

TEST SAMPLE

READING COMPREHENSION AREA

Read the passage below and use the information to answer the following five questions

Numerous research said the breakfast is one of the most important meals of the day. The habit of some people to skip just this meal is harmful to health. Our body can bear to not eat during the night thanks to the energy it keeps in the liver and, although to a lesser extent, in the muscles. However, this energy is limited: it runs out after about 8 hours in children and up to 12 hours after the last meal in adults. After this period of fasting, the body needs other energy to perform all its functions. Therefore, it is important to have a breakfast that provides our body with the necessary carbohydrates (namely, sugars), that is the energy for the proper working of cells. The sugar used mainly by the body is glucose, which is found in foods both in simple shape (for example fructose and lactose) either in complex form (as in the case of starches). It is precisely because of the lack of sugar that people who skip breakfast often have difficulty in normal activities that take place in the morning, for example paying attention during school activities. Another problem linked to breakfast privation is excess weight, since skipping breakfast does not make you lose weight, as someone thinks. Instead, when you do not have breakfast, the sense of hunger increases and you tend to eat more at lunch or have high-calorie snacks, which is not recommended. In fact, during the day, the calories should be distributed as follows: approximately 20% at breakfast, 40% at lunch and 30% at dinner; snacks should only be 10% of total calories. However, this distribution is only as an indication: when it comes to nutrition, we must always take into account age, physical characteristics of everyone and the activities carried out. Nutrition professionals also suggest to have breakfast without eating fatty foods, but more nutritious foods: milk or yogurt (for calcium), a fruit or a juice (for vitamins), tea or coffee (for water), a bit of dried fruit (for vegetable protein), honey or jam (for simple carbohydrates), bread or biscuits (for complex carbohydrates).

1. THE HUMAN BODY:

1. must necessarily endure fasting during the night
2. stores most of the energy in the muscles, which then use it to carry out normal functions related to movement
3. manages to be reactive after waking up in direct proportion to the contribution of fat
4. manages to be reactive after waking up in inverse proportion to the contribution of sugars
- 5. manages to be reactive after waking up in direct proportion to the contribution of sugars**

2. IT IS CORRECT TO STATE THAT:

1. eating early in the morning is noxious to health
2. an adult should eat every 8 hours
3. an adult has a lower energy reserve capacity than a child
4. honey is part of complex carbohydrates
- 5. dried fruit is rich in non-animal proteins**

3. FOR PROPER NUTRITION, IT IS IMPORTANT TO:

- 1. assess the habits and characteristics of an individual**
2. follow only general information on nutrition
3. reduce the intake of complex sugars
4. avoid taking calories out of the meals and achieve a daily positive energy balance
5. avoid too nutritious food

4. BREAKFAST:

1. can be compared to a snack in terms of energy intake
2. must bring necessarily 20% of the daily calories to an individual
- 3. should be made up of varied food (that is varied nutrients)**
4. can be skipped for the control of body weight
5. increases the sense of hunger

5. CARBOHYDRATES:

1. are ingested by humans only through the bread
2. are substances that bring fats to the body
3. are not suitable energy suppliers for the human body
4. are critical to the proper functioning of the liver
- 5. are functional for the life of the cell**

Read the passage below and use the information to answer the following five questions

Worldwide, there are about 250 million children between 5 and 14 years old trapped in jobs that jeopardize their mental and physical health (in fact, these children are subject to many diseases and at 40 years old, their physique is like that of an elderly 90-year-old) and that condemn them to a life without fun or education. Almost half are employed full-time. The phenomenon of child labour is mainly concentrated in the poorest areas of the planet, as a by-product of poverty, which also contributes to cause. However, there are cases of child workers even in the northern marginal areas of the world (such as Eastern Europe, where there are 2.4 million working children). UNICEF statistics show that 61% of child labour is concentrated in Asia (with 127.3 million children in the central areas and 13.4 in the Middle East), 32% in Africa (including 48 million in sub-Saharan areas), 7% in Latin America (for a total of about 17.41 million of exploited children). UNICEF, in its estimates, takes account of the difference between *child labour* – exploitation of child workers in conditions that are detrimental to the psychological and physical well-being of the child – and *children's work*, a lighter form of economic activity, such as to do not harm the education or health of a child. Since Western multinational companies transfer their subsidiaries more and more to the Third World, where they can produce low-tech manufactured goods with a very low cost of labour, the children here easily find employment in export sectors. One in four children in developing countries is working even more than 9 hours a day for six days a week. Many adults are unemployed simply because business owners prefer children: they cost less, do not rebel and they are not trade union members.

1. IN TOTAL, HOW MANY WORKERS BETWEEN 5 AND 14 YEARS OLD ARE ESTIMATED TO BE IN THE FULL-TIME EMPLOYMENT WORLDWIDE?

1. Approximately 250 million
2. More than 500 million
3. 350 million, of which half are in Asia
4. More than 350 million

5. Approximately 125 million

2. THE TERM "MANUFACTURED GOODS" (LINE 15) MEANS:

- 1. products**
2. valuable assets
3. toys
4. imports
5. artefacts

3. WHICH OF THE FOLLOWING IS UNRELATED TO THE EXPLOITATION OF CHILD LABOUR?

1. Premature aging of individual workers
2. Proliferation of diseases
- 3. Crisis in the export sector**
4. Adult unemployment

5. Decreased workforce costs

4. ACCORDING TO THE DATA QUOTED IN THE PASSAGE, THE CHILD LABOUR WORKFORCE IS LESS IMPOSING IN:

1. the Middle East

2. Latin America

3. Eastern Europe

4. Sub-Saharan Africa

5. none of these

5. ACCORDING TO THE PASSAGE, WE CAN TALK ABOUT *CHILDREN'S WORK* IF:

1. a minor works under severe exploitation

2. a child voluntarily works 8 hours a day

3. the work done by the minor does not affect her/his psychological and physical development or her/his education

