

MATHCOUNTS[®] Problem of the Week Archive

Hayride – November 13, 2023

Problems & Solutions

Abby, Brenda, Celia, Denise and Elizabeth are going to their town's annual hayride. Tickets cost \$8.00 for people 12 years old and older but only \$5.00 for people 11 years old and younger. The total price for their five tickets is \$31.00. How many people in the group are 12 years old or older?

First let's set up equations based on the information in the question. Let's use a to represent the number of tickets for people 12 years old and older sold and b to represent the number of tickets for people 11 years old and younger sold.

$$a + b = 5$$

$$8a + 5b = \$31.00$$

Now that we have two variables and two equations, we can use substitution to solve.

$$a + b = 5 \rightarrow a = 5 - b$$

Substitute

$$8(5 - b) + 5b = \$31.00$$

$$40 - 8b + 5b = 31 \rightarrow -3b = -9 \rightarrow b = 3 \text{ people 11 years old or younger.}$$

Thus, $5 - 3 = 2$ people are 12 years old or older.

The group of five girls managed to secure five seats in a row on the crowded hayride. In how many orders can the five girls sit if they all sit in a row?

Any of the five girls could sit in the first seat; any of the remaining four girls could sit in the second seat, and so on. Thus, there are $(5)(4)(3)(2)(1) = 120$ orders the five girls could sit in.

In an attempt to minimize the lines this year, the hayride operators decided to run 3 flatbeds at a time. Initially, they use 20 bales of hay on each flatbed. They find that at the end of each day they need to replace half of the hay on each of the flatbeds to be ready for the next day's business. How many total bales of hay will the hayride operators have used on the 3 flatbeds after they replenish the hay at the end of the fifth day of business?

On the first day, they start with $20(3) = 60$ bales of hay. At the end of each business day, they replenish half of the hay (which would be 10 bales per flatbed, or 30 bales). After replenishing at the end of the first day, they have used a total of $60 + 30 = 90$ bales. After replenishing at the end of the second day, they have used a total of $90 + 30 = 120$ bales. Continuing this process, we see that at the end of the fifth day, they have used $60 + 30 + 30 + 30 + 30 + 30 = 60 + 150 = \mathbf{210}$ bales of hay.

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