5.) On Box A, the sign reads "At least one of these boxes contains $1 million." Box B reads, "a deadly snake that will kill you instantly is in Box A."

If both statements are true, then there is definitely a snake in Box A, and by the sign on Box A, the $1 million must be in <u>Box B</u>.

However, the key is to think about when both statements are false. This gives a <u>contradiction</u> because there is neither a snake, nor the $1 million in Box A. But there must be something.

Therefore, both statements are true, and you should choose Box B.

7.) Chip should <u>not</u> be trying to set $30 = 9 \times 3 + 2$. Rather, $25 = 9 \times 3 - 2$.

One can think of each of the three paying $9, getting $2 back from Chip, which Milly pockets.

11.) Here is one possible solution to the problem:

During the first 10 miles, Bob, Mary, and Ivan are all in the taxi, hence they should split the cost for 10 miles

$$1.50 \, \$/mi \cdot 10 \, mi = \$15$$

Split three ways, each pays $5. $\boxed{\text{Bob therefore pays a total of } \$5.}$

The next 10 miles still cost $15, but should be split equally between Mary and Ivan.

$$\boxed{\text{Mary therefore pays } \$5 + \$7.50 = \$12.50}$$

The final 10 miles should be paid in full by Ivan.

$$\boxed{\text{Ivan therefore pays } \$5 + \$7.50 + \$15 = \$27.50}$$

13.) In the cup of tea, we have 3oz of tea, and 1oz of milk. Therefore it is 75% tea. Assuming everything has mixed, when removing some of the mixture, it will remain $\boxed{75\% \text{ tea.}}$

In the cream cup, we have 2oz of cream, after removing 1oz. The 1oz of fluid poured back into the cream cup is 0.75oz tea, and 0.25oz cream.
We therefore have 2.25oz of cream and 0.75 oz of tea.

$$\frac{2.25}{2.25 + 0.75} = 0.75 \implies \boxed{75\% \text{ cream}}$$

15.) Label the stones 1-12. First, weigh 1,2,3,4 vs. 5,6,7,8

If they balance, we know the diamond is in 9,10,11,12. Weigh 9,10,11 vs. 1,2,3

and 9,10,11 is heavy!

Assume that if they don't balance, 5,6,7,8 is heavy. Weigh 1,5,6 vs. 2,7,8

If they balance, then 12 has the diamond, & the final scale can determine if it's light or heavy

If they don't balance, then 9,10, or 11 is a heavy diamond. Weigh two against each other, & use final scale if need be.

If they balance, the diamond is in 3 or 4, and the final scale can be used.

If it doesn't balance, and 2,7,8 is heavy, then either 7,8 is a heavy diamond, or 1 is a light diamond. The final scale can determine which is the case!

If however 9,10,11 was light, do the same procedure, except now the diamond will be light.