IN5 T2 KEY + Psychology Glossary KEY

2. Don't bet on it

Engage p. 22

1. The total is 18 t-shirts, and one-third (6) of them are black (6/18 = 1/3 = 33.3%). The probability of picking a black t-shirt is 1/3 or 33.3%.
2. Out of a total of 17 people, three are your aunts. The probability of seeing one of your aunts first is 3/17 or 17.6%.
3. There are 20 numbers in all. Out of numbers 1 - 20 the following nine are a multiples of 3 or 5: {3, 6 , 9, 12, 15, 18, 5, 10, 20}. So the probability of getting a multiple of 3 or 5 is 9/20 or 45%.

2a p. 26

1. Its faces are smooth; it's got precise edges.
2. The pips that are carved out are filled with plastic that is of the same density (weight) as the plastic in the dice.
3. It makes him unsettled because to him it represents the unknowable.
4. His specialty is mathematics, the science of patterns.
5. Knowing the patterns helps him predict the future and know the unknowable.
6. It can be the key to survival.
7. There seems to be no way of knowing the outcome of a roll before the dice rests.
8. He realized that there were patterns that could be used in throwing the dice and betting on them.
9. It means that there are 36 different combinations for the dice to land with
10. He had predicted the date of his own death and committed suicide on that day to make the prediction come true.

2b p. 26

1. Arpakuution silmät on kaiverrettu noppaan ja sitten täytetty maalilla, jonka tiheys on sama kuin muovin, jota käytetään/on käytetty nopan valmistuksessa.
2. Tällä varmistetaan, ettei sivu, jossa on numero 6 ole hiukkaakaan kevyempi kuin sivu vastakkaisella puolella, missä on vain yksi silmä.
3. Varmastikin siinä on vain kyse oikeiden fysiikan lakien soveltamisesta ja sopivien matemaattisten yhtälöiden ratkaisusta.
4. Kyky huomata kaavoja/säännönmukaisuuksia on vahva ase evoluution henkiinjäämiskamppailussa.
5. Mutta on joitakin asioita, jotka eivät vaikuta olevan säännönmukaisia tai joiden kaavat ovat niin monimutkaisia tai niin piilossa, että ne ovat inhimillisen ymmärryksen ulottumattomissa.
6. Hän oli niin omistautunut pyrkimykselleen ennustaa sitä, mitä ei voi tietää, että kerran hän jopa myi vaimonsa omaisuuden kerätäkseen varoja pelipöydän panoksiin.

2c p. 27

1. The writer got his red dice on a trip to Las Vegas.
2. Pips are the dots indicating a numerical unit on dice.
3. Mathematics is the writer's field of expertise. He says maths is the science of patterns.
4. There are regular patterns in the movements of the Sun and the Moon which can be relied on to predict the future correctly.
5. Girolamo Cardano was a gambler who tried to use patterns to his advantage in the throw of dice.
6. Cardano reasoned that in the case of two dice being thrown, it made sense to bet on 9 rather than 10.
7. Cardano had predicted the date of his death: 21 September 1576. He committed suicide when the date finally struck.

2d p. 27

1. provided there is some way
2. it's just a matter of applying the right laws of physics
3. To become masters of fate, not its servants
4. the human species
5. some chance to predict the future
6. in the evolutionary fight for survival
7. beyond human knowledge
8. the dice has been used since antiquity
9. to raise the funds
10. when it came to his gambling
11. he took matters into his own hands
12. As much as I crave knowledge
13. most would prefer to opt out

2f p. 28

1. On
2. to
3. on/from
4. to
5. On
6. into
7. to
8. on
9. in
10. -
11. through/into
12. beyond
13. to
14. on
15. On
16. to
17. -
18. on
19. over/in
20. to
21. at
22. to
23. -
24. on
25. to
26. on
27. from/off
28. across/on
29. on

2g p. 28

1. Ihmiset pelaavat uskoen voittoputkeen.
2. Ruletin pallo pysähtyi mustalle numerolle 26 kertaa peräkkäin. Ihmiset menettivät miljoonia uskoessaan punaisen numeron todennäköisyyteen.
3. Yhdennentoista heiton todennäköisyys on 50/50 eli sama kuin jokaisella heitolla, mutta kymmenen peräkkäisen kruunan heittämisellä on hyvin pieni todennäköisyys.
4. Apinat valitsivat silmien liikkeellä tietokonenäytöltä kahdesta vaihtoehdosta, joista toinen tuotti heille palkinnon. 5.

Apinat uskoivat (ihmisten tavoin) voittojen tulevan jatkumossa.
6. Asioilla on usein yhteys, jolloin yksi seikka johtaa toiseen.

TAPESCRIPT

People make foolish choices when they are gambling, but there is possibly a good reason.
When we gamble, something peculiar occurs. It's called the 'hot hand' myth – an idea that luck comes in streaks. Believing in this myth can cost you a large amount of money. Playing e.g. roulette, your chances of winning stay the same throughout the game. If you win, your chances of another win aren't any better or worse. But we do not accept this fact, and people frequently bet on the possibility that streaks of luck will continue – the idea of the 'hot hand'. **// 1**

The opposite belief is to wager on the end of a good luck streak. People have the pathetic hope that events of chance must balance out. This is known as the gambler's fallacy. In 1913, at the roulette table at the Casino of Monte-Carlo, the ball fell on black 26 times in a row. Gamblers believed that the chances of the ball falling on red grew better with the length of the run of blacks and, as a result, lost millions. **// 2**

In truly random events like roulette or the lottery, there is no force which makes things more or less probable. If you toss a coin and get ten heads in a row, the chances of throwing yet another heads is still 50/50. (Of course, in the beginning before starting to toss a coin, the odds of throwing ten in a row are very little.)

