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2005 Q1

1. Connie multiplies a number by 2 and gets 60 as her answer. However, she should have divided the number by 2 to get the correct answer. What is the correct answer?

(A) 7.5 **(B)** 15 **(C)** 30 **(D)** 120 **(E)** 240

1. **(B)** If multiplying a number by 2 results in 60, then the number must be 30. If 30 is divided by 2, the correct answer is 15.

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1997 Q2

2. Ahn chooses a two-digit number, subtracts it from 200, and doubles the result. What is the largest number Ahn can get?

(A) 200 **(B)** 202 **(C)** 220 **(D)** 380 **(E)** 398

2. **(D)** The largest number is achieved by choosing the smallest number to subtract. The smallest two-digit number is 10, so the largest answer is (200-10) (2) = 380.

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2001 Q2

2. I'm thinking of two whole numbers. Their product is 24 and their sum is 11. What is the larger number?

(A) 3 (B) 4 (C) 6 (D) 8 (E) 12

2. (D) Since their sum is to be 11, only positive factors need to be considered. Number pairs whose product is 24 are $(1, 24)$, $(2, 12)$, $(3, 8)$ and $(4, 6)$. The sum of the third pair is 11, so the numbers are 3 and 8. The larger one is 8.

1996 Q2

2. José, Thuy, and Kareem each start with the number 10. José subtracts 1 from the number 10, doubles his answer, and then adds 2. Thuy doubles the number 10, subtracts 1 from her answer, and then adds 2. Kareem subtracts 1 from the number 10, adds 2 to his answer, and then doubles the result. Who gets the largest final answer?

(A) José **(B)** Thuy **(C)** Kareem

(D) José and Thuy **(E)** Thuy and Kareem

2. **(C)** Starting with 10:
   - José computes, consecutively, 9, then 18, and finally 20.
   - Thuy computes, consecutively, 20, then 19, and finally 21.
   - Kareem computes, consecutively, 9, then 11, and finally 22.

Thus Kareem gets the largest final answer.

Note. Any number n could have been used instead of 10 to obtain the same result.

	José	Thuy	Kareem
Start :	n	n	n
First :	$n-1$	$2n$	$n-1$
Then :	$2(n-1) = 2n-2$	$2n-1$	$(n-1)+2 = n+1$
Finally :	$(2n-2)+2 = \underline{2n}$	$(2n-1)+2 = \underline{2n+1}$	$2(n+1) = \underline{2n+2}$

Since $2n+2 > 2n+1 > 2n$, Kareem gets the largest final answer.

2. If $\begin{vmatrix} a & b \\ c & d \end{vmatrix} = a \cdot d - b \cdot c$, what is the value of $\begin{vmatrix} 3 & 4 \\ 1 & 2 \end{vmatrix}$?

(A) -2 **(B)** -1 **(C)** 0 **(D)** 1 **(E)** 2

1998 Q2

2. **Answer (E):** $3 \cdot 2 - 4 \cdot 1 = 6 - 4 = 2$.

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1995 Q4

4. A teacher tells the class,

"Think of a number, add 1 to it, and double the result. Give the answer to your partner. Partner, subtract 1 from the number you are given and double the result to get your answer."

Ben thinks of 6, and gives his answer to Sue. What should Sue's answer be?

(A) 18 **(B)** 24 **(C)** 26 **(D)** 27 **(E)** 30

4. **(C)** Ben adds 1 to 6 to get 7, and then doubles 7 to get 14. Sue subtracts 1 from 14 to get 13, and then doubles 13 to get 26.

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2003 Q4

4. A group of children riding on bicycles and tricycles rode past Billy Bob's house. Billy Bob counted 7 children and 19 wheels. How many tricycles were there?

(A) 2 **(B)** 4 **(C)** 5 **(D)** 6 **(E)** 7

4. **(C)** The following chart shows that the answer must be 5 tricycles.

Bicycles	Tricycles	Wheels
0	7	21
1	6	20
2	5	19
3	4	18

OR

Let b equal the number of bicycles and t equal the number of tricycles. Then the number of vehicles is $b+t=7$, and the number of wheels is $2b+3t=19$. Because $b=7-t$, it follows that

$$\begin{aligned} 2(7-t)+3t &= 19 \\ 14-2t+3t &= 19 \\ 14+t &= 19 \\ t &= 5. \end{aligned}$$

OR

If each child had a bicycle, there would be 14 wheels. Since there are 19 wheels, 5 of the vehicles must be tricycles.