

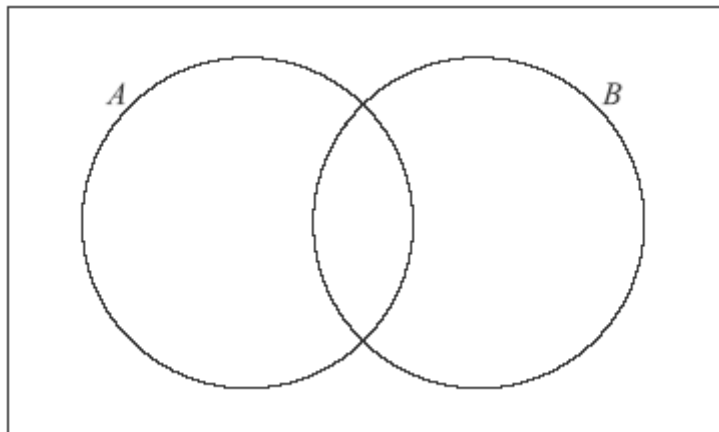
1. A group of 30 students were asked about their favourite topping for toast.

18 liked peanut butter (A)

10 liked jam (B)

6 liked neither

- (a) Show this information on the Venn diagram below.



(2)

- (b) Find the number of students who like both peanut butter and jam.

(2)

- (c) Find the probability that a randomly chosen student from the group likes peanut butter, given that they like jam.

(2)

(Total 6 marks)

2. In a research project on the relation between the gender of 150 science students at college and their degree subject, the following set of data is collected.

| | | Degree Subject | | |
|--------|--------|----------------|---------|-----------|
| | | Biology | Physics | Chemistry |
| Gender | Male | 40 | 16 | 35 |
| | Female | 15 | 24 | 20 |

Find the probability that a student chosen at random

- (a) is male;

(2)

- (b) is either male or studies Chemistry;

(2)

- (c) studies Physics, given that the student is male.

(2)

(Total 6 marks)

3. 100 students are asked what they had for breakfast on a particular morning. There were three choices: cereal (X), bread (Y) and fruit (Z). It is found that

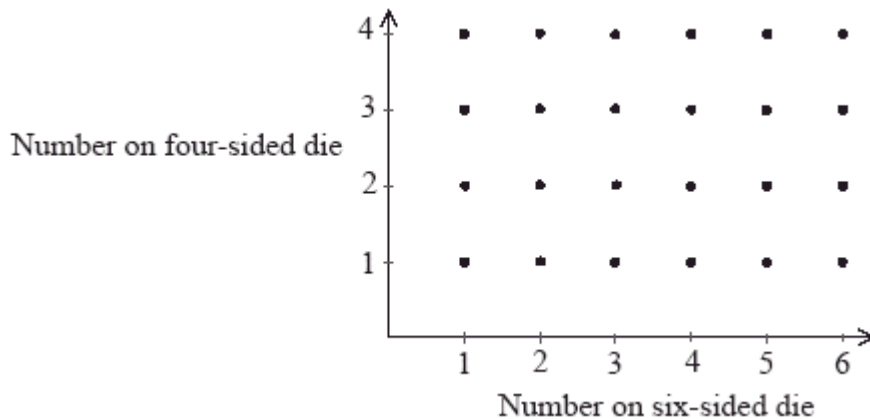
10 students had all three
17 students had bread and fruit only
15 students had cereal and fruit only
12 students had cereal and bread only
13 students had only bread
8 students had only cereal
9 students had only fruit

- (a) Represent this information on a Venn diagram. (4)
- (b) Find the number of students who had none of the three choices for breakfast. (2)
- (c) Write down the percentage of students who had fruit for breakfast. (2)
- (d) Describe in words what the students in the set $X \cap Y$ had for breakfast. (2)
- (e) Find the probability that a student had **at least** two of the three choices for breakfast. (2)
- (f) Two students are chosen at random. Find the probability that both students had all three choices for breakfast. (3)

(Total 15 marks)

4. A fair six-sided die has the numbers 1, 2, 3, 4, 5, 6 written on its faces. A fair four-sided die has the numbers 1, 2, 3, and 4 written on its faces. The two dice are rolled.

The following diagram shows the possible outcomes.



- (a) Find the probability that the two dice show the same number. (2)
- (b) Find the probability that the difference between the two numbers shown on the dice is 1. (2)
- (c) Find the probability that the number shown on the four-sided die is greater than the number shown on the six-sided die, given that the difference between the two numbers is 1. (2)
- (Total 6 marks)**

5. The diagram shows triangle ABC in which angle $\hat{BAC} = 30^\circ$, $BC = 6.7$ cm and $AC = 13.4$ cm.

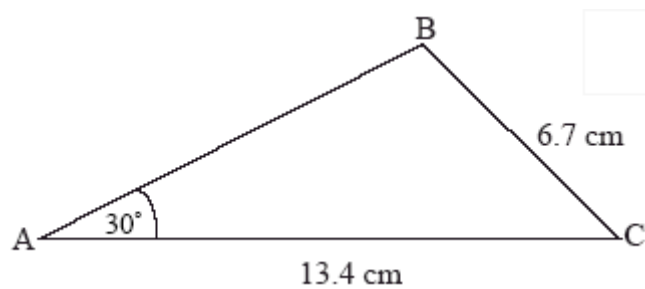


diagram not to scale

- (a) Calculate the size of angle \hat{ACB} . (4)

Nadia makes an accurate drawing of triangle ABC. She measures angle \hat{BAC} and finds it to be 29° .

- (b) Calculate the percentage error in Nadia's measurement of angle \hat{BAC} . (2)
- (Total 6 marks)**

6. A basketball is dropped vertically. It reaches a height of 2 m on the first bounce. The height of each subsequent bounce is 90% of the previous bounce.
- (a) What height does it reach on the 8th bounce? (2)
- (b) What is the total vertical distance travelled by the ball between the first and sixth time the ball hits the ground? (4)
- (Total 6 marks)**
7. A National Lottery is offering prizes in a new competition. The winner may choose one of the following.
- Option one:** \$1000 each week for 10 weeks.
- Option two:** \$250 in the first week, \$450 in the second week, \$650 in the third week, increasing by \$200 each week for a total of 10 weeks.
- Option three:** \$10 in the first week, \$20 in the second week, \$40 in the third week continuing to double for a total of 10 weeks.
- (a) Calculate the amount you receive in the tenth week, if you select
- (i) **option two;**
- (ii) **option three.** (6)
- (b) What is the total amount you receive if you select **option two?** (2)
- (c) Which option has the greatest total value? Justify your answer by showing all appropriate calculations. (4)
- (Total 12 marks)**