1. Use $x$ for the unknown number.
   
   $38 + 2x = 124$
   
   $2x = 86$
   
   $x = 43$
   
   The unknown number is 43.

2. Two consecutive integers will differ by one.
   We can represent them with $x$ and $x + 1$.
   Inequality: $(x) + (x + 1) < 83$
   
   $2x < 82$
   
   $x < 41$
   
   The largest possible integer would be $x = 40$.
   The pair of numbers with the largest sum would be 40 and 41.

3. 

   
   $x$
   
   $x + 12$
   
   Use $x$ for the width, so $x + 12$ is the length.
   
   Equation (perimeter): $2(x) + 2(x + 12) = 68$
   
   $4x + 24 = 68$
   
   $4x = 44$
   
   $x = 11$
   
   Length = 23m and Width = 11m.

4. 

   
   $x$
   
   $x + 4$
   
   Use $x$ for the width, so $x + 4$ is the length.
   
   Inequality (perimeter): $2(x) + 2(x + 4) \geq 48$
   
   $4x + 8 \geq 48$
   
   $4x \geq 44$
   
   $x \geq 11$
   
   The smallest possible value for $x$ is 11cm.
   Length = 15cm and Width = 11cm.
5. Consecutive integers are 1 unit apart, so if we use $x$ for the smallest, then the three consecutive integers would be $x$, $x+1$, and $x+2$.

The equation would be $(x) + (x+1) + (x+2) = 171$
\[3x + 3 = 171\]
\[3x = 168\]
\[x = 56\]
So the consecutive integers are 56, 57, and 58.

6. Consecutive even integers are 2 units apart, so if we use $x$ for the smallest, then the four consecutive even integers would be $x$, $x+2$, $x+4$, and $x+6$.

The equation would be $(x) + (x+2) + (x+4) + (x+6) = 244$
\[4x + 12 = 244\]
\[4x = 232\]
\[x = 58\]
So the consecutive integers are 58, 60, 62, and 64.

7. One could use $x$ to represent the amount of money belonging to any one of the people. I think the easiest way is to use $x$ for Shannon’s amount.
So, Shannon has $x$ dollars, Jennifer has $x-6$ dollars, and Alex has $2(x-6)$ dollars.

Equation: $(x) + (x-6) + 2(x-6) = 54$
\[x + x - 6 + 2x - 12 = 54\]
\[4x - 18 = 54\]
\[4x = 72\]
\[x = 18\]
So Shannon has $18, Jennifer has $12, and Alex has $24.

8. The average of three test scores is the sum of the scores, divided by three. We will use $x$ for the third test score.

Inequality: $(75 + 81 + x)/3 \geq 80$
Multiply both sides by three: $(75 + 81 + x) \geq 240$
\[156 + x \geq 240\]
\[x \geq 84\]
The student must get at least 84.
Day 19

Fuel cost numbers will vary, here are example calculations using the averages from California and Arizona on a particular day:

California: Gas price per gallon: $4.039
Use x for the fuel cost.

Equation: \( x + .184 + .180 + x(.0725) = 4.039 \)
\[ 1.0725x + .364 = 4.039 \]
\[ 1.0725x = 3.675 \]
\[ x = 3.427 \]
Fuel cost is about $3.43 for California.

Arizona: Gas price per gallon: $4.039
Use x for the fuel cost.

Equation: \( x + .184 + .180 + x(.056) = 3.550 \)
\[ 1.056x + .364 = 3.550 \]
\[ 1.056x = 3.186 \]
\[ x = 3.017 \]
Fuel cost is about $3.02 for Arizona.

Day 27

1. Event Solutions: \( 300 + 5p \leq 2000 \)
   \[ 5p \leq 1700 \]
   \[ p \leq 340 \] \( \leftarrow \) Better choice
   Parties Made Easy
   \[ 8p \leq 2000 \]
   \[ p \leq 250 \]

2. Acme Party Rental
   \[ 250 + 250 + 200h \leq 1500 \]
   \[ 200h \leq 1000 \]
   \[ h \leq 5 \] \( \leftarrow \) Better choice
   Rentals-R-U's
   \[ 0 + 100 + 350h \leq 1500 \]
   \[ 350h \leq 1400 \]
   \[ h \leq 4 \]

3. Tunes Inc.
   \[ 325 + 125h \leq 825 \]
   \[ 125h \leq 500 \]
   \[ h \leq 4 \]
   Music Innovations
   \[ 165h \leq 825 \]
   \[ h \leq 5 \] \( \leftarrow \) Better choice