61/68

Math Test
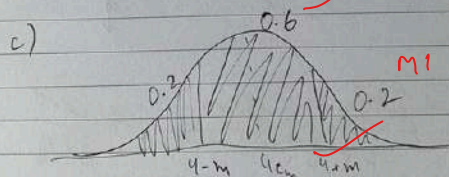
Name: Kaanya
Start: 07:06
End: 07:54

Q1)

a) $X \sim N(4, 0.25^2)$
$P(X < 3.7)$ M1
$p = 0.115$ (3 s.f.) [GDC] A1

b) $P(X > t) = 0.3$ M1
$k = 4.13$ (3 s.f.) [GDC] A1

c)

$P(\text{length} < 4-m) = 0.2$
$m = 0.210$ (3 s.f.) A1

6/6

Q2)

a) $0.86 \times 56 = 48.2$ (3 s.f.) A1

b) $X \sim B(56, 0.86)$ M1
$P(X \geq 50)$
$p = 0.316$ (3 s.f.) [GDC] A2
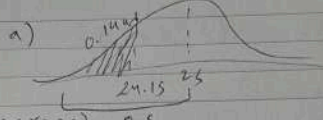
c) $P(x \leq n) \geq 0.25$
$n = 46$ [GDC] A2   6/6

Q3) a) $2(P(2) \times P(0)) + P(1) \times P(1) =$ M1M1 M1
$2(0.1 \times 0.5) + (0.4 \times 0.4) = 0.26$ A1

b) $(-8 \times 0.3) + (4 \times 0.4) + (k \times 0.1) = 0$ M1M1 A1
$k = 24$

7/7

Q4)

a)

24.15   25

P(24.15 < x < 25)   0.5

~~answer~~ = 0.5 - 0.1446 = 0.3554   M1A1

b)

(i) xInv = -1.0598781....M1

$$\frac{24.15 - 25}{\sigma} = -1.0598782$$ A1

$\sigma = 0.802$ (3 s.f.)   A1

(ii) $P(X > 26) = 0.106$ (3 s.f.) [G.D.C]

M1A1

c) $X \sim B(10, 0.106)$ M1

$E(Y) = 10 \times 0.106 = 1.06$ A1A1

d) $P(Y=3) = 0.0655$ (3 s.f.) [G.D.C] M1A1

e) $$\frac{P(24.15 < x < 25)}{1 - P(x > 26)} = \frac{0.3554}{1 - 1.06} = 0.398$$

M1   A1   (3 s.f.)   A1

15/15

Q5) (N/A)

Q6) $X \sim N(10, 3^2)$

a)

(i) $P(x < 13) = 0.841$ (3 s.f.) M1A1
[GDC]

(ii) $P(x > 15) = 0.0478$ (3 s.f.) [GDC]
A1

b) $P(x > 15) \times P(x > 15)$ M1
= 0.0478^2
= 0.00228 (3 s.f.)   A1

c) $1 - (0.8143)^5 = 0.460$ (3 s.f.) M1A1

d)

(i) $10 \times 0.8143^3 = 5.40$ (3 s.f.)

(ii) $Y \sim B(10, 0.5399497002)$
$P(Y \geq 5) = 0.717$ A1 (3 s.f.) [GDC]

(iii) $P(5 < Y < 8) = 0.628$ (3 s.f.) [GDC]   M1 A1

(iv) $$\frac{P(5 < Y < 8)}{P(Y \geq 5)} = \frac{0.628}{0.717}$$ M1

= 0.875   (3 s.f.)
A1

12/16

Q7) $T \sim N(35, \sigma^2)$ ✓   **M1**

a) $P(T > 40) = 0.25$

0.75   0.25   **M1**

35 40

× INV
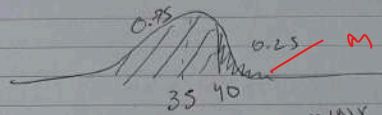
$$\frac{40 - 35}{\sigma} = 0.67448975$$

$\sigma = 7.41$ (3 s.f.)   **A2**

b) $P(T > 45) = 0.0887$ (3s.f.) [GDC] **M1 A1**

c) $L \sim B(5, 0.0887)$ **M1**

$P(L \geqslant 1)$
$= 1 - P(L = 0)$
$= 0.371$ (3 s.f.)   **A1**

d) $\dfrac{P((L < 3) \cap (L \geqslant 1))}{P(L \geqslant 1)}$ **M1**

$= \dfrac{P(L = 1) + P(L = 2) = 0.36532}{0.371}$ **A1**

$= 0.984$ (3 s.f.)   **A1**

e) She can only be late 1 more time **M1**

$Z \sim B(6, 0.0887)$, where Z is the number of days late.   **M1**

$P(Z \leqslant 1) = P(x = 0) + P(x = 1)$ **M1**

$= 0.907$ (3 s.f.) **A1**

15/18