1. The Book store marked down some notepads from $2.00 but still kept the price over $1.00. It sold all of them. the total amount of money from the sale of the pads was $31.45. How many notepads were sold?

Answer: 17 notebooks

2. The radio station gave away a discount coupon to every fifth caller and a CD to every sixth caller. Every twentieth caller received free concert tickets. Which caller was first to get both a discount coupon and a CD? Which caller was first to get all three prizes? If there were 150 callers, how many of each prize did they give away?

Answer: 30th caller to get both = 30th caller

Answer: 1st caller to get all 3 prizes = 60th caller

3. Larry and Mary bought a special 360-day joint membership to a tennis club. Larry will use the club every other day, and Mary will use the club every third day. The both use the club on the first day. How many days will neither person use the club in the 360-days?

Answer: Neither person will be in the gym 120 days

4. On a string of Christmas tree lights, the red ones blink every 3 seconds, the blue ones blink every 4 seconds and the white blinks every 4.5 seconds. What is the maximum number of times they all blink together in a one-hour interval?

Answer: 100 times

5. Three runners are running on a circular track. The first completes one lap every 4 minutes. The second completes one lap every 6 minutes, the third every 8 minutes. If they start together, when is the first time they get to the starting line at the same time? At that time, how many laps has each completed?

Answer: 24 mins

1st runner: 6 laps

2nd runner: 4 laps

3rd runner: 3 laps

6. You have a square pattern with which you would like to tile a room that is 203 feet by 77 feet. You want the square design to be as big as possible and you do not want any gaps or borders, the squares must exactly tessellate the area. What is the largest square pattern you can do?

Answer: 7 x 7 ft square
1. The Book store marked down some notepads from $2.00 but still kept the price over $1.00. It sold all of them, the total amount of money from the sale of the pads was $31.45. How many notepads were sold?
Include in your discussion of these problems, connections to the concepts of factors, multiples, lcm and/or gcd.

1. The bookstore marked down some notepads from $2.00 but still kept the price over $1.00. It sold all of them. The total amount of money from the sale of the pads was $31.45. How many notepads were sold?

   If guess check: has to be in between $1 & $2.
   31.45/1.5 = 20.97
   31.45/1.7 = 18.50
   31.45/1.6 = 19.67
   31.45/1.8 = 17.47
   31.45/1.85 = 17.

   *17 notepads were sold at $1.85.*

   Guess: 17

   - Why did you start with 1.5 and not 1.01, 1.02, etc?
   - Why did you go up by increments of .05, .10, or .15 and not increments of .1?
1. Bookstore marked down notepads from $2.00 but still kept the price over $1.00. So $1.00 \leq \text{notepads} \leq $2.00

The total sale of notepads was $31.45. How many were sold?

The new price could be $1.01, $1.02, ..., $1.99. So there are 99 possible prices. But the price must evenly divide the total sale of $31.45.

Since finding the factors of $31.45 would be too time consuming, we can move the decimal 2 places over and find the factors of 3145.

\[ 3145 \quad \text{factors:} \quad 5, 629, 17, 37, 85 \]

\[ 5 \mid 3145 \quad 17 \mid 3145 \quad 37 \mid 3145 \quad 85 \]

\[ -30 \quad -17 \quad -296 \]

\[ 17 \quad 14 \quad 144 \quad 185 \]

\[ -10 \quad -136 \quad -185 \]

\[ 45 \quad -85 \quad 0 \]

\[ -45 \quad -85 \quad 0 \]

\[ 0 \]

$6.29 \quad -$1.85

17 notepads were sold at $1.85 each.
Problem set #6

0) Notebooks $1.00 - $2.00
The total amount of money from the sale of pads = $31.45

+10

1) I made $31.45 to 3145 by moving the decimals two places right.
The prime factorization of 3145 = 5 x 17 x 37
Then, I divided 5, 17, and 37 from $31.45 and saw if the amount came out to be between $1.00 - $2.00.

→ 5 pads = $6.29 each          great job of using prime factorization

× 17 pads = $1.85 each * prime factorization

→ 37 pads = $0.93 each          to solve the problem!

Note: pads said: 17 for $1.85 each

2) 5th caller: Discount coupon
6th caller: CD
10th caller: Free concert tickets

Which caller was first to get both discount coupon and CD?
5, 10, 15, 20, 25, 30, 50, 55, 60
6, 12, 18, 24, 30

= The 50th caller

Used LCM to solve problem, excellent!