4. the child produces toys

5. the child is not employed in a multinational company

Read the passage below and use the information to answer the following five questions

In last weeks, the media have told the story of a family from Perdasdefogu, certified as the most long-lived family in the world for three years running, from 2012 to 2015. Nine living brothers, for a total of 818 years and 205 days (until June 1, 2012). However, their case is not an isolated example in Sardinia: rather, this island is one of the few "blue zones" in the world, term used by scholars to indicate areas in which the presence of centenarians is higher by percentage. Think that, now, in Sardinia, there are three hundred centenarians, while there are six hundred people who are 99 years old. The very interesting thing is that there are entire families of centenarians and the cases of spouses who are both centenarians are not rare. The "blue zones" owe their name to the colour of the marker used by scholars to plot the first maps of longevity in Sardinia (only later, the term was extended to show other areas of the planet with levels of longevity higher than average). To measure the level of longevity in each of the 377 Sardinian municipalities, they used the ELI index (Extreme Longevity Index), which expresses the probability of a newborn baby to get to 100 years; this is, by far, a more accurate index than the "old" prevalence criterion, which expresses the proportion of centenarians in a population within a geographical area. The chances of becoming centenarians in this island are twenty in ten thousand, against one in ten thousand in the rest of the world. The Sardinians are also the first in the world for male longevity. What are the secrets? Some familiar factors appear important, particularly with regard to lifestyle, diet (healthy food in the right quantities, sourdough bread and homemade yogurt, little or no alcohol) and exercise, so much that all "blue zones" are located in mountain village characterized by steep slopes that favor the continuous physical exercise of low intensity, even thanks to the daily travel to work; in addition, there is a pleasant social climate, where everyone knows and helps each other and where everyone is never alone. One note: on average, the Sardinians have not a longer life of the other Italian people; only the so-called "blue zones" swarm with centenarians, who live with clean air, their very simple and healthy life and with lower levels of stress.

1. THE SARDINIAN POPULATION:

1. lives mainly in mountainous areas
2. lives secluded

3. has been the first population to be "mapped" in terms of length of life

4. according to ELI index, is the most long-lived population in Italy
5. lives in areas where the air is healthy

2. AS FOR THE FAMILY FROM PERDASDEFOGU, IT IS RIGHT TO SAY THAT:

1. it is a family that has been known for 818 years
2. in 2015, it boasted the presence of nine ultra-centenarians within it
3. it is a family where all members are ultra-centenarians

4. none of these answers is correct

5. it is the household having the oldest person in the world

3. WHAT DOES THE TEXT MEAN WITH THE TERM “BLUE ZONES”?

1. Areas that overlook the sea or that are surrounded by water

2. Areas where the life expectancy at birth is higher than the rest of the territory

3. Areas marked with blue color on some maps in the archives of the Sardinian municipalities

4. Areas characterized by a low rate of senility

5. Areas where the mortality rate is lower than the national average

4. WHICH OF THE FOLLOWING STATEMENTS IS TRUE?

1. The longevity index was measured on a sample of Sardinian municipalities

2. The prevalence criterion records the chance of newborn children to get to 100 years

3. The ELI index is considered more accurate than the prevalence criterion as it allows you to define how many centenarians are within the population of a given geographical area

4. The Sardinians have twenty chance in ten thousand to become centenarians more than the world's population

5. On average, the Sardinian men are the men who live longer in the world

5. ACCORDING TO THE TEXT, WHICH ARE THE “SECRETS” FOR A HEALTHY AND LONG LIFE?

1. Living in a place where the weather is nice, go to work every day and drink little alcohol

2. Drink alcohol, take regular and never too much exercise

3. Living in the mountains or in secluded places and eating little bread

4. Having a balanced diet and keeping one's body in shape

5. Avoiding to subject the body to exercise and the mind to work stress

Read the passage below and use the information to answer the following five questions

Fact checkers are people or organizations controlling factual statements contained in various types of news, both before (*ante hoc*) and after (*post hoc*) their spread. The verification has always the aim to determine the truthfulness and accuracy of the statements. The use of the verified text can vary considerably, but often, they are texts directed to the public (for example, news of a newspaper or magazine) or to be spread within an association or institution. In the digital age, with the quick spread of news via the web and easier availability of sources, the fact-checking has extended to include also oral statements (for example, interviews or public speeches), public telephone conversations and other audio sources. Of course, when it comes to consider the degree of truthfulness of public statements, a special attention is given to the statements of politicians. A recent report from Duke University, which monitored the online fact-checking initiatives around the world, has reported the site "Pagella Politica" in Italy, that is a project aiming at monitoring the statements of the leading Italian politicians, in order to assess the truthfulness through numbers and facts. The site has been online since October 3, 2012. It is interesting to note that this project is based on a "graduated scale" of truthfulness: between the full truth and the clear lie there are intermediate levels. The levels defined on the site are five: true; nice try; neither yes nor no; prone to be a liar; absurd lie. It is not a very scientific approach, but it helps to think about the complexity of reality, as well as the effort to understand and respect it. Namely: there are numbers, data, events, that are precisely those and counterfeiting them, due to bad faith or shabby behaviour, is not allowed. However, in the interpretation of those numbers, in the story that we tell about the reality, there is a margin of error (from venial to serious), which is part of the risk of expressing oneself. Therefore, even the fact checking, which has its undoubted objectivity of approach, advises against a Manichean interpretation of reality. Not surprisingly, just the fanatics run more often and more severely than others, in total lie.

