



Problem of the Week

Problem C and Solution

Two Bricks

Problem

Dhvanil has a large number of cards. On the back of each card there is either a honeycomb pattern (hexagons) or a brick pattern (rectangles). On the front of each card there is either a 1 or a 2. As Dhvanil went through all the cards, he found that 30% of the cards have a honeycomb pattern on the back. Of the cards with a brick pattern on the back, 80% have a 1 on the front.

Determine the percentage of all the cards that have a brick pattern on the back and a 2 on the front.

Solution

Solution 1

Let's suppose that Dhvanil has 100 cards.

If 30% of the cards have a honeycomb pattern on the back, that means that $0.3 \times 100 = 30$ cards have a honeycomb pattern on the back. Therefore, $100 - 30 = 70$ cards have a brick pattern on the back.

Of the cards with a brick pattern on the back, 80% have a 1 on the front. Therefore, there are $0.8 \times 70 = 56$ cards with a brick pattern on the back and 1 on the front. Therefore, $70 - 56 = 14$ cards have a brick pattern on the back and a 2 on the front.

Therefore, the percentage of all cards with a brick pattern on the back and a 2 on the front is $\frac{14}{100} \times 100\% = 14\%$.

Solution 2

If 30% of the cards have a honeycomb pattern on the back, that means that 70% of the cards have a brick pattern on the back.

Of the cards with a brick pattern on the back, 80% have a 1 on the front. Therefore, of the cards with a brick pattern on the back, 20% have a 2 on the front. Since $0.2 \times 0.70 = 0.14$, 14% of all of the cards have a brick pattern on the back and a 2 on the front.