Which caller was first to get all three prizes?
5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60
6, 12, 18, 24, 30, 36, 42, 48, 54, 60
20, 40

= The 60th caller

150 callers, then 62 prizes given away

• Disc. coupon: 150 / 5 = 30
CD: 150 / 6 = 25
Free concert tickets: 150 / 20 = 7.5 = 7

3) 3rd caller: Free concert tickets
2. The radio station gave away a discount coupon to every fifth caller and a CD to every sixth caller. Every twentieth caller received free concert tickets. Which caller was first to get both a discount coupon and a CD? Which caller was first to get all three prizes? If there were 150 callers, how many of each prize did they give away?
2) Discount coupon  5 10 15 20 25 30 35 40 45 50 55 60
CD  6 12 18 24 30 36 42 48 54 60 66 72
Free concert tickets  20 40 60 80 100 120 140 160 180 200 220 240

From the chart above, the person who first received a discount coupon and a CD will be the least common multiple of 5 and 6 which is 30. Thirtieth caller is the first one to get both prizes.

A person who can get all three prizes will be the least common multiples of 5, 6, and 20 which is 60. Sixtieth caller can receive all three prizes.

If they were 150 callers,

\[
\frac{150}{5} = 30 \text{ discount coupons}
\]
\[
\frac{150}{6} = 25 \text{ CDs}
\]
\[
150 \div 20 = 7.5 \text{ which means they gave away 7 concert tickets}
\]

62 prizes
3. Larry and Mary bought a special 360-day joint membership to a tennis club, Larry will use the club every other day, and Mary will use the club every third day. The both use the club on the first day. How many days will neither person use the club in the 360-days?
#3
- good job of restating the problem
- to fully understand what it was asking
- good use of rest to recognize a pattern
- nice recognition of LCM

3. Larry: every other day (LCM2)
   Mary: every third day (LCM3)
   Both starts on the first day (+1)
   For Larry I need to find LCM of 2 + 1
   For Mary I need to find LCM of 3 + 1
   You can use equation:
   \[ L = 2x + 1 \]
   \[ M = 3x + 1 \]
   using calculator \[ Y_1 = 2x + 1 \]
   \[ Y_2 = 3x + 1 \]
   Looking at the table I noticed that 2x + 1 = L
covers all the odd days so 1, 3, 5, 7, 9, etc.
looking at the table I noticed that 3x + 1 = M
covers both even & odd days but not all even days
so I need to look for even numbers that
are not shown in the table, this number
will be the days that none of two will
use the club.
3) 360 day membership:
Larry = every other day (3)
Mary = every third day (2)

<p>| | | | |</p>
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<thead>
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</thead>
<tbody>
<tr>
<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
</tr>
<tr>
<td>0</td>
<td>X</td>
<td>X</td>
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<td>X</td>
<td>X</td>
<td>O</td>
<td>X</td>
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<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

Larry = X
Mary = O

There are 12 shaded/unused days:
360 x 10 = 3600
12 x 10 = 120
120 days unused

4) Red lights = every 3 seconds
Blue lights = every 4 seconds
White lights = every 4.5 seconds

How many sec in 1 hour?
(1 hr)(60 min)(60 sec) = 3600 sec in 1 hour

3600 / 3 = 1200
3600 / 4 = 900
3600 / 4.5 = 800

Prime factorization:

\[ 1200 = 2^3 \times 5^2 \]

\[ 900 = 2^2 \times 3^2 \times 5 \]

\[ 800 = 2^5 \times 5 \]

\[ = 2 \times 2 \times 5 \times 5 = 100 = \text{max. # of times lights blink together in 1 hr} \]
4. On a string of Christmas tree lights, the red ones blink every 3 seconds, the blue ones blink every 4 seconds and the white blinks every 4.5 seconds. What is the maximum number of times they all blink together in a one-hour interval?
Red → 3 sec
Blue → 4 sec
White → 4.5 sec

\[
1 \text{ hr} \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{60 \text{ sec}}{1 \text{ min}} = 3600 \text{ sec in 1 hr}
\]

\[
3600 \div 3 = 1200 \\
3600 \div 4 = 900 \\
3600 \div 4.5 = 800
\]

Max # of times they can all possibly blink together is 800 times

4.5 multiples → 36, 72, 108, 144, 180, 216, 252, 288, 324, 360
(That are also multiples of 3, and 4)

10 multiples from 0 - 3600 sec

\[
3600 \div 360 = 10
\]

\[
\downarrow
\]

10 multiples

\[
\downarrow
\]

10 sets of above

\[
10 \times 10 = 100
\]

\[
\downarrow
\]

Sets of multiples

Max # of times they all blink together in a one hour interval is 100

#4
- showed common multiples of 45, 3, 4
- chose LCM accurately
- good use of conversion from hr to sec.
4. Thought 3, 4, 4.5 would give LCM

- Thought 66 was LCM
- 6 and 36 is the LCM
- Seems like student rushed this problem.

