



# The Card Counter

NAME: .....

CLASS: .....

DATE: .....



## Basic

1) For each statement, write one of the following words to describe the probability: impossible, unlikely, evens (50-50), likely and certain.

- a) I will blink my eyes today.
  
- b) I will have a birthday this year.
  
- c) There will be snow in January.
  
- d) Christmas will be in June this year.
  
- e) The next person I see will be female.
  
- f) I will win the lottery on Saturday night.

2) A bag contains six green balls and twelve blue balls. If a ball is picked at random, what is the probability that it will be green?

- 3) A die numbered from 1 to 6 is rolled.
  - a) What is the probability that it will show a 3?
  
  - b) What is the probability that it will be an even number?
  
  - c) What is the probability that it will be an 8?

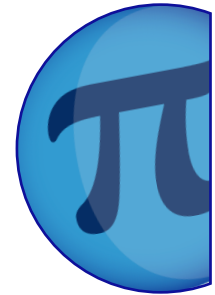


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## Core

1) Complete the sentences using one of the following words: outcome, event, success, failure.

a) In any trial, each separate possible result is called an \_\_\_\_\_.

b) The particular occurrence being looked for in a trial is the \_\_\_\_\_.

c) When it occurs, we have a \_\_\_\_\_; when it does not occur, we have a \_\_\_\_\_.

2) a) What is the probability of drawing an ace from a pack of cards?

b) If this card is replaced and the cards are shuffled, now what is the probability of drawing an ace?

c) If the card is not put back in the pack then what would be the probability of drawing an ace?

3) A box contains six 20ohm resistors and twelve 30ohm resistors. The resistors are all unmarked and of the same physical size.

a) If one resistor is picked out at random, determine the probability of its resistance being 20ohms.

b) If the first resistor is found to be 20ohms and it is retained on one side, find the probability that a second selected resistor will be of resistance 30ohms.



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## Advanced

- 1) A die is rolled five times. Determine the probability of obtaining three sixes.
  
- 2) It is known that 10% of moulded plastic items are defective. Determine:
  - a) the probability that any one item is (i) defective (ii) acceptable.
  
  - b) the number of acceptable items likely to be found in a sample batch of 4500.
  
- 3) A machine produces on average 2% defectives. In a random sample of 60 items, determine the probability of there being three defectives.
  - a) Use the Poisson distribution to find the probability.
  
  - b) Use the binomial expression to find the probability.



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## ANSWERS

### Basic

- 1) a) certain                      b) certain                      c) likely  
d) impossible                    e) evens (50-50)              f) unlikely
- 2)  $\frac{1}{3}$
- 3) a)  $\frac{1}{6}$                               b)  $\frac{1}{2}$                               c) 0 : impossible

### Core

- 1) a) outcome                    b) event                          c) success                      d) failure
- 2) a)  $\frac{4}{52} = \frac{1}{13}$                     b)  $\frac{1}{13}$                               c)  $\frac{1}{17}$
- 3) P(20 ohm) =  $\frac{6}{18} = \frac{1}{3}$                               b) P(30 ohm) =  $\frac{12}{17}$

### Advanced

- 1)  $n = 5$      $r = 3$      $P(\text{six}) = \frac{1}{6}$                        $P(\text{not six}) = \frac{5}{6}$   
 $P(\text{three sixes}) = \frac{125}{3888} = 0.0322$
- 2) a) (i)  $P(\text{defective}) = \frac{1}{100} = \frac{1}{10}$                               (ii)  $P(\text{acceptable}) = \frac{90}{100} = \frac{9}{10}$
- b)  $E = n \times P(\text{acceptable}) = 4500 \times \frac{9}{10} = 4050$
- 3) a)  $n = 60$ ;  $p = \frac{2}{100} = 0.02$ ;  $\mu = np = 60 \times 0.02 = 1.2$ ;  $P = 0.0867$
- b)  $n = 60$ ;  $r = 3$ ;  $q = 0.98$ ;  $p = 0.02$ ;  $P = 0.0865$