GCSE Mathematics

Venn Diagrams & Set Notation

Worked Solutions

Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation — Worked Solutions

[Fluency] Question 1

(a) A∩B = {2,4,6}

(b) A∪B = {1,2,3,4,5,6,8,10}

(c) A' = {1,3,5,7,9}

∴ **(a) {2,4,6} (b) {1,2,3,4,5,6,8,10} (c) {1,3,5,7,9}**

[Fluency] Question 2

Only F=11, Only T=5, Both=7, Neither=7

(b) P(F)=18/30=3/5

(c) P(both)=7/30

(d) P(at least one)=23/30

∴ **(b) 3/5 (c) 7/30 (d) 23/30**

[Fluency] Question 3

Neither=7 out of 30

∴

[Reasoning] Question 4

A={3,6,9,12,15,18}. B={4,8,12,16,20}.

A∩B={12}. P(A∩B)=1/20

∴ **(c) P(A∩B) = 1/20**

[Reasoning] Question 5

$(a)\ P(T|F) = \frac{7}{18}$

(b) P(only F) = 11/30

∴ **(a) 7/18 (b) 11/30**

[Reasoning] Question 6

Only C=40, Only T=25, Both=15, Neither=20

(b) P(C∪T)=80/100=4/5

(c) P(C'∩T)=25/100=1/4

∴ **(b) 4/5 (c) 1/4**

[Problem Solving] Question 7

(a) $P(A \cap B) = 0.4 + 0.3 - 0.6 = 0.1$

(b) P(A'∩B')=P((A∪B)')=1–0.6=0.4

∴ **(a) 0.1 (b) 0.4**

[Problem Solving] Question 8

Only M=10, Only E=7, Only S=7, M∩E only=5, M∩S only=2, E∩S only=3, all three=3

Total in sets=37. Neither=40–37=3

P(exactly one)=(10+7+7)/40=24/40=3/5

∴ **(b) 3 (c) P = 3/5**

Section B — Higher — Worked Solutions

[Fluency] Question 1

Mult of 3: {3,6,9,12,15,18}=6. Mult of 5: {5,10,15,20}=4. Both: {15}=1.

(b) P(A∩B)=1/20

(c) Neither: 20–6–4+1=11; P(A'∩B')=11/20

∴ **(b) 1/20 (c) 11/20**

[Fluency] Question 2

(a) $n(A \cup B) = 28 + 19 - 8 = 39$

(b) P(A')=(50–28)/50=22/50=11/25

(c) $P(A|B) = \frac{8}{19}$

∴ **(a) 39 (b) 11/25 (c) 8/19**

[Reasoning] Question 3

(a) A∩B' = A only (inside A, outside B)

(b) A∪B' = everything except (B only region)

(c) (A∪B)' = outside both circles

∴ **Shaded regions described above.**

[Reasoning] Question 4

(a) $P(A \cap B) = 0.5 + 0.4 - 0.7 = 0.2$

(b) P(A)×P(B)=0.5×0.4=0.2=P(A∩B) → independent ✓

∴ **(a) 0.2 (b) Independent ✓**

[Problem Solving] Question 5

Only A=10, Only B=7, Only C=7, AB only=5, AC only=2, BC only=3, ABC=3. Total=37

(a) Neither=40–37=3

(b) P(A∩B∩C)=3/40

(c) P(exactly one)=24/40=3/5

∴ **(a) 3 (b) 3/40 (c) 3/5**

[Problem Solving] Question 6

(a) $P(A \cup B) = 0.6 + 0.5 - 0.3 = 0.8$

(b) P(A)×P(B)=0.6×0.5=0.3=P(A∩B) → independent ✓

(c) $P(A' \cup B') = P((A \cap B)') = 1 - 0.3 = 0.7$

∴ **(a) 0.8 (b) Independent ✓ (c) 0.7**