🇬🇧 TEST YOUR SKILLS

1 Simplify the expression

$$\frac{\left|3-15\right|-\left|-3+11\right|}{\left|-6+4\right|}.$$

(USA *Southeast Missouri State University: Math Field Day,* 2005)
[2]

2 **TEST** The reciprocal of a negative number is always:

A negative.

B positive.

C prime.

D 1.

(CAN *Mathleague Contest: 8th grade,* 1995)

3 **TEST** The average of 6 numbers is 7. When a 7th number is added, the average of all 7 numbers is 0. The 7th number is:

A -42

B -7

C -6

D 0

(CAN *Mathleague Contest: 8th grade,* 1995)

4 What is the sum of the positive integer divisors of 76?

(USA *Southeast Missouri State University: Math Field Day,* 2005)
[140]

5 **TEST** In our number system the base is ten. If the base were changed to five, you would count as follows: 1, 2, 3, 4, 10, 11, 12, 13, 14, 20, 21, … The thirtieth number would be:

A 30   B 40   C 50   D 55   E 110

(USA *Indiana State Mathematics Contest,* 2006)

6 The numbers a, b, c are the digits of a three digit number which satisfy $49a + 7b + c = 286$. What is the three digit number $(100a + 10b + c)$?

(CAN *Canadian Open Mathematics Challenge,* 1996)
[556]

7 Here are two numbers:

$2^4 \cdot 3^5 \cdot 7^2 \cdot 13^2$ and $2 \cdot 3^9 \cdot 5^4 \cdot 11 \cdot 13^2$.

What is the LCM of the two numbers? Please write the prime factorization of the two numbers; do not multiply it out. Explain what are you doing to obtain the answer.

(USA *Arizona University*, *Practice Problems*, 2004)

8 During the night, the temperature fell from 2 °C to -15 °C. How many degrees did the temperature fall? [17]

9 Find the value of $(3 - 4 \cdot 5 + 3)^0$.

(CAN *John Abbott College*, Final Exam, 2000)
[1]

10 John tempts fate with some slot machines. He puts a coin in the first slot machine, two coins in the second, three coins in the third, and so on: at last, he puts ten coins in the tenth slot machine. The sixth slot machine gives John 9 times the stake, nothing the others. How many coins does John have now? [-1]

11 **TEST** Suppose $a = 212$ and $b = 2201$ are numbers expressed in the base 3 number system.
The product ab expressed in the base 3 number system is:

A 1102212_{three};

B 2110001_{three};

C 2002211_{three};

D 2022012_{three};

E none of these.

(USA *North Carolina State High School Mathematics Contest*, 2003)

12 Two security cameras overlook a parking lot. The first camera scans the lot 70 times each hour, while the second camera scans the lot 84 times per hour. If the cameras began scanning at the same time, how many times per hour will they both start a scan simultaneously?

(USA *Arizona University*, *Practice Test*, 2004)
[14]

GLOSSARY

average: media
to begin-began-begun: iniziare
both: entrambi
camera: macchina fotografica, telecamera
coin: moneta
to count: contare
degree: grado
digit: cifra
divisor: divisore

each: ogni
expression: espressione
factorization: fattorizzazione, scomposizione
to fall-fell-fallen: abbassarsi
first: primo
Least Common Multiple (LCM): minimo comune multiplo
to overlook: guardare dall'alto
parking lot: parcheggio

prime: primo
reciprocal: reciproco, inverso
to scan: esaminare, esplorare
to simplify: semplificare
stake: posta (gioco)
sum: somma, addizione
to suppose: supporre
to tempt fate: tentare la sorte