MATH 7: HANDOUT 0
REVIEW PROBLEMS

1. On the island of knights and knaves, you meet two inhabitants: Sue and Zippy. Sue says that Zippy is a knave. Zippy says, "I and Sue are knights." Who is a knight and who is a knave?

2. In a class of 25 students, 10 students know French, 5 students know Russian, and 12 know neither. How many students know both Russian and French?

3. Let
A=set of all people who know French
B=set of all people who know German
C=set of all people who know Russian
Describe in words the following sets:

(a) $A \cap B$ (b)$A \cup (B \cap C)$ (c) $(A \cap B) \cup (A \cap C)$ (d) $C \cap \overline{A}$.

4. Solve the following equation:

$$3x^2 - (3x + 2)(x - 1) - 4(x + 2) = 0$$

5. Solve the equation

$$|7x + 3| = 24$$

6. Imagine that from the regular card deck of 52 cards (4 suits, 13 cards per suit) you randomly choose 5 cards. What is the probability that all five cards are hearts ♡?

7. In how many ways can one arrange 5 books on a shelf?

8. Simplify the following expression

$$\frac{(z^3y)^2 \cdot z^2y^3}{z^3y^2}$$

9. Draw the graphs of the following functions:
(a) $2x + 3y = 1$
(b) $2x - 1 = y$
(c) $y = |x| - 2$
(d) $y = |2x - 4|$

10. Point M has coordinates $(5, 7)$.
(a) Find coordinates of the point M_1 obtained from M by reflection around the x-axis
(b) Find coordinates of the point M_2 obtained from M by reflection around the diagonal line.