



Problem of the Week

Problem B and Solution

When is This Deal a Deal?

Problem

Danielle uses a battery-powered magnifying headlamp when creating silver jewellery. The headlamp requires one AA battery.

Instead of buying a 10-pack of non-rechargeable AA batteries for \$17.50, she decides to buy one rechargeable battery and a charger for \$40.

Suppose each non-rechargeable battery is used until it no longer works and the rechargeable battery is used until it needs to be recharged. Also suppose that the length of time until a non-rechargeable battery no longer works is the same as the length of time until a rechargeable battery needs to be recharged.

After how many rechargeable battery uses will Danielle's choice be a better deal than buying 10-packs?

Solution

The cost of a single battery in a 10-pack is $\$17.50 \div 10 = \1.75 . Therefore, the price per non-rechargeable battery use is \$1.75.

We will use the following completed table to answer the question.

Number of Rechargeable Battery Uses	Price Per Rechargeable Battery Use
5	\$8.00
10	\$4.00
15	\$2.67
20	\$2.00
25	\$1.60
22	\$1.82
23	\$1.74

Examining the completed table above, we see that when we look at increasing the number of rechargeable battery uses by 5, Danielle's purchase becomes a better deal after 25 uses. We then calculate the price per battery use for 22 and 23 uses. We notice that 23 uses is the smallest number of uses where the price per battery use is less than \$1.75.

Therefore, on the 23rd use the rechargeable battery is a better deal.