IB Math Minds

# Quiz 1 - Probability of Events

**[total marks on quiz: 35 marks]**

No GDC allowed on questions 1-5; GDC is allowed on the last question #6.

1. A bag contains 4 black balls, 2 white balls and 3 red balls. A ball is chosen at random from the bag and is not replaced. A second ball is chosen. Find the probability of choosing one black ball and one red ball in any order. **[4 marks]**

2. Independent events $A$ and $B$ are such that $p(A) = 0.2$ and $p(A \cup B) = 0.6$. Find $p(B)$. **[4 marks]**

3. An alarm clock is used to wake a student for school. The probability that the alarm rings is $\frac{4}{5}$. If the alarm rings, there is a probability of $\frac{7}{8}$ that the student arrives at school on time; but, if the alarm does not ring, the probability that the student arrives at school on time is $\frac{1}{10}$.
   Find:
   (a) the probability that the student arrives at school on time on a given day; **[4 marks]**
   (b) the probability that, on a randomly chosen morning on which the student is late for school, the alarm did not ring. **[4 marks]**

4. Two dice are rolled. The score is the smaller of the two numbers that appear; if the same number appears on both dice, then the score is that number. What is the probability that the score is 3? **[4 marks]**

5. Events $A$ and $B$ are given such that $\mathrm{P}(A \cap B) = \frac{1}{5}$, $\mathrm{P}(B \mid A) = \frac{1}{2}$, $\mathrm{P}(A \mid B) = \frac{3}{10}$. Find:
   (a) $\mathrm{P}(B)$; **[3 marks]** (b) $\mathrm{P}(A)$; **[3 marks]** (c) $\mathrm{P}(A \cup B)$ **[2 marks]**

6. A couple is told that the probability that they will have blue-eyed children is $\frac{1}{4}$. The couple would like to have 6 children.
   (a) What is the probability that 3 of the 6 children will be blue-eyed? **[4 marks]**
   (b) What is the probability that all 6 children will be blue-eyed? **[3 marks]**