Name:
Group 1
Result:

1. [2]
Let $A = \{1, 2, 3, 4, 5\}, B = \{2, 4, 6, 8\}$ and $C = \{3, 5\}$. State, if the following statements are true (T) or false (F).

$A \cap B = \{2, 4, 6\}$

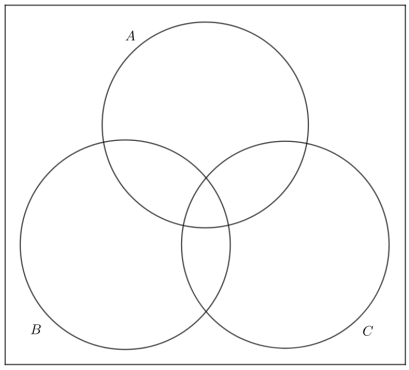
$C \subset A$

$B \cup C = \emptyset$

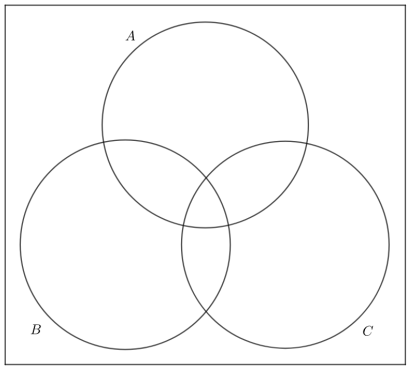
$A - B = \{1, 3, 5, 6, 8\}$

2. [2]
Represent the following sets on the Venn diagrams:

$(A \cap B) \cup C$



$(A \cup B \cup C)^c$



3. [2]
A class consists of 30 students: 12 like football, 9 like volleyball and 15 do not like either. Find the number of students who:

(a) like both sports,

(b) like exactly one of the two sports.

4. [4]

A group of 40 teenagers were asked what social media platform they use.

33 use Facebook,
28 use Instagram,
10 use X (former Twitter),
24 use both Facebook and Instagram,
7 use both Facebook and X,
6 use both X and Instagram,
2 use none.

Find the number of teenagers in this group who:

(a) use all three platforms,

(b) use exactly one of the three platforms,

(c) use Facebook or Instagram but not X.

5. [3]

Let $A =]-\infty, 2]$, $B = [-1, 3]$ and $C =]0, \infty[$. Find:

$A \cap B$	$A \cup B$	$A - B$
$A \cap C$	$A \cup C$	$A - C$
$B \cap C$	$B \cup C$	$B - C$

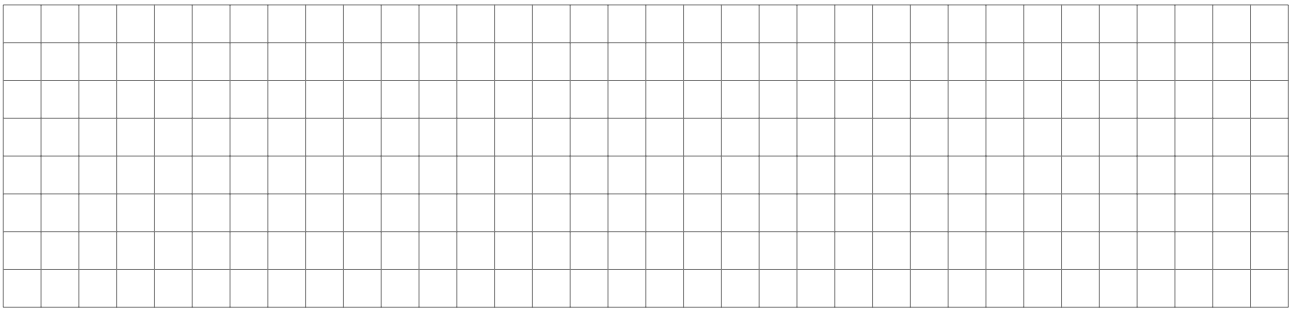
6. [6]

Solve the following inequalities:

(a) $\dfrac{x+2}{3} - \dfrac{x-1}{4} > 1$

(b) $2|x-2| - 1 \leqslant 5$

Represent each solution on the number line:



Let A and B be the sets of all solutions to inequalities in parts (a) and (b) respectively. Find:

(i) $A \cap B$, (ii) $A \cup B$. (iii) $B - A$.

7. [4]

Solve the following systems of equations:

(a) $\begin{cases} 2x + 3y = 4 \\ x - 2y = 9 \end{cases}$

(b) $\begin{cases} 3x - y = 7 \\ y = 3x - 1 \end{cases}$

Each equation in the above systems represents a line. State in each case, if the two equations in a system represent lines which are (i) intersecting, (ii) coincident (they are the same line) or (iii) parallel, but not coincident.

8. [4]

Consider the points $A(-2, 5)$ and $B(4, 1)$.

(a) Calculate the gradient of the line segment AB,

(b) Point $C(7, y_c)$ is collinear with A and B, find y_c.

(c) Find the midpoint of AB,

(d) Find the equation of perpendicular bisector of AB.

9. [10]

Consider two lines with equations: $2x - 3y = 12$ and $y = -2x + 4$.

(a) Find:

(i) the gradient of each line,

(ii) intercepts of each line with the axes,

(iii) coordinates of point of intersection of the two line,

(b) Determine if the points $A(1, 2)$, $B(4, 5)$ and $C(3, -2)$ lie on these lines.

(c) Sketch the two lines.