1. WHICH OF THE FOLLOWING STATEMENTS MAY HAVE THE AUTHORSHIP OF ONE OF THE FOUNDERS OF THE SITE PAGELLA POLITICA?

1. **In our own small way, we try to inject a dose of objectivity in the Italian political dialectics**
2. Unfortunately, the fact checking, is in decline worldwide
3. To interpret numbers, we do not need skills, but common sense
4. What interests us is to assess every public statement in terms of truth and / or falsehood
5. In the age of the Internet, you certainly can not say that lies have short legs

2. WHAT DOES THE WORD "SCIENTIFIC" (LINE 16) MEAN IN THIS CONTEXT?

1. Reliable
2. True
3. Numeric
4. **Rigorous**
5. Experimental

3. THOSE WHO VISIT THE SITE PAGELLA POLITICA DO IT IN ORDER TO:

1. **determine how much the public statements of politicians are true and reliable**
2. know the truth about numbers, data, events related to social issues of national importance
3. compare the opinions of different political leaders on issues of public concern
4. check if the politicians keep their promises
5. listen to online statements of national politicians

4. THE WORD "CLEAR" (LINE 14) IS EQUIVALENT TO:

1. unreported
2. **obvious**
3. approved
4. wished for
5. latent

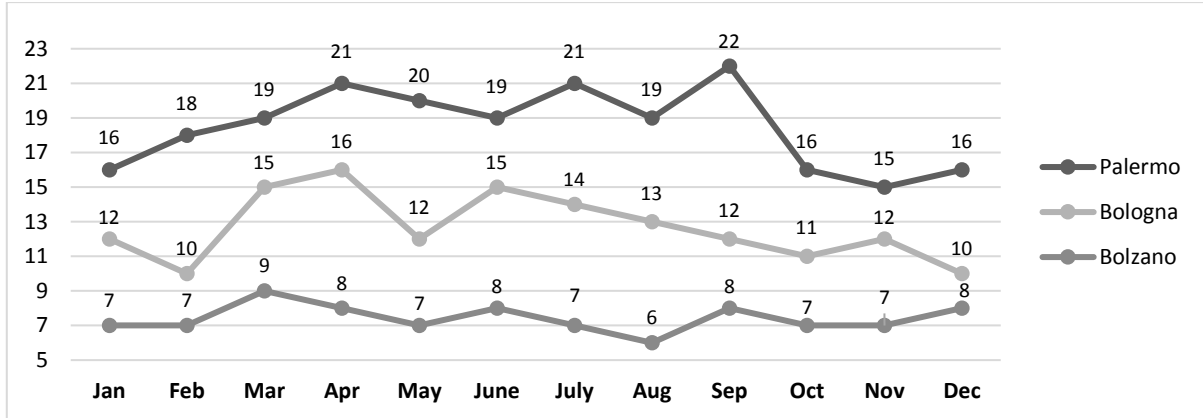
5. YOU CAN SAY THAT:

1. those who interpret reality by using the numeric data cannot make mistakes
2. those who choose to express their opinion based on objective data can not be misunderstood
3. those who check the information disclosed to the general public do it only for ethical reasons
4. **the reality is complex and the facts are hardly categorized in a clear way free of shades**
5. the site Pagella Politica is an example of the method of protest

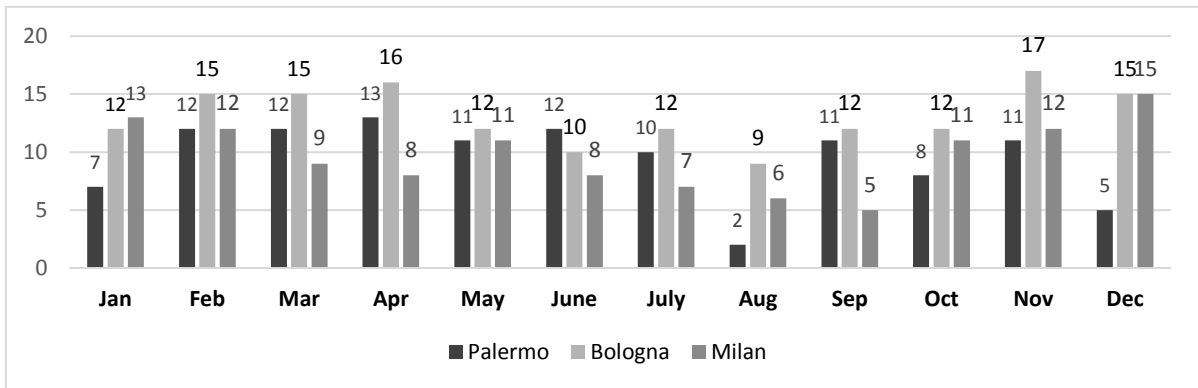
NUMERICAL REASONING AREA

INFORMATION SHEET A

Number of days in a month in which they recorded a level of fine dust higher than $50 \mu\text{g}/\text{m}^3$ in three Italian cities (year 2014)



Number of days in a month in which they recorded total rainfall higher than 200 mm in three Italian cities (year 2014)



Number of times in which the yearly average level of fine dust equal to $40 \mu\text{g}/\text{m}^3$ has been exceeded in some Italian cities in the decades 1986-1995, 1996-2005 and 2006-2015

	1986-1995	1996-2005	2006-2015
Bologna	5	6	6
Bolzano	2	4	4
Genoa	3	5	6
Milan	6	7	9
Naples	6	7	7
Palermo	6	6	9
Turin	4	5	8

Average minimum and maximum temperatures recorded in six Italian cities (year 2014)

	January		June		December	
	Min	Max	Min	Max	Min	Max
Ancona	2	12	12	25	1	11
Bolzano	-5	7	9	20	-4	9
Genoa	0	13	10	22	0	11
Naples	2	15	11	26	3	17
Palermo	3	17	13	26	3	18
Turin	-1	9	9	19	0	11

In order to answer the next five questions refer also to the graphs and tables on the INFORMATION SHEET – A situated on the previous page

1. FOR HOW MANY MONTHS IN 2014, IN PALERMO, THERE HAVE BEEN MORE THAN 17 DAYS IN A MONTH WITH A LEVEL OF FINE DUST HIGHER THAN 50 MG/M³?

