MATHCOUNTS® Problem of the Week Archive

Happy Birthday Blue Jeans! – May 16, 2022

Problems & Solutions

Did you know that May 20th is the official birthday of "blue jeans"? It was on May 20, 1873 that Levi Strauss and David Jacobs received patent number 139,121 from the US Patent and Trademark Office for using rivets to strengthen the pockets of denim work pants. The rest, as they say, is history.

If each of the six digits in the patent number is placed on a separate card and 2 cards are selected at random without replacement, what is the probability that the sum of the numbers on the selected cards will be an even number? Express your answer as a common fraction.

> *An even sum will occur if two cards with even numbers are selected or if two cards with odd numbers are selected. With these six numbers, it is not possible to select two cards with even numbers, so we need only consider the cases when two cards with odd numbers are selected. The probability that the first card selected contains an odd number is 5/6. Without replacing the first card selected, the probability of selecting a second card with an odd number is 4/5. That means the probability of selecting two odd cards, and consequently getting an even sum is (5/6)(4/5) = 4/6 = **2/3**.*

From one single bale of cotton measuring 54 in long, 20 in high and 32 in wide, 215 pairs of jeans can be produced. At this rate, approximately how many cubic inches of cotton are used to create one pair of jeans from a bale of cotton? Express your answer as a decimal to the nearest tenth.

> *This particular bale contains 54 × 20 × 32 = 34,560 cu in of cotton. It follows that the volume of cotton used to produce one pair of jeans is 34,560/215 ≈ **160.7** cu in.*

In 2006 the **Cotton. From Blue to Green.**® (now Blue Jeans Go Green) denim drive began and since then has converted hundreds of thousands of units of denim into environmentally friendly insulation. If 70,000 sq ft of insulation is produced from 36,000 units of denim, how many square feet of insulation can be made from 15,500 units of denim? Express your answer to the nearest whole number.

> *To solve this problem, we can set up a proportion. Let x represent the number of square feet of insulation produced from 15,500 pieces of denim. Then, we have 70,000/36,000 = x/15,500. Cross-multiplying yields 36,000x = 70,000(15,500) → 36,000x = 1,085,000,000 → x ≈ **30,139** sq ft.*

Happy Birthday Blue Jeans! – May 16, 2022

Problems

Did you know that May 20th is the official birthday of "blue jeans"? It was on May 20, 1873 that Levi Strauss and David Jacobs received patent number 139,121 from the US Patent and Trademark Office for using rivets to strengthen the pockets of denim work pants. The rest, as they say, is history.

If each of the six digits in the patent number is placed on a separate card and 2 cards are selected at random without replacement, what is the probability that the sum of the numbers on the selected cards will be an even number? Express your answer as a common fraction.

From one single bale of cotton measuring 54 in long, 20 in high and 32 in wide, 215 pairs of jeans can be produced. At this rate, approximately how many cubic inches of cotton are used to create one pair of jeans from a bale of cotton? Express your answer as a decimal to the nearest tenth.

In 2006 the **Cotton. From Blue to Green.**® (now Blue Jeans Go Green) denim drive began and since then has converted hundreds of thousands of units of denim into environmentally friendly insulation. If 70,000 sq ft of insulation is produced from 36,000 units of denim, how many square feet of insulation can be made from 15,500 units of denim? Express your answer to the nearest whole number.