MATHCOUNTS® Problem of the Week Archive

The Cullinan Diamond – January 30, 2023

Problems & Solutions

On January 26, 1905, a 3,106-carat diamond was discovered in Pretoria, South Africa. Weighing nearly 1.5 pounds, the Cullinan, as it was named, is the largest diamond ever found. Since the greatest value in such a large diamond is in the number of stones that can be produced, renowned diamond cutter, Joseph Asscher, was chosen to cut the diamond. What remained after the stone was finally cut were nine major stones and 100 smaller stones totaling nearly 1,068 carats.

What percent of the diamond's 3,106-carat total weight was lost as a result of cutting? Express your answer as a percent to the nearest tenth.

*We are told that 1,068 carats of the original 3,106 carats remained after the diamond was cut. Thus, 3106 – 1068 = 2038 carats were lost as a result of the cutting. So, 2038/3106 = 0.6561493883 ≈ **65.6**% of the total 3,106 carats was lost.*

The largest of the nine major diamonds cut from the original stone, known as the Cullinan I or the Star of Africa, is now located in the Tower of London, set in the British royal scepter. This stone, with a total weight of 530.2 carats, has an estimated value of 400 million dollars. What is the approximate value of the portion of the diamond lost due to the cutting process, if we assume the same value per carat as the Cullinan I? Express your answer to the nearest dollar.

*From the previous problem, we determined that a total of 2,038 carats were lost due to the cutting process. We can set up a proportion to determine the value of that portion of the diamond. We know that 530.2 carats is valued at 400 million dollars, so 530.2/$400,000,000 = 2038/Y, where Y is the value of the 2,038 carats of the diamond that was cut away. Cross-multiplying, we have 530.2Y = 815,200,000,000. Then, once we divide each side by 530.2 and round to the nearest dollar, the result is $**1,537,533,006**.*

For his services, Asscher received payment, in diamonds, equivalent to about 1/5 of the total finished weight of 1,068 carats. This is equivalent to what percent of the Cullinan's original weight before cutting? Express your answer as a percent to the nearest hundredth.

*Asscher's payment was equivalent to (1/5) × 1068 = 213.6 carats. That is 213.6/3106 = 0.0687701223 ≈ **6.88**% of the diamond's original weight before cutting.*

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