1. 9

2. 5

3. 7

4. 8

5. 6

2. COMPARING THE DATA OF THE DECADES 1986-1995 AND 2006-2015, IN WHICH CITY/CITIES, HAS THE YEARLY AVERAGE LEVEL OF FINE DUST EQUAL TO 40 MG/M³ INCREASED BY 20%?

1. Palermo and Bolzano

2. In no city

3. Genoa

4. Bologna

5. Turin and Bologna

3. KNOWING THAT IN MARCH 2015, IN BOLOGNA, THEY RECORDED A 20% INCREASE OF DAYS WITH TOTAL RAINFALL HIGHER THAN 200 MM COMPARED TO THE SAME MONTH OF THE PREVIOUS YEAR, HOW MANY DAYS WITH TOTAL RAINFALL HIGHER THAN 200 MM THERE WERE IN BOLOGNA IN MARCH 2015?

1. 18

2. 20

3. 25

4. 12

5. 16

4. IN WHICH ITALIAN CITY/CITIES AND IN WHICH MONTH OF YEAR 2014, DID THEY RECORD THE HIGHEST TEMPERATURE RANGE (MEANT AS THE DIFFERENCE BETWEEN MAXIMUM AND MINIMUM TEMPERATURE)?

1. Naples, in June

2. Naples, in December

3. Naples, in June and Palermo, in December

4. Palermo, in December

5. Ancona, in June

5. THE AMOUNT OF RAINFALLS IS LINKED TO THE LEVELS OF FINE DUST EXISTING IN A SPECIFIC AREA. IN WHICH OF THE FOLLOWING MONTHS, IN PALERMO, DID THEY RECORD THE HIGHEST RATIO BETWEEN THE NUMBER OF DAYS WITH TOTAL RAINFALL HIGHER THAN 200 MM AND THE NUMBER OF DAYS IN WHICH THE LEVEL OF FINE DUST WAS HIGHER THAN 50 MG/M³?

1. November

2. February

3. March

4. June

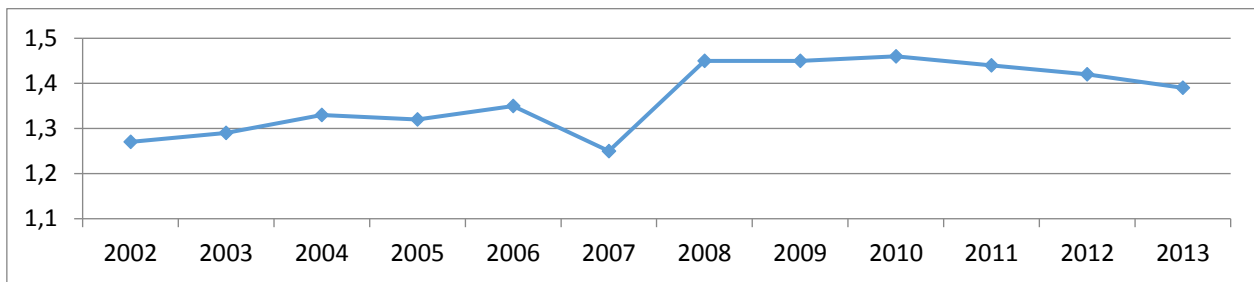
5. July

INFORMATION SHEET C

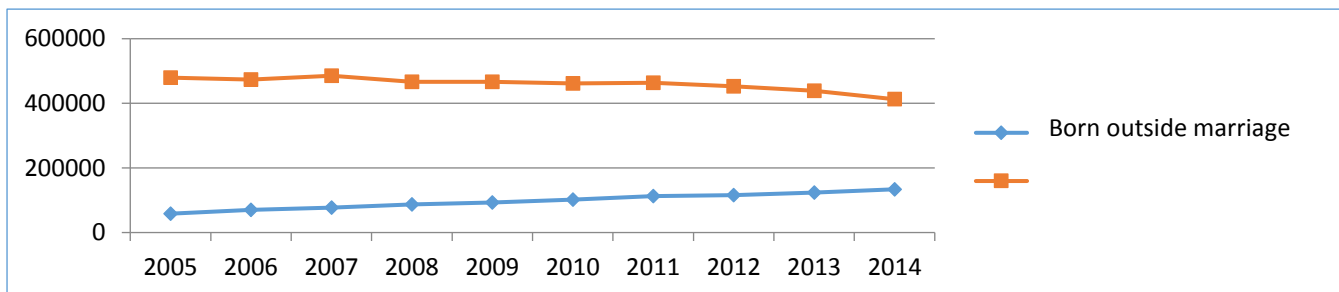
Most common male names in Italy for children born in 2013 and 2014

2013			2014		
Name	Absolute value	%	Name	Absolute value	%
Francesco	8,949	3.16	Francesco	10,316	4.05
Alessandro	8,462	2.99	Alessandro	6,940	2.73
Marco	8,023	2.84	Lorenzo	6,665	2.62
Lorenzo	7,746	2.74	Marco	6,270	2.46
Matteo	7,269	2.57	Leonardo	6,079	2.39
Mattia	6,743	2.38	Mattia	6,073	2.39
Gabriele	6,710	2.37	Matteo	5,754	2.26
Riccardo	5,422	1.92	Gabriele	5,557	2.18
Davide	5,270	1.86	Riccardo	4,533	1.78
Leonardo	5,195	1.84	Tommaso	4,488	1.76

Average number of children in Italian households (2002-2013)