4. On a string of Christmas tree lights, the red ones blink every 3 seconds, the blue ones blink every 7 seconds and the white blinks every 4.5 seconds. What is the maximum number of times they all blink together in a one-hour interval?

\[ \text{LCM} \frac{3 \times 4 \times 5}{\text{GCF}} = 60 \text{ seconds} \]

\[ \frac{3600 \text{ sec}}{54 \text{ sec}} = 66 \text{ blinks together in hr.} \]
4. Red lights
\[
\frac{3600 \times \frac{200 \text{ blinks}}{\text{sec}}}{1\text{ min}} \times \frac{1\text{ hr}}{60\text{ min}} = 3,1000
\]
used prime factorization.
Excellent!

Blue lights
\[
\frac{3600 \times 4}{\text{sec}} = 900 \text{ blinks in 1 hr}
\]

White lights
\[
\frac{3600 \times 4.5}{\text{sec}} = 800 \text{ blinks in 1 hr}
\]

I found out how many times each light blinks in 1 hr. To find out the maximum number the lights would blink together, I found the GCD of 3,100, 900, and 800. I found the GCD to be 100. With that I know that the maximum number the lights would blink together would be 100.

5. Runner 1: 4, 8, 12, 16, 20, 24, 28, 32, 36 | lap 4
Runner 2: 6, 12, 18, 24, 30, 36, 42 | lap 4
Runner 3: 8, 16, 24, 32, 40, 48 | lap 3

What I did was find the multiplies of Runner 1: (4)
Runner 2: 6 | runner 3: 48)
When I found the multiplies I found the least common multiple (LCM) which is 24. That means at 24 mins they will start at the starting line together. The first runner would be on lap 6 (24 / 4 = 6) The second runner would be on lap 4 (24 / 4 = 6) The third runner would be on lap 3 (24 / 8 = 3).
5. Three runners are running on a circular track. The first completes one lap every 4 minutes. The second completes one lap every 6 minutes, the third every 8 minutes. If they start together, when is the first time they get to the starting line at the same time? At that time, how many laps has each completed?
6. You have a square pattern with which you would like to tile a room that is 203 feet by 77 feet. You want the square design to be as big as possible and you do not want any gaps or borders, the squares must exactly tessellate the area. What is the largest square pattern you can do?
5.  

1st runner = 1 lap in 4 min  

2nd runner = 1 lap in 6 min  

3rd runner = 1 lap in 8 min  

1st runner: 4 min, 8, 12, 16, 20, 24, 28  

2nd runner: 6 min, 12, 18, 24, 30, 36, 42  

3rd runner: 8 min, 16, 24, 32, 40, 48  

At 64 min, they are all at the starting line. Runner 1 completed 6 laps, Runner 2 completed 4 laps and Runner 3 completed 3 laps.
What I did for this problem was I found the greatest common divisor (GCD) of 77 and 203. I found the GCD to be 7 because 77 is divisible by 7 and 203 is also divisible by 7. The tile size must be 7 feet x 7 feet. Since the room is 203 feet x 77 feet, that would mean that there need to be 11 tiles of the 7 x 7 going one way (7 x 11 = 77) and there need to be 29 tiles of 7 x 7 going the other way (7 x 29 = 203). This would be the largest square pattern you can do.
<table>
<thead>
<tr>
<th>203 ft</th>
<th>?</th>
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<tbody>
<tr>
<td>?</td>
<td>WHAT IS THE</td>
</tr>
<tr>
<td>77 ft</td>
<td>LARGEST SQUARE</td>
</tr>
<tr>
<td>PATTERN YOU</td>
<td></td>
</tr>
<tr>
<td>CAN DO?</td>
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</tbody>
</table>

11 TILES

\[ \text{WE CAN FIND THE DIMENSIONS OF THE LARGEST POSSIBLE SQUARES BY FINDING THE COMMON FACTORS OF 203 AND 77.} \]

\[
\begin{array}{cc}
203 & 77 \\
\downarrow & \downarrow \