TEST YOUR SKILLS

TEST

1 Which of the numbers below is a solution to the following equation?

$$\sqrt{3-x}+\sqrt{3+x}=x.$$

A $\sqrt{6}$
B $2\sqrt{3}-1$
C $\dfrac{3\sqrt{3}}{2}$
D $\sqrt{6+\sqrt{2}}$
E $2\sqrt{2}$

(USA *University of South Carolina: High School Math Contest*, 2004)

2 Find the solution set to the system:

$$\begin{cases} x^2+y^2=10 \\ y=3x \end{cases}$$

A $\{(1;3),(-1;3)\}$
B $\{(1;3),(-1;-3)\}$
C $\{(1;3),(1;-3)\}$
D $\{(\pm 1;\pm 3)\}$
E $\{(\pm 1;-3)\}$

(USA *Tennessee Mathematics Teachers Association: 39th Annual Mathematics Contest*, 1995)

3 Let $f(n)=n(n+1)$, where n is a natural number. Find a pair $(a;\ b)$ such that $2f(b)+2=f(a)$ and $a=b+2$.

A $(2;0)$
B $(3;1)$
C $(4;2)$
D $(5;3)$
E $(6;4)$

(USA *Tennessee Mathematics Teachers Association: 39th Annual Mathematics Contest*, 1995)

4 How many different real numbered pairs $(x;\ y)$ satisfy the system of two equations below?

$$\begin{cases} x+xy+y=-9 \\ x^2+y^2=17 \end{cases}$$

A 6 B 4 C 3 D 2 E 0

(USA *University of South Carolina: High School Math Contest*, 2004)

5 Solve the inequality:

$$\frac{(x+1)(x-\sqrt{2})}{(x+5)^2}\geq 0.$$

Express your answer in interval notation or graph your solution on the number line.

(USA *Southern Illinois University Carbondale, Final Exam*, 2001)

$[\,]-\infty,-5[\cup]-5,-1]\cup[\sqrt{2},+\infty[\,]$

6 Solve $\dfrac{5x+2}{x+3}\leq 0$.

Write the answer in interval notation.

(USA *North Carolina State High School Mathematics Contest*, 2002)

$\left[\,\right]-3,-\dfrac{2}{5}\left]\,\right]$

7 **TEST** How many numbers from the set

$$\{-5,-4,-3,-2,-1,0,1,2,3\}$$

satisfy the inequality $-3x^2<-14$?

A 1 B 2 C 3 D 4 E 5

(CAN *Canadian Mathematics Competition, Gauss Contest*, 2003)

8 **TEST** Solve for y: $\dfrac{y}{9}+4<\dfrac{y-5}{5}+1$.

A $y<45$
B $y>45$
C $y<-1$
D $y>-1$
E $y<9$

(CAN *Canadian Open Mathematics Challenge*, 1996)

GLOSSARY

equation: equazione	**number line**: retta numerica
to express: esprimere	**to satisfy**: soddisfare
inequality: disequazione	**solution set**: insieme delle soluzioni
numbered pair: coppia ordinata	

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