Children born in Italy outside and within marriage (2005-2014)



Children born in Italy by mother's age and marital status (year 2014)

		<i>Mother's marital status</i>				Total
		Unmarried	Married	Divorced	Widowed	
Mother's age	Under 18 years	1,956	55	–	–	2,011
	18-19 years	4,203	1,346	1	2	5,552
	20-24 years	17,207	21,452	50	8	38,717
	25-29 years	24,242	73,465	316	58	98,081
	30-34 years	31,123	121,420	1,062	174	153,779
	35-39 years	36,524	21,432	2,132	281	60,369
	40-44 years	27,854	25,821	1,442	182	55,299
	45-49 years	634	1,754	193	25	2,606
	50 years or more	55	223	18	6	302

In order to answer the next five questions refer also to the graphs and tables on the INFORMATION SHEET – C situated on the previous page

1. WITH REGARD TO CHILDREN BORN IN ITALY IN 2014, ONE CAN SAY THAT:

1. women under 18 years have given birth least
- 2. more children were born to unmarried women aged between 40 and 44 than to married women of the same age group**
3. women aged between 25 and 29 have given birth more than women aged between 30 and 34
4. more children were born to widowed women aged between 40 and 44 than to divorced women aged between 45 and 49
5. none of these answers is correct

2. IN ABSOLUTE VALUES, WHICH MALE NAME HAS SEEN THE MOST GROWTH OF USE FROM 2013 TO 2014?

1. Marco
- 2. Francesco**
3. Alessandro
4. Lorenzo
5. Leonardo

3. CONSIDERING THE AVERAGE NUMBER OF CHILDREN IN ITALIAN HOUSEHOLDS, IT CAN BE SAID THAT:

1. since 2008, the average number of children is steadily declining
2. from 2002 to 2006, the average number of children has always increased
3. between 2007 and 2008, there has been a significant decrease in the average number of children
- 4. considering the entire period, the highest average number of children has been recorded between 2008 and 2010**
5. the highest average number of children has been recorded in 2011

4. CONSIDERING THE NUMBER OF CHILDREN BORN IN ITALY IN 2014, SORT THE MOTHER'S MARITAL STATUS IN DESCENDING ORDER:

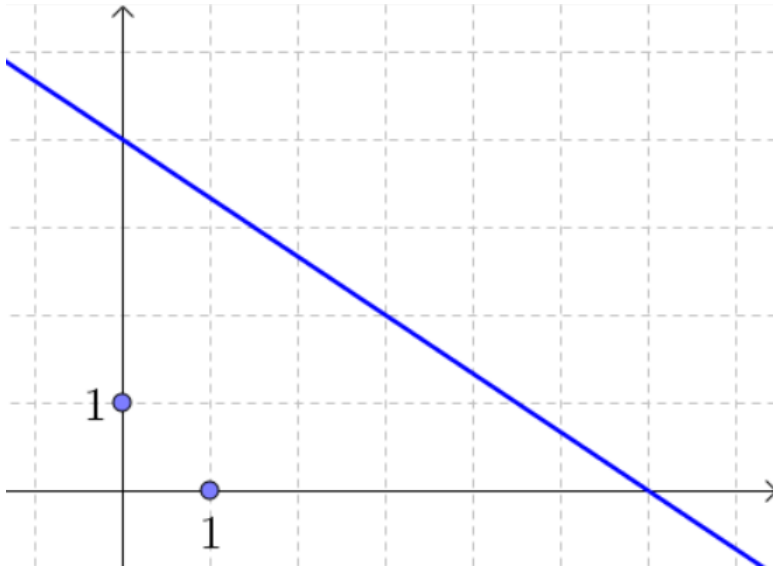
- 1. Married - Unmarried - Divorced - Widowed**
2. Unmarried - Married - Widowed - Divorced
3. Married - Unmarried - Widowed - Divorced
4. Unmarried - Married - Divorced - Widowed
5. Married - Divorced - Unmarried – Widowed

5. WITH REGARD TO CHILDREN BORN IN ITALY OUTSIDE AND WITHIN MARRIAGE, WHICH OF THE FOLLOWING STATEMENTS IS CORRECT?

1. From 2008 to 2011, the trend in births outside and within marriage is steady
2. From 2005 to 2014, children born within marriage have always decreased, while those born outside marriage have increased
- 3. Comparing the 2005 data with that of 2014, we can say that children born outside marriage are increasing, while those born within marriage are decreasing**
4. From 2005 to 2014, children born outside marriage are increasing as well as those born within marriage
5. None of these answers is correct

MATHEMATICS AREA

1. THE EQUATION FOR THE STRAIGHT LINE IN THE FIGURE IS:



- a] $y = \frac{3}{2}x + 4$
- b] $y = \frac{2}{3}x + 4$
- c] $y = -\frac{3}{2}x + 4$
- d] $y = -\frac{2}{3}x + 4$**
- e] insufficient data

2. A QUANTITY THAT IS WORTH N TODAY UNDERGOES A DECREASE OF 10% EVERY DAY COMPARED TO THE PREVIOUS DAY, AND AN INCREASE OF 100 UNITS. WHAT WILL ITS VALUE BE IN TWO DAYS' TIME?

