REVIEW SET 7A

1 If $S = \{x \mid 2 < x \leqslant 7, \ x \in \mathbb{Z}\}$:

   a list the elements of S **b** find $n(S)$.

2 Determine whether $A \subseteq B$ for the following sets:

   a $A = \{2, 4, 6, 8\}$ and $B = \{x \mid 0 < x < 10, \ x \in \mathbb{Z}\}$

   b $A = \varnothing$ and $B = \{x \mid 2 < x < 3, \ x \in \mathbb{R}\}$

   c $A = \{x \mid 2 < x \leqslant 4, \ x \in \mathbb{Q}\}$ and $B = \{x \mid 0 \leqslant x < 4, \ x \in \mathbb{R}\}$

   d $A = \{x \mid x < 3, \ x \in \mathbb{R}\}$ and $B = \{x \mid x \leqslant 4, \ x \in \mathbb{R}\}$

3 Find the complement of X given that:

   a $U = \{$the 7 colours of the rainbow$\}$ and $X = \{$red, indigo, violet$\}$

   b $U = \{x \mid -5 \leqslant x \leqslant 5, \ x \in \mathbb{Z}\}$ and $X = \{-4, -1, 3, 4\}$

   c $U = \{x \mid x \in \mathbb{Q}\}$ and $X = \{x \mid x < -8, \ x \in \mathbb{Q}\}$

4 On separate Venn diagrams like the one alongside, shade:

   a N' **b** $M \cap N$ **c** $M \cap N'$

5 Let $U = \{$the letters in the English alphabet$\}$, $A = \{$the letters in "springbok"$\}$, and $B = \{$the letters in "waterbuck"$\}$.

   a Find: **i** $A \cup B$ **ii** $A \cap B$ **iii** $A \cap B'$

   b Write a description for each of the sets in **a**.

   c Show U, A, and B on a Venn diagram.

6 Let $U = \{x \mid x \leqslant 30, \ x \in \mathbb{Z}^{+}\}$, $P = \{$factors of 24$\}$, and $Q = \{$factors of 30$\}$.

   a List the elements of: **i** P **ii** Q **iii** $P \cap Q$ **iv** $P \cup Q$

   b Illustrate the sets P and Q on a Venn diagram.

7 A school has 564 students. During Term 1, 229 of them were absent for at least one day due to sickness, and 111 students missed some school because of family holidays. 296 students attended every day of Term 1.

   a Display this information on a Venn diagram.

   b Find how many students:

      i missed school for both illness and holidays

      ii were away for holidays but not sickness

      iii were absent during Term 1 for any reason.

8 The main courses at a restaurant all contain rice or onion. Of the 23 choices, 17 contain onion and 14 contain rice. How many dishes contain both rice and onion?
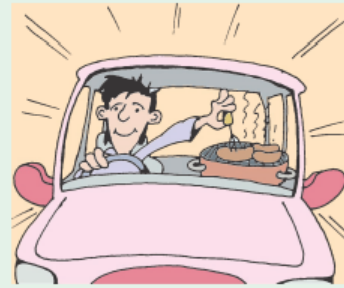
9 38 students were asked what life skills they had. 15 could swim, 12 could drive, and 23 could cook. 9 could cook and swim, 5 could swim and drive, and 6 could drive and cook. There was 1 student who could do all three. Find the number of students who:

