Problems

1. Which expression is equal to $|a-2-\sqrt{(a-1)^2}|$ for $a<0$?

(A) $3-2a$ **(B)** $1-a$ **(C)** 1 **(D)** $a+1$

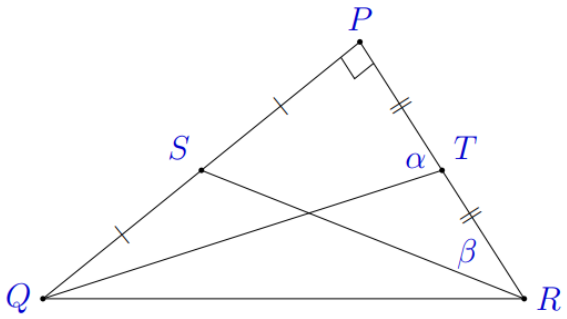
Answer: **(A)**

2. What is the value of $1234+2341+3412+4123$?

(A) $10,000$ **(B)** $1,010$ **(C)** $10,110$ **(D)** $11,000$

Answer: **(D)**

3. The triangle PQR shown has a right angle at P. Points T and S are the midpoints of the sides PR and PQ, respectively. Also $\angle QTP=\alpha$ and $\angle SRP=\beta$. The ratio $\tan\alpha:\tan\beta$ equals to



(A) $3:1$ **(B)** $4:1$ **(C)** $5:1$ **(D)** $7:2$

Answer: **(B)**

4. In the addition shown below A, B, C, and D are distinct digits. How many different values are possible for D?

$$\begin{array}{r} ABBCB \\ +\ BCADA \\ \hline DBDDD \end{array}$$

(A) 2 **(B)** 4 **(C)** 7 **(D)** 8

Answer: **(C)**

5. Which of the following numbers is a perfect square?
(A) $\frac{14!15!}{2}$ **(B)** $\frac{15!16!}{2}$ **(C)** $\frac{16!17!}{2}$ **(D)** $\frac{17!18!}{2}$

Answer: **(D)**

6. Is it true that $\sqrt{(x-1)^4} = (x-1)^2$ for all real values of x?

Answer: Yes

7. How many four-digit positive integers have at least one digit that is a 2 or a 3?
(A) 5416 **(B)** 4096 **(C)** 4903 **(D)** 4904

Answer: **(A)**

$$(1+1) - \left(\frac{1}{3} - \frac{1}{2}\right) + \left(\frac{1}{5} + \frac{1}{4}\right) - \left(\frac{1}{7} - \frac{1}{8}\right) + \left(\frac{1}{9} + \frac{1}{16}\right) - \cdots$$