- a] $0.8N + 200$
- b] $0.81N + 190$**
- c] $0.9N + 100$
- d] $0.1N + 100$
- e] $0.2N + 200$

3. CONSIDER THE OPERATION $A \otimes B = \frac{a+b}{a-b}$. THEN $(6 \otimes 4) \otimes 2 =$

a] $\frac{7}{3}$

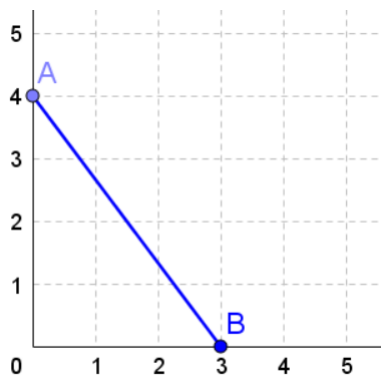
b] $-\frac{1}{2}$

c] 60

d] $\frac{1}{6}$

e] 3

4. THE LADDER AB IS LEANING AGAINST A WALL.



If point A moves downwards by 2, how much does point B move horizontally?

a] 1

b] 2

c] About 2.5

d] $\sqrt{21}$

e] About 1.6

5. CONSIDER THE FOLLOWING RECURSIVE SEQUENCE:

$$\begin{cases} x_0 = 4 \\ x_1 = 7 \\ x_{n+2} = 20 - x_{n+1} - x_n \end{cases}$$

Hence $x_{50} =$

a] 4

b] 7

c] 11

d] 9

e] 3

6. CONSIDER A FUNCTION f DESCRIBED BY THE FOLLOWING TABLE.

x	0	1	2
$f(x)$	1	3	7

What is the function?

a] $f(x) = 2x + 1$

b] $f(x) = 4x - 1$

c] $f(x) = 2^x + 1$

d] $f(x) = x^2 + x + 1$

e] $f(x) = \frac{5x+1}{x+1}$

7. a and b are two real numbers. If $a + b = 10$ then it must be that $a^2 + b^2 =$

a] 100

b] 82

c] 68

d] 50

e] insufficient data

8. WHICH OF THE FOLLOWING EQUATIONS REPRESENTS A PARABOLA THAT HAS ITS VERTEX AT POINT $(-2,9)$?

a] $y = -x^2 + 4x + 5$

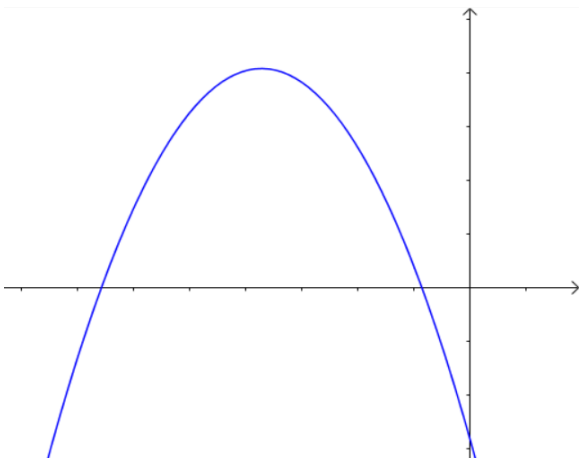
b] $y = -x^2 + 4x - 5$

c] $y = -x^2 - 4x + 5$

d] $y = -x^2 - 4x - 5$

e] $y = x^2 + 4x + 5$

9. THE FOLLOWING FIGURE SHOWS THE GRAPH OF A FUNCTION OF TYPE $f(x) = ax^2 + bx + c$. THEREFORE:



a] $a < 0$ $b > 0$ $c < 0$

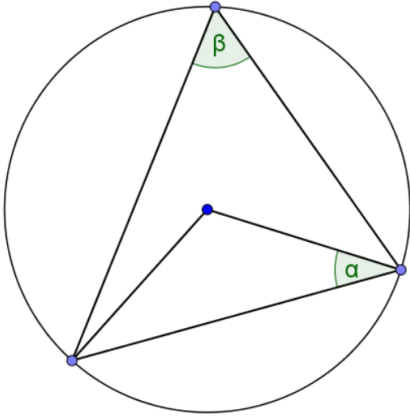
b] $a < 0$ $b < 0$ $c > 0$

c] $a < 0$ $b < 0$ $c < 0$

d] $a > 0$ $b < 0$ $c > 0$

e] $a > 0$ $b < 0$ $c < 0$

10. WHAT IS THE SIZE OF ANGLE β ?



a] $\frac{360^\circ - 2\alpha}{2}$

b] $180^\circ + 2\alpha$

c] $90^\circ + \alpha$

d] $90^\circ - \alpha$

e] $180^\circ - 2\alpha$

11. WHICH OF THE FOLLOWING EQUATIONS ALLOWS TWO NEGATIVE REAL NUMBERS AS SOLUTIONS?

a] $2^{-x} = 2 - x$

b] $2^{-x} = x - 2$

c] $2^{-x} = -2x$

d] $2^{-x} = -x^2$

e] $2^{-x} = -2x - 2$

12. A SEMICIRCLE HAS AN AREA OF S . WHAT IS THE LENGTH OF THE SEMI CIRCUMFERENCE?

a] $2\sqrt{\frac{S}{\pi}}$

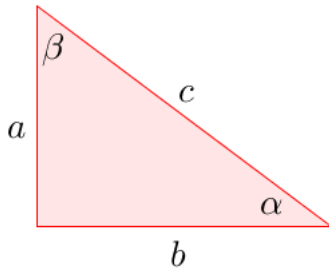
b] $\sqrt{\frac{2S}{\pi}}$

c] $\sqrt{2\pi S}$

d] $\sqrt{\frac{2\pi}{S}}$

e] $\sqrt{\frac{S}{2\pi}}$

13. THE FOLLOWING FIGURE SHOWS A RIGHT-ANGLED TRIANGLE.



Hence:

a] $c = a \tan(\alpha)$

b] $b = c \sin(\alpha)$

c] $a = b \cos(\alpha)$

d] $b = a \tan(\beta)$

e] $c = b \cos(\beta)$

14. CONSIDER THE FUNCTION $f(x) = x^2 - 4x + 2$. If x TAKES ALL OF THE REAL VALUES IN INTERVAL $[1,4]$, FUNCTION f TAKES ALL OF THE VALUES INCLUDED IN THE INTERVAL:

