Practice for L3 Equations #2

1. Solve the system of equations

$a - 15 = 2(b - c)$ $\quad$ $a + 1 = c$ $\quad$ $2a + 5b = 2c - 12$

2. Bingabonga Company employs three casual workers in its packing area at different rates.

Using hours worked and money paid in wages, the following equations can be written:

$6x + 6y + 6z = 321$ $\quad$ $5x + 6y + 8z = 345$ $\quad$ $8x + 8z = 288$

Randy and Billy-Bob worked three days, but Jimbo was sick and couldn't work the last day so only worked two days. What is Jimbo paid per hour?

3. A cheeseburger and one serving of fries plus a discount coupon cost $3.50.

Three cheeseburgers and one fries, plus two discount coupons cost $6.50.

Three cheeseburgers and two fries, plus a discount coupon cost $11.50.

How much is the discount coupon worth?

4. Bingabonga have three drivers, Alex, Bailey and Charlie, who are paid by the hour.

If they work a full eight hour day they are paid a total of $552.

Bailey earns $4 less an hour than Charlie.

Alex earns the average of Bailey and Charlie.

Write equations to represent this situation, and use them to solve what Charlie earns.

5. Why could we not solve the situation if we were given only the following information?

If all three work a full eight hour day they are paid a total of $544.

If all three work a part day of 6 hours they are paid a total of $408.

Bailey earns $4 less an hour than Charlie.

Give a geometric explanation for your answer.

6. Find k so that that the group of equations below are unsolvable, and describe fully the nature of the lack of solutions:

$2x + y = z$ $\quad$ $3x + 2y + z = 1$ $\quad$ $x + kz = 6$

Answers: Practice for L3 Equations #2

1. $a - 2b + 2c = 15$ $a - c = -1$ $2a + 5b - 2c = -12$

   $a = 3, b = \bar{}2, c = 4$

2 Solving gives $x = 16$, $x = 17.5$ and $z = 20$. Jimbo is y – as that is the unknown omitted from the third equation, representing the day he didn't work.

Jimbo earns $17.50 an hour.

3. $c + f + d = 3.5$ $3c + f + 2d = 6.5$ $3c + 2f + d = 11.5$

   $c = 2.5, f = 3, d = -2$ **So the discount coupon takes $2 off the price**

4. $8a + 8b + 8c = 552$ $8a + 8b + 8c = 552$

   $b + 4 = c$ $b - c = -4$

   $a = ½ (b + c)$ $2a - b - c = 0$

   Solving gives $c = 25$. **Charlie earns $25 an hour**

5. The **first and third** equations are the **same plane,** being multiples of $a + b + c = 68$. Therefore, being effectively the same, the second equation intersects them along a line. The result is that **there are an infinite number of solutions**. A distinct third equation is required to solve the values.

6. ① $2x + y - z = 0$ ② $3x + 2y + z = 1$ ③ $x + 0y + kz = 6$

   taking 2① – 1② – 1③ cancels out the x and y components. To do the same for the z component gives that **$k = \bar{}3$**.

   As, using the same ratios, $2 \times 0 + \bar{}1 \times 1 + \bar{}1 \times 6 \neq 0$, the system is **inconsistent**.

   There are **no solutions**. Taking each pair of planes and finding their line of intersection gives a system of **three parallel lines**, so that you can only solve for two at a time.