

# Probability taken further

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- 1 If an ordinary die is thrown once, what is the probability that the score is
- (a) even (c) even and greater than 4  
(b) greater than 4 (d) even or greater than 4?
- 2 Jim throws a coin and a die. List the possible outcomes and find the probabilities that he gets
- (a) a head and a six (c) a head but not a six.  
(b) a head or a six (or both)
- 3 A twenty-sided fair die is thrown once. Find the probabilities that the score is
- (a) prime  
(b) square  
(c) prime and square  
(d) prime or square  
(e) neither prime nor square. (The first square is 1, the first prime is 2.)
- 4 Years ago I wrote out by hand all the numbers from 1 to 900 on a square grid, (to be used for finding prime numbers by the *sieve of Eratosthenes*.) If a number on the grid is chosen randomly, what is the probability that it is divisible by
- (a) 6 (c) 6 and 10  
(b) 10 (d) 6 or 10 (or both)?
- 5 Assuming that an unborn baby is equally likely to be a boy or a girl, find, by listing the possibilities, the probabilities that Mrs Smith's first two children are
- (a) both boys,  
(b) of opposite sex.  
(c) If you know that at least one of the two children is a girl, what is the probability that both are girls? Would the answer be different if you knew that the firstborn was a girl?

In a family of three children, what is the chance of

- (d) the boys outnumbering the girls  
(e) having at least one child of each sex?
- 6 In Mammon Square 15% of the residents are millionaires ( $M$ ) and 8% own a Rolls-Royce ( $R$ ). Anyone who is either a millionaire or a Rolls-Royce owner (or both) can be enrolled in the membership of the exclusive Mammon Club. Use the Venn diagram on the right to help answer:
- (a) If 3% of residents are Rolls-Royce owning millionaires, what percentage qualify for membership of the Mammon Club?  
(b) If instead 18% of the residents qualify for club membership, what percentage are millionaires with Rolls-Royces?