a] $[1,4]$

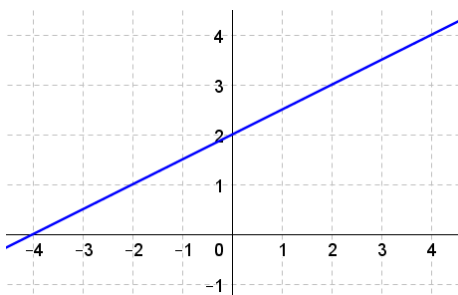
b] $[-2,2]$

c] $[0,+\infty)$

d] $[-1,2]$

e] $[-1,4]$

15. WHAT IS THE EQUATION FOR A STRAIGHT LINE PERPENDICULAR TO THE STRAIGHT LINE SHOWN IN THE FOLLOWING FIGURE AND PASSING THROUGH THE ORIGIN OF THE AXES?



a] $y = -\frac{1}{2}x$

b] $y = \frac{1}{2}x$

c] $y = 2x$

d] $y = -2x$

e] $y = x$

16. A and B ARE TWO EVENTS. $\Pr(A|B)$ EXPRESSES THE PROBABILITY OF A OCCURRING ASSUMING THAT B HAS OCCURRED. If $\Pr(A) = 3/5$, $\Pr(B) = 4/5$ and $\Pr(A \cup B) = 9/10$, THEN $\Pr(A|B)$ IS EQUAL TO:

a] $5/8$

b] $7/8$

c] $7/10$

d] $9/10$

e] $3/8$

17. A RECTANGLE HAS A CERTAIN AREA. IF THE BASE AND THE HEIGHT BOTH DECREASE BY 40%, THEN THE AREA:

a] decreases by 60%

b] decreases by 80%

c] decreases by 64%

d] decreases by 16%

e] decreases by 20%

18. THE SOLUTIONS OF THE INEQUALITY $\log_2(x-5) < 3$ ARE REAL NUMBERS:

a] less than 13

b] between -13 and 13

c] between 6 and 13

d] between 0 and 13

e] between 5 and 13

19. POINT P(3,-1) ROTATES ANTI-CLOCKWISE BY 90 DEGREES AROUND THE ORIGIN AND BECOMES POINT P':
point P' UNDERGOES HOMOTHETIC TRANSFORMATION WITH CENTRE THE ORIGIN AND RATIO 2 and
BECOMES P''. THE COORDINATES of P'' ARE:

a] (0.5,1.5)

b] (6,2)

c] (-2,-6)

d] (2,6)

e] (-6,-2)

20. THE REAL SOLUTION OF THE EQUATION $8^x = 0.125$ IS:

a] $\frac{1}{8}$

b] $\sqrt{8}$

c] -3

d] -1

e] the equation does not allow solutions

LOGIC AREA

1. MARIO GOES RUNNING EVERY MORNING AROUND A LAKE. HE USUALLY TAKES 60 MINUTES AT A PACE OF 10 MINUTES PER KM. WHILE HE WAS RUNNING TODAY HE MET AN OLD FRIEND AND HE STOPPED FOR 3 MINUTES TO TALK TO HIM. HIS AVERAGE PACE FOR TODAY IS:

- a] 10 minutes 50 seconds per km
- b] 10 minutes 30 seconds per km**
- c] 11 minutes per km
- d] 11 minutes 30 seconds per km
- e] 13 minutes per km

2. A SUPERMARKET HAS A PROMOTION ON BREAD, GIVING 20% MORE BREAD FOR FREE THAN THE AMOUNT REQUESTED BY CUSTOMERS. THE MONETARY DISCOUNT GIVEN IS:

- a] about 5%.
- b] about 30%.
- c] about 20%.
- d] about 17%.**
- e] insufficient data

3. THERE ARE 30 GIRLS IN A CLASS OF 50 STUDENTS. IN THE SAME CLASS 30 PEOPLE PLAY COMPETITIVE SPORTS. THEREFORE IT IS CERTAIN THAT:

- a] there are some boys who do not play competitive sports
- b] at least 10 girls play competitive sports**
- c] at least one boy plays competitive sports
- d] no girl plays competitive sports
- e] all the girls play competitive sports

4. ONE QUART EQUALS 32 OUNCES AND 1 GALLON EQUALS 4 QUARTS. ONE OUNCE EQUALS 3 CL. THUS ONE GALLON EQUALS:

- a] about 0.38 l.
- b] about 38 l.
- c] about 3.8 l.**
- d] about 1.3 l.
- e] about 0.13 l.

5. IN A SMALL TOWN COUNCIL THERE ARE 12 COUNCILLORS REPRESENTING 5 DIFFERENT POLITICAL PARTIES. WHAT IS THE MAXIMUM NUMBER OF REPRESENTATIVES BELONGING TO THE SAME PARTY?

- a] 9
- b] 7
- c] 8**
- d] 10
- e] 6

6. LAURA HAS A FEW NECKLACES (5 GOLD AND 4 SILVER) AND A FEW RINGS (4 GOLD AND 3 SILVER) IN THE SAFE. TODAY SHE CHOSE A PIECE OF JEWELLERY AT RANDOM AND HER HUSBAND SAID TO HER "GOLD ALWAYS REALLY SUITS YOU". WHAT IS THE PROBABILITY THAT IT WAS A NECKLACE?

