

**1**  
Puzzle

# Input/Output Machines

**PROBLEM 1** (2011 AMC 8 #1)

Machine **M** takes a number **N** as input and produces a number **M(N)** as output.



Machine **P** takes a number **P** as input and produces a number **P(P)** as output.

Input	Output
1	1
2	4
3	9
4	16
5	25
6	36
7	49
8	64

- (1)  $M(30) = 90$  and  $P(90) = 8100$ .
- (2)  $M(30) = 90$  and  $P(90) = 810$ .

Which of the following is the value of  $M(P(30))$ ?

**ANSWER**

- (1) The two machines **M** and **P** take the same input and produce the same output.

(A)



Input	Output
30	90
90	

(B)



Input	Output
30	8100
8100	

- (2) Machine **M** takes the output of machine **P** as input and produces the same output as machine **P**.

(A)

(B)  $M(P(30)) = 8100$ .

(C)

(D)  $M(P(30)) = 810$ .

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