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Probability

Venn diagrams and probability

Calculating probability can be easier when you can see the information in a diagram. In this lesson, we introduce the terminology and concepts needed to draw and use Venn diagrams.

Lesson Outcomes

By the end of this lesson, you should be able to:

- represent a probability with a Venn diagram
- identify the sample space of an experiment
- describe what an event space is
- use Venn diagrams to help solve problems

Curriculum Links

LO 3: Data Handling and Probability

- 10.4.2 (b) Use Venn diagrams as an aid to solving probability problems, appreciating and correctly identifying:
- the sample space of a random experiment;
 - an event of the random experiment as a subset of the sample space

Lesson Notes

A **Venn diagram** can be used to represent data in sets.

A **set** is a collection of things which have something in common.

A **subset** is a set completely contained within another set.

A **sample space** is the set of all possible outcomes.

An **event** is a description of an outcome from an experiment.

An **event space** is the set of all favourable outcomes. The event space is a subset of the sample space.

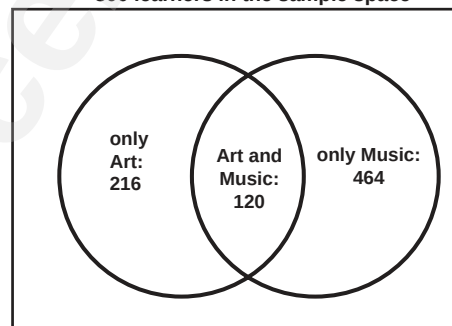
Subsets can **intersect**. This means that some elements of one set also belong to the other set.

Example: Here is a Venn diagram to represent the numbers of learners wanting to do Art and Music at a school.

What is the chance of meeting a learner who wants to do both Art and Music?

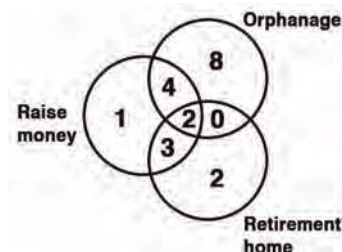
$$\begin{aligned}
 \text{Probability} &= \frac{\text{Number of favourable outcomes}}{\text{Number possible outcomes}} \\
 &= \frac{\text{event space}}{\text{sample space}} \\
 &= \frac{120}{800} \\
 &= \frac{3}{20}
 \end{aligned}$$

800 learners in the sample space



Task

20 learners are asked what social responsibility activities they prefer to do. They can raise money for a charity, play with the children at an orphanage and entertain the aged at a retirement home. This Venn diagram shows the results.



1. Explain what the number in each part of the Venn diagram represents.
2. What percentage of all the learners want to raise money?
3. If we chose one learner at random, what is the probability that he or she wants to visit the orphanage?