



# Diversions

Monday, 16 Aug 2010

## Cross Numbers

In this puzzle, use the digits from 1 to 9 exactly once. Using the arithmetic signs *in the order they occur* from left to right and from top to bottom (and not the usual order of precedence), the expression in the rows must evaluate to the bold number in the rightmost column, and the expressions in the columns must evaluate to the bold number on the bottom.

The first row of the first puzzle has been done for you.

<b>1</b>	+	<b>6</b>	×	<b>2</b>	<b>14</b>
+		+		×	
	-		×		<b>28</b>
+		×		+	
	×		-		<b>4</b>
<b>13</b>		<b>44</b>		<b>22</b>	

	+		+		<b>15</b>
+		÷		÷	
	-		×		<b>24</b>
×		+		×	
	+		-		<b>0</b>
<b>27</b>		<b>11</b>		<b>18</b>	

## Word Problem

Form a square from five rectangles which do not overlap or leave any holes, and whose side lengths use every integer from 1 to 10.

Quizmaster: Alex Clark.

Quizmaster Assistants: Reena Bhagani, Andrea Blezy, Rachael Verbruggen



# Solutions

to Diversions of Sunday, 15 Aug 2010

## KenKen

$\times 10$ 2	$\times 192$ 4	6	$\times 30$ 5	$-2$ 3	1
5	2	4	1	6	$\times 24$ 3
$\times 15$ 3	5	$+3$ 1	$\div 2$ 6	4	2
$\times 108$ 6	1	2	3	$\times 20$ 5	4
$\times 4$ 4	6	3	$\times 4$ 2	1	$\times 30$ 5
1	$\times 60$ 3	5	4	2	6

## Word Problem

Suppose there are 12 coins. All of the coins weigh the same except one. Using a balance scale, what is the smallest number of weighings you can make that will

- (a) find the one coin that has a different weight, and
- (b) determine whether that coin weighs more or less than the other coins?

*Solution:* Three is the smallest number of weighings needed.

Number the coins from 1 to 12. Carry out the following weighings.

- Place coins 1, 2, 3, 10 on the left side of the scale and 4, 5, 6, 11 on the right side of the scale.
- Place coins 1, 2, 3, 11 on the left side of the scale and 7, 8, 9, 10 on the right side of the scale.
- Place coins 1, 4, 7, 10 on the left side of the scale and 2, 5, 8, 12 on the right side of the scale.

Let's imagine that coin 1 is the different coin and that it is heavier. Would our three weighings allow us to identify coin 1? After the first weighing the scales would tip to the left and we would deduce that one of the coins 1, 2, 3, 10 is heavier or that one of the coins 4, 5, 6, 11 is lighter, and that all of the coins 7, 8, 9, 12 weigh the same. After the second weighing we would deduce that one of the coins 1, 2, 3 is heavier and that all of the remaining coins weigh the same. After the third weighing we would know that 1 is the heavier coin.

One can check all 24 possibilities in a similar way.