GIMNASIO FEMENINO
ÁREA DE MATEMÁTICAS
4ᵗᵒ CONCURSO NACIONAL DE MATEMÁTICAS IB
PRUEBA 1 Y 2 – ESTUDIOS MATEMÁTICOS NM
2017 – 2018

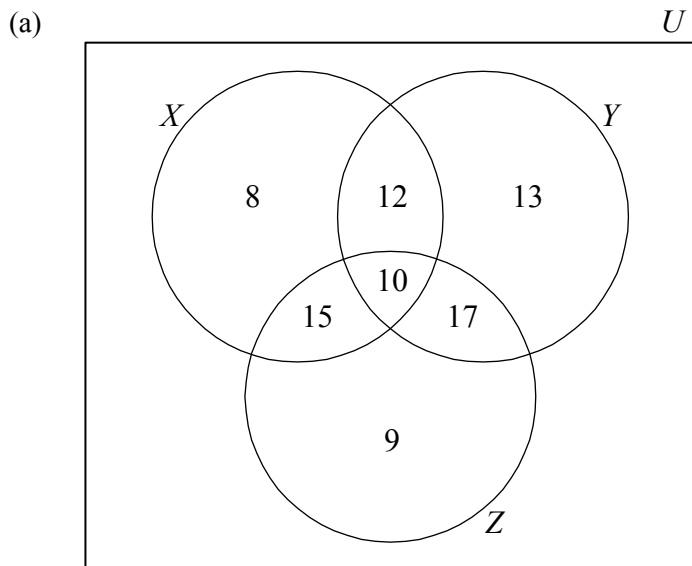Gimnasio Femenino

QUESTION 3.1

Part A

(a)

(A1) for rectangle and three intersecting circles
(A1) for 10, *(A1)* for 8, 13 and 9, *(A1)* for 12, 15 and 17   *(A4)*   *[4 marks]*

(b) $100 - (9 + 12 + 13 + 15 + 10 + 17 + 8) = 16$ *(M1)(A1)(ft)(G2)*   *[2 marks]*

> **Note:** Follow through from their diagram.

(c) $\dfrac{51}{100}$ (0.51)   *(A1)(ft)*

         $= 51\%$ *(A1)(ft)(G2)*   *[2 marks]*

> **Note:** Follow through from their diagram.

(d)   **Note:** The following statements are correct. Please note that the connectives are important. It is not the same (had cereal) <u>and</u> (not bread) and (had cereal) <u>or</u> (not bread). The parentheses are not needed but are there to facilitate the understanding of the propositions.

         (had cereal) and (did not have bread)
         (had cereal only) or (had cereal and fruit only)
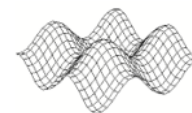   (had either cereal or (fruit and cereal)) and (did not have bread)   *(A1)(A1)*   *[2 marks]*

> **Notes:** If the statements are correct but the connectives are wrong then award at most *(A1)(A0)*.
> For the statement (had only cereal) and (cereal and fruit) award *(A1)(A0)*.
> For the statement had cereal and fruit award *(A0)(A0)*.

Question 3.1 *continued*

(e) $\dfrac{54}{100}$ (0.54, 54 %) **(A1)(ft)(A1)(ft)(G2)**   *[2 marks]*

Note: Award **(A1)(ft)** for numerator, follow through from their diagram, **(A1)(ft)** for denominator.   Follow through from total or denominator used in part (c).

(f) $\dfrac{10}{100} \times \dfrac{9}{99} = \dfrac{1}{110}$ (0.00909, 0.909 %) **(A1)(ft)(M1)(A1)(ft)(G2)**   *[3 marks]*

Notes: Award **(A1)(ft)** for their correct fractions, **(M1)** for multiplying two fractions, **(A1)(ft)** for their correct answer.
Answer 0.009 with no working receives no marks.
Follow through from denominator in parts (c) and (e) and from their diagram.

Part B

(a) H_0 :   The (average) number of meals per day a student has and gender are independent   **(A1)**   *[1 mark]*

Note: For "independent" accept "not associated" but do not accept "not related" or "not correlated".

(b)   2   **(A1)**   *[1 mark]*

(c)   5.99 (accept 5.991)   **(A1)(ft)**   *[1 mark]*

Note: Follow through from their part (b).

(d) $\dfrac{28 \times 45}{100} = 12.6 = 13$ or $\dfrac{28}{100} \times \dfrac{25}{100} \times 100 = 12.6 = 13$ **(M1)(A1)(AG)**   *[2 marks]*

Notes: Award **(M1)** for correct formula and **(A1)** for correct substitution.
Unrounded answer must be seen for the **(A1)** to be awarded.

(e)   0.0321   **(G2)**   *[2 marks]*

Note: For 0.032 award **(G1)(G1)(AP)**.
For 0.03 with no working award **(G0)**.

(f) $0.0321 < 5.99$ **or** $0.984 > 0.05$ **(R1)**
accept H_0 **(A1)(ft)**   *[2 marks]*

Note: If reason is incorrect both marks are lost, do not award **(R0)(A1)**.

Total [24 marks]