Math 123-02
Spring 2026
Dr. Lily Yen

# Quiz One

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Name: _____
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Score: ___/10

**Problem 1**: Mei has a 4 ft stick to saw into three pieces to stake her potted plants. Suppose the longest stick is as long as the combined length of the two shorter sticks, and the the middle one is three times the shortest one, find the length of each stick.

Suppose the length of the shortest piece is $x$. Then the middle piece has length $3x$, and the longest piece has length $x + 3x = 4x$.
Therefore $x + 3x + 4x = 4\,\text{ft}$, so $8x = 4\,\text{ft}$, so $x = 0.5\,\text{ft}$. The three lengths are therefore

$$x = 0.5\,\text{ft}, \quad 3x = 1.5\,\text{ft}, \quad \text{and} \quad 4x = 2\,\text{ft}.$$

Score: /3

**Problem 2**: Anjali's family was invited to a friend's party. Suppose there were 3 families in total: 6 parents and 8 ( $= 2+3+3$) children. If all the adults shook hands with one another except with their spouses and all the children shook hands except with their siblings, how many handshakes took place?

Adults' handshakes: $\frac{6\times4}{2} = 12$.
Children's handshakes: $\frac{2\times6+3\times5+3\times5}{2} = 21$.
Total $12 + 21 = 33$ handshakes.
**Alternatively**: All the adults could shake hands in $\frac{6\times5}{2} = 15$ ways. But the 3 handshakes between spouses do not happen, so only $15 - 3 = 12$ handshakes between adults.
Similarly, the children could shake hands in $\frac{8\times7}{2} = 28$ ways. Within the 2-child family, the siblings could shake hands in $\frac{2\times1}{2} = 1$ way. That's 1 handshake that does not happen. Similarly, within each 3-child family, the siblings could shake hands in $\frac{3\times2}{2} = 3$ ways, so that's 6 handshakes that do not happen. So there is only $28 - 1 - 6 = 21$ handshakes between children.
Again, a total of $12 + 21 = 33$ handshakes.

Score: /4

**Problem 3**: Jimmy and Candice just became friends with Beatrice, and they want to know when her birthday is. Beatrice gives them a list of ten possible dates:

February 9 14
May 15 24
July 1 15 27
November 1 14 24

Beatrice then tells Jimmy and Candice separately the month and the day of her birthday, respectively.

Jimmy: I don't know when Beatrice's birthday is, but I know that Candice doesn't know either.

Candice: At first I didn't know when Beatrice's birthday is, but I know now.

Jimmy: I STILL DON'T know when Beatrice's birthday is.

Find the month Beatrice was born and explain why Jimmy still didn't know. Do you know when Beatrice's birthday is?

Candice would know the birthday if the date is either the 9th or the 27th (since there is only one of each of those two days). But Jimmy knows that Candice doesn't know the birthday, so he knows that the day isn't one of those; but the only way he could know that would be that the month is either May or November.
With this information, Candice knows the birthday, so it cannot be the 24th. However, Jimmy still doesn't know, so it must be either November 1st or 14th.

Score: /3