   a could only cook

   b could not do any of these things
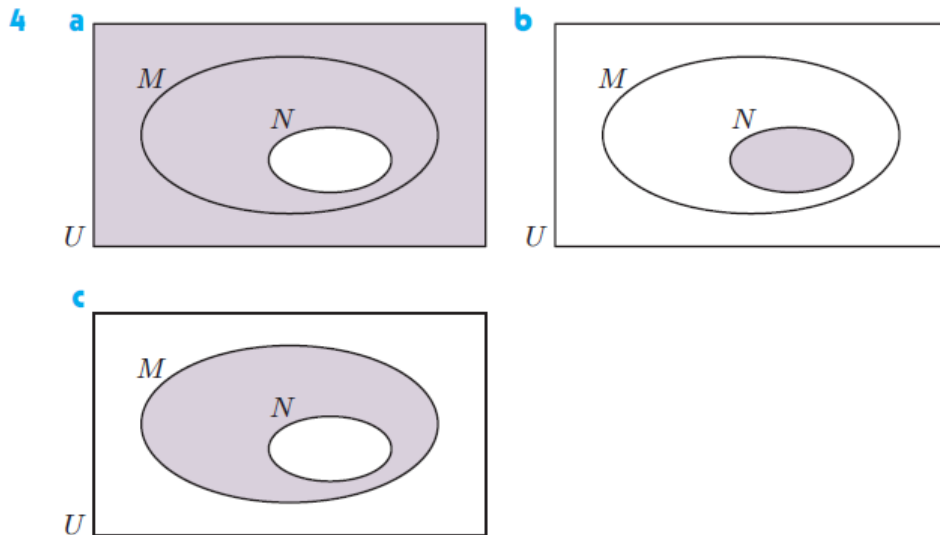
   c had exactly two life skills.

10 Consider the sets $U = \{x \mid x \leqslant 10, \; x \in \mathbb{Z}^+\}$, $P = \{$odd numbers less than 10$\}$, and $Q = \{$even numbers less than 11$\}$.

   a List the sets P and Q.   **b** What can be said about sets P and Q?

   c Illustrate sets P and Q on a Venn diagram.

ANSWERS

1 **a** $S = \{3, 4, 5, 6, 7\}$ **b** 5

2 **a** Yes **b** Yes **c** No **d** Yes

3 **a** $X' = \{\text{orange, yellow, green, blue}\}$
   b $X' = \{-5, -3, -2, 0, 1, 2, 5\}$
   c $X' = \{x \mid x \geqslant -8, x \in \mathbb{Q}\}$

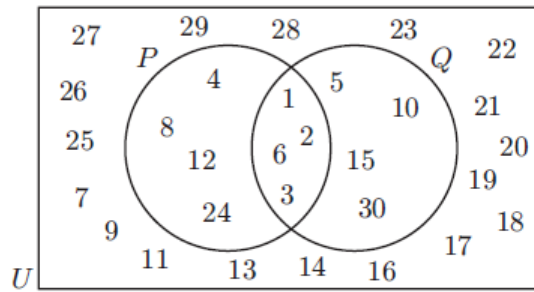**4** **a**

b

c

5 **a** **i** $\{s, p, r, i, n, g, b, o, k, w, a, t, e, u, c\}$
   ii $\{r, b, k\}$ **iii** $\{g, i, n, o, p, s\}$

   b **i** {the letters in 'springbok' or 'waterbuck'}
   ii {the letters common to both 'springbok' and 'waterbuck'}
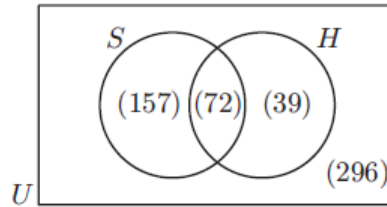   **iii** {the letters in 'springbok' but not 'waterbuck'}

c
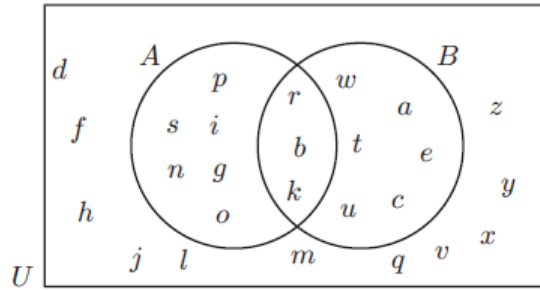
6 a i {1, 2, 3, 4, 6, 8, 12, 24}

ii {1, 2, 3, 5, 6, 10, 15, 30}　　　**iii** {1, 2, 3, 6}

iv {1, 2, 3, 4, 5, 6, 8, 10, 12, 15, 24, 30}

b

7 a

b i 72

ii 39

iii 268

8 8　　　**9 a** 9　　**b** 7　　**c** 17

10 a $P = \{1, 3, 5, 7, 9\}$

$Q = \{2, 4, 6, 8, 10\}$

b They are disjoint.

c