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**Lesson 6: Problem Solving and Data Analysis**

1. Matt sells 450 cookie boxes. The chocolate chip cookies, *c*, are $4 each and the mint cookies, *m*, are $5 each. He receives $2025. Find how many of each flavor cookie he sold. Which system of equations can be used to solve this problem?

A) $c+m=2025$

$$4c+5m=450$$

B) $c+m=450$

$$4c+5m=2025$$

C) c$+m=450$

$$5c+4m=2025$$

D) $c+m=2025$

$$5c+4m=450$$

2. Kelsey borrows *j* library books. She returns them all *c* days late. There is a 25 cent charge on each book. How much money does she owe in dollars?

A) $\frac{25cj}{100}$

B) $25cj$

C) $\frac{25c}{100j}$

D) $\frac{25j}{100c}$

3. Courtney is selling tickets for her play. She sells a total of 286 tickets. The student tickets are $8, k, and the guest tickets are $10 each, l. She gets a total of $2552. Find how many of each ticket he sold. Which system of equations can be used to solve this problem?

A) $k+l=2552$

$$8k+10l=286$$

B) $k+l=286$

$$8k+10l=2552$$

C) k$+l=286$

$$10k+8l=2552$$

D) $k+l=2552$

$$10k+8l=286$$

A medium sized business polled its employees and collected data on both education level and wage. The business is trying to understand how education and income are related. Use the chart to answer the following questions

|  |  |
| --- | --- |
| Education Level | Wage |
| Low | Medium | High |
| High School | 12 | 10 | 9 |
| College | 4 | 6 | 8 |
| Graduate | 2 | 5 | 15 |

4. What proportion of employees did not earn a high wage?

5. If a medium wage employee was randomly selected, what is the probability that he did not attend graduate school?

6. What proportion of employees attended graduate school, earn a high wage, or both?

7. Researchers believe that this data is representative of medium sized business in general. If 12 million people work for medium sized businesses, how many are expected to earn high wages?

8. A team of researchers believe that high school educated employees earn low wages, those with a college education earn a medium wage, and those with a graduate level education earn a high wage. What percent of employees in this data set match this belief?

9. The return on education can be calculated by dividing wage by the number of years of education. If the average low wage is $30,000, the average medium wage is $50,000, and the average high wage is $100,000. Those who complete high school complete 13 years of education. Those who complete college complete 17 years of education and those who complete graduate school complete 20 years of education. Find the Average return to education for those who complete high school.

|  |  |
| --- | --- |
| Number of Cans Purchased  | Total Cost |
| 2 | 1.00 |
| 5 | 8.00 |
| 8 | 12.00 |
| 11 | 15.00 |

10. Which of the following would correctly describe the relationship between number of cans purchased and total cost

1. Positive linear
2. Exponential Growth
3. Exponential Decay
4. Logarithmic growth

11. What is the average cost per can for all cans purchased?

Bergen county has over 900,000 residents across seventy towns. Consider this fictionalized data set from 7 randomly selected towns.

|  |  |
| --- | --- |
| Town | Average Household Income in USD $ |
| Teaneck | 80,000 |
| Bergenfield | 85,000 |
| Closter | 105,000 |
| Cresskill | 100,000 |
| Tenafly | 135,000 |
| Cliffside Park | 75,000 |
| Fort Lee | 68,000 |

Average Household income is determined by the after tax (t) income of two adults who earn $I\_{1} and I\_{2}$, respectively. The product of these values is divided by two times the number of dependents (N) per household.

$$Average Household Income=\frac{\left(1-t\right)\*I\_{1}\*I\_{2}}{2N}$$

12. For an average family in Cresskill with 2 dependents and an average tax rate of 7%, find the income of the second adult, if the first adult earns $90,000.

13. Suppose that all towns have equal population sized, except for Fort Lee, which has twice as many people as all other towns. Find the Average Household Income across all 7 towns in the data set.

14. Across all 7 towns, the average tax rate is 8% and the income of the highest earner is $90,000 and the income of the second highest earner is $200,000. If all towns are equally populated, find the average number of dependents.