<49)}$$

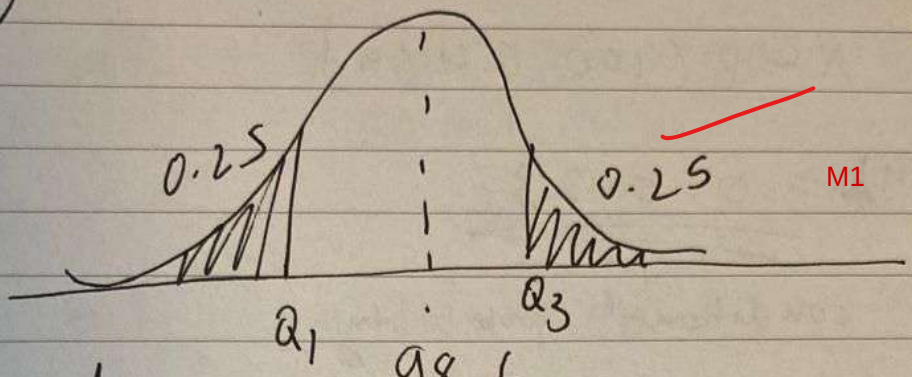
$P(X<49) = 0.8904744$ using Bpd function on GDC

$$= \frac{0.0133}{0.8904744}$$ A1

$$= 0.014935858\ldots$$

$$\approx 0.0149$$

d)



M1

$\sigma = d$

$$z = \frac{Q_1 - 98.6}{\sigma} = -0.6744897$$

$$z = \frac{Q_3 - 98.6}{\sigma} = 0.6744897$$

$Q_1 = -0.674d + 98.6$

$Q_3 = 0.674d + 98.6$ A1

$Q_3 - Q_1 = 4.82$

$4.82 = (0.674d + 98.6) - (-0.674d + 98.6)$

$4.82 = 1.3489794d$

$d = 3.57$ A1

Q8) N/A What is Poisson Distribution?

Q9)

$$\frac{x_1 + x_2 + \dots x_{10}}{10} = 10$$

$$x_1 + x_2 + \dots x_{10} = 100 \quad \text{A1}$$

$$\hookrightarrow : \sum_{i=1}^{10}$$

$$\sum_{i=1}^{10} (x-12)^2 \quad \text{M1}$$

$$= \left(x_1^2 - 24x_1 + 144\right) \sum_{i=1}^{10}$$

$$\sum_{i=1}^{10} x_1^2 - 24(100) + 144 \quad \text{A1}$$

$$\sigma^2 = \frac{\sum_{i=1}^{10} x_1^2}{10} - 10^2 = 9 \quad \text{M1}$$

$$= 10(9 + 100) \quad \text{A1}$$

$$\sum_{i=1}^{10} (x_1 - 12)^2 = 1090 - 2400 + 1440 = 130 \quad \text{A1}$$

d) There is no certainty that the number of hours practiced are the direct cause of their diploma results. The model can only show correlation not guarantee causation. Her assertion is not valid.

REDO

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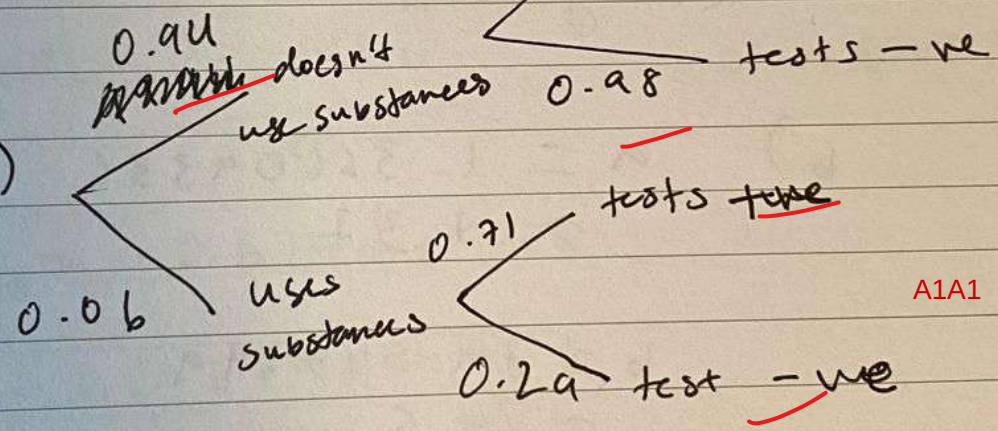
e) No effect A1

Q7)

a)



A1A1

b) (i) $0.94 \times 0.98 = 0.9212$ M1A1

(ii) $(0.9212)^2 = 0.84860944$ A1

≈ 0.849 A1

c)

(i) $(0.94 \times 0.02) + (0.06 \times 0.29)$ A1M1

$= 0.0362$ A1

(ii) 0.0362×1300 M1

$= 47.06$

around 47 athletes A1

d) $X \sim B(20, 0.02)$ M1

$P(X=0) = 0.66760797$ M1

≈ 0.668 A1

e) $P(2 \leq X) = 1 - (x \leq 2)$

$= 1 - (P(X=1) + P(X=0) + P(X=2)$

$= 1 - (0.27249305 + 0.66760797 + 0.05283025)$

$= 0.00707$ A1

Q5) N/A x on y regression is not on the test and hasn't been taught yet

Q6)

a) $r = 0.883529722$ M1

≈ 0.883 A1

[Using GDC]

b) $a = 1.36609336$

≈ 1.37

$b = 64.517199$ A1

≈ 64.5

c) $1.37(h+5) + 64.5$ M1

$1.37(h) + 64.5$

$= 6.8304668$

≈ 6.83 marks increase A1