- a] 4/5
- b] 9/16
- c] 5/9**
- d] 5/16
- e] 4/9

7. IF X IS THE MEDIAN OF THE NUMBERS 10, 18, 4, 15, 3, 21, X , THEN X MIGHT BE:

- a] 5
- b] 8
- c] 14**
- d] 9
- e] 16

8. A GROUP OF MEN AND WOMEN ARE GOING ON AN ORGANISED TRIP, TOTALLING 10 PEOPLE IN ALL. SOME PEOPLE ARE RETIRED, OTHERS WORK. THERE ARE MORE RETIRED PEOPLE THAN THOSE WHO WORK. THERE ARE MORE WOMEN THAN MEN. THERE ARE 3 RETIRED WOMEN. THEREFORE:

- a] there is, at the most, 1 man who works**
- b] there are only 2 men
- c] there are 2 retired men
- d] there is only 1 woman who works
- e] there are 3 men who work

9. FILIPPO GOES TO WORK BY CAR AND ALWAYS DRIVES AT A CONSTANT SPEED. TODAY HE PASSED BY TO PICK UP ONE OF HIS COLLEAGUES, GLORIA, AND HE LENGTHENED HIS JOURNEY BY 2 KM, ARRIVING 5 MINUTES LATE. AT WHAT AVERAGE SPEED DOES FILIPPO TRAVEL?

- a] 30 km/h
- b] 24 km/h**
- c] 20 km/h
- d] 36 km/h
- e] Insufficient data

10. HOW MANY DIFFERENT WAYS CAN 8 PEOPLE BE DIVIDED INTO TWO GROUPS OF 5 AND 3?

- a] 112
- b] 336
- c] 15
- d] 56**
- e] 120

11. A BOX CONTAINS 4 RED BALLS AND 5 BLUE BALLS. ONE BALL IS TAKEN OUT AND THEN, WITHOUT PUTTING THE ONE JUST TAKEN OUT BACK IN THE BOX, ANOTHER ONE IS TAKEN OUT. THE SECOND BALL TAKEN OUT IS RED. WHAT IS THE PROBABILITY THAT THE FIRST ONE WAS ALSO RED?

- a] $5/8$
- b] $4/9$
- c] $3/8$**
- d] $3/4$
- e] $5/9$

12. "EVERY STUDENT HAS A FAVOURITE SUBJECT". THE NEGATION OF THIS STATEMENT IS:

- a] some students have two favourite subjects
- b] all students have two favourite subjects
- c] there exists a student who does not have a favourite subject**
- d] no student has a favourite subject
- e] no student has two favourite subjects

13. THERE ARE 2 BOXES: BOX A CONTAINS 10 RED BALLS AND 10 BLUE BALLS. BOX B CONTAINS 5 RED, 5 GREEN AND 5 BLUE BALLS. ONE BOX IS CHOSEN AT RANDOM AND ONE BALL IS TAKEN OUT. THE BALL TAKEN OUT IS RED. WHAT IS THE PROBABILITY THAT THIS COMES FROM BOX A?

- a] $1/2$
- b] $2/3$
- c] $3/5$**
- d] $3/7$
- e] $2/5$

14. THE TREND IN THE NUMBER OF EMPLOYEES AT A COMPANY HAS BEEN AS FOLLOWS:

Year	2010	2011	2012	2013	2014	2015
Employees	120	133	100	115	120	110

Between which consecutive years was there the greatest relative change in absolute terms?

- a] 2010 and 2011
- b] 2011 and 2012**
- c] 2012 and 2013
- d] 2013 and 2014
- e] 2014 and 2015

15. THE VEHICLE LICENCE PLATES OF A CERTAIN COUNTRY ARE MADE UP OF 6 CHARACTERS: ONE LETTER, TWO DIGITS, 3 LETTERS, IN THIS ORDER. HOW MANY LICENCE PLATES ARE THERE ENDING WITH ABC? (THE ALPHABET HAS 26 LETTERS)

- a] 2,600**
- b] 676
- c] 100
- d] 260
- e] 6,760

16. GIUSEPPE PUT HIS CAR ON SALE FOR 40% OF ITS INITIAL COST. HE EVENTUALLY FOUND A BUYER WHO THEN OBTAINED A FURTHER 10% DISCOUNT ON THE PRICE. GIUSEPPE RECEIVED €7,200. WHAT WAS THE INITIAL COST OF THE CAR?

- a] About €20,000**
- b] About €22,000
- c] About €18,000
- d] About €16,000
- e] About €24,000

17. SET A CONTAINS 5 ELEMENTS AND SET B CONTAINS 4 ELEMENTS. THEREFORE AUB CONTAINS:

a] a maximum of 9 elements

b] exactly 9 elements

c] exactly 20 elements

d] a maximum of 20 elements

e] insufficient data

18. A PHOTOCOPIER WORKS AT A SPEED OF 50 PAGES PER MINUTE. EVERY 10 MINUTES THE PRINTER STOPS FOR 1 MINUTE TO RECALIBRATE THE MECHANISM. HOW MANY MINUTES DOES THE PHOTOCOPIER TAKE TO PRINT 1,200 COPIES?

a] 26

b] 24

c] 120

d] 22

e] 20

19. IN THE UNIVERSITY CANTEEN GUIDO HAD A STEAK, MAURO ATE SALMON AND MARGHERITA HAD A PIZZA. THEY SPENT A TOTAL OF €37. IF THEY HAD ALL HAD A STEAK THEY WOULD HAVE SPENT €8 MORE. THE PIZZA COSTS THE SAME AS THE SALMON. HOW MUCH DOES THE PIZZA COST?

a] €11

b] €12

c] €10

d] €9

e] €13

20. ANNA, BARBARA, CLAUDIO AND DAVIDE PLAY THE CARD GAME BRISCOLA IN PAIRS, 2 AGAINST 2. DURING THE EVENING EACH PERSON PLAYS ONCE IN A PAIR WITH EACH OF THE OTHER 3. ANNA WINS ALL THE GAMES, THEREFORE:

a] nobody wins exactly 2 games

b] someone fails to win even one game

c] someone wins one game, someone two

d] all the others win two games

e] insufficient data