The hot hand and gambler’s fallacy show that we have an irrational belief in the non-randomness of the universe. We can't quite believe that those coins, roulette wheels or playing cards really have the same probabilities on each toss, spin or deal. **//3**

An experiment in the University of Rochester showed that monkeys playing a gambling game are influenced by the same hot hand superstition as humans. The experiment involved monkeys using eye-movements to control a computer display. They shifted their gaze either left or right to show their picks. They were given two choices, one of which gave them a reward. The right option was random and had the same 50/50 chance as tossing a coin. Still, the monkeys tended to select the option they had previously won with, as if thinking their luck would continue.

Monkeys aren't taught probability theory at school. They haven't learned theories of randomness. The monkeys' choices must, therefore, be based on some basic feeling about how the world works. They share the same misconceptions as we humans.**//4**

The researchers argue that it’s sometimes beneficial to act this way. Often, chains of good luck or failure are linked. On some days everything seems to go your way, on another, nothing really works for you. There usually is an underlying reality here, things are connected so one thing leads to another. An example of this for the monkeys is food. Finding a ripe fruit to eat is a chance event, but also one which isn't independent. If you find one ripe fruit in a tree, the chances are that you'll find more in that same tree.

The deeper lesson in human nature is that we shouldn't be hasty in calling actions irrational. A belief in the hot hand might make you choose wrong, or worse, lose a lot of money. But it may be that in the long-term, in evolution, believing that luck comes in streaks can prove to be more often beneficial than harmful. **//5**

2i p. 29

1. anthro**pol**ogist
a social scientist who specializes in the study of humanity
2. archae**ol**ogist
a specialist in the study of prehistoric peoples and their cultures
3. a**stron**omer
a scientist who observes and studies the celestial bodies (planets, comets, asteroids, etc)
4. bi**ol**ogist
a specialist in the science of life or living matter in all its forms and phenomena
5. crimi**no**logist
a specialist in the study of crime and criminals
6. e**co**logist
a biologist who studies the relation between organisms and their environment
7. e**con**omist
an expert in the science of economics
8. ge**net**icist
a biologist who specializes in genetics
9. ge**og**rapher
a person who specializes in geographical research, delineation, and study
10. ge**ol**ogist
an expert in the field of geology, the study of what the Earth is made of and how it was formed
11. ichthy**ol**ogist
an animal scientist who studies fish
12. immun**ol**ogist
a medical scientist who specializes in the structure and function of the immune system
13. mathema**tic**ian
a person skilled or learned in mathematics
14. meteo**ro**logist
a specialist who studies processes in the earth's atmosphere that cause weather conditions
15. neuro**sci**entist
a neurobiologist who specializes in the study of the brain
16. nu**tri**tionist
a person who specializes in nutrition and the nutritive value of various foods
17. orni**tho**logist
an animal scientist who studies birds
18. paleon**to**logist
a specialist in the science of the forms of life in former geologic periods, as represented by their fossils
19. pa**tho**logist
a doctor who specializes in medical diagnosis
20. pharma**co**logist
an expert in the science of drugs (their composition and uses and effects)
21. **phy**sicist
a scientist trained in physics
22. physi**ol**ogist
a biologist specializing in the functions of living organisms
23. soci**ol**ogist
a social scientist who studies development of human society and human social relationships
24. statis**tic**ian
an expert in or compiler of statistics
25. vi**ro**logist
someone who studies viruses and viral diseases.
26. zo**ol**ogist
a specialist in the branch of biology dealing with animals

2j p. 30

1. Ada Lovelace: English
Famous for being often regarded as the first computer programmer producing a mathematical algorithm that was later used in computers
2. Albert Einstein: German/American
Famous for changing history with 'E = mc2'
3. Alan Turing: British
Famous for cracking the German Enigma encryptions; also called "the Father of computer science"
4. Archimedes: Greek
Famous for being "the Greatest mathematician of antiquity"; came up with the law: "Any object, wholly or partially immersed in a fluid, is buoyed up by a force equal to the weight of the fluid displaced by the object."
5. Blaise Pascal:French
Famous for inventing the mechanical calculator. The SI unit of pressure was named after him.
6. Galileo Galilei: Italian
Famous for making important discoveries relating to planetary motion and orbits. With his telescope he discovered the Sun had sunspots.
7. Girolamo Cardano : Italian
Famous for being a mathematician, physician, biologist, physicist, chemist, astrologer, astronomer, philosopher, writer, and gambler.
8. Isaac Newton: English
Famous for formulating the laws of gravity; the inventor of calculus.
9. Leonardo Fibonacci: Italian
Famous for introducing the Arabic numbering system; came up with a number sequence named after him (0, 1, 1, 2, 3, 5, 8, 13, 21, 24, 34, 55, 89, …)
10. Pythagoras: Greek
Famous for formulating a famous theorem in trigonometry on the three sides of a right triangle: $a^2 + b^2 = c^2$.
11. René Descartes: French
Famous for inventing 'the Cartesian coordinate system' (i.e. square grid lines, x and y axis, etc.).

2k p. 31

The bet was not fair. He calculated the probability wrongly. Probability does not accumulate, like 1/6 x 3. The probability of the man NOT getting a one in three throws is: 5/6 x 5/6 x 5/6, which is 125/216. This was the probability of the hustler winning and keeping the bet.
Thus, the remaining fraction, 91/216, was the actual chance of the man winning.

Glossary: Psychology

A p. 33

1. phobia
2. delusion
3. sanity
4. obsession
5. innate
6. frustration
7. insomnia
8. conscious
9. trait
10. mature

B p. 33

1. conscious
2. emotions
3. traits
4. reinforcement
5. intrinsic
6. therapy
7. disorders
8. self-esteem
9. anxiety
10. obsession