


**TEST YOUR SKILLS**

**1 TEST** Let  $3^a = 4$ ,  $4^b = 5$ ,  $5^c = 6$ ,  $6^d = 7$ ,  $7^e = 8$ , and  $8^f = 9$ . What is the value of the product  $abcdef$ ?

- A 1  
 B 2  
 C  $\sqrt{6}$   
 D 3  
 E  $\frac{10}{3}$

(USA University of South Carolina: High School Math Contest, 2002)

**2 TEST** A comb for horses has 100 teeth, each 1 mm wide. The gaps between the teeth are also 1 mm wide. How long is the comb?

- A 9,9 cm  
 B 10 cm  
 C 19 cm  
 D 19,9 cm  
 E 20 cm

(UK Junior Mathematical Challenge, 2003)

Le gare Junior Challenge e Intermediate Challenge si rivolgono a studenti britannici dai 13 ai 16 anni.

**3 TEST** For an arbitrary real number  $x$ , we define  $[x]$  to be the greatest integer less than or equal to  $x$ . Let  $a$  and  $b$  be positive real numbers such that  $a \cdot [a] = 17$  and  $b \cdot [b] = 11$ . What is the value of  $a - b$ ?

- A  $\frac{1}{3}$     B  $\frac{1}{2}$     C  $\frac{9}{17}$     D  $\frac{6}{11}$     E  $\frac{7}{12}$

(USA University of South Carolina: High School Math Contest, 2002)

**4 TEST** If I first increase five by one hundredth, and next I subtract one thousandth from the resulting sum, then I will get:

- A 4.999  
 B 4.099  
 C 5.009  
 D 5.099

(CAN Mathleague Contest: 8th grade, 1995)

**5** Find the exact value of each of the following. Show your work and do not give decimal answers.

a)  $\left(\frac{1+1}{3}\right)\left(\frac{5+1}{2}\right) : \frac{7}{6};$   
 b)  $\frac{-3^0(-2)^5 + 1}{3|4-20|}.$

(CAN John Abbott College, Final Exam, 2001)

**6 TEST** For the nonzero numbers  $a$ ,  $b$  and  $c$ , define

$$(a, b, c) = \frac{a}{b} + \frac{b}{c} + \frac{c}{a}.$$

Find  $(2, 12, 9)$ .

- A 4  
 B 5  
 C 6  
 D 7  
 E 8

(USA American Mathematics Contest 10, AMC 10: sample questions, 2002)

**GLOSSARY**

**comb:** pettine  
**to define:** definire  
**gap:** intervallo, salto  
**(one) hundredth:** (un) centesimo  
**to increase:** incrementare, aumentare

**to result:** risultare  
**to subtract:** sottrarre  
**(one) thousandth:** (un) millesimo  
**tooth (teeth):** dente (denti)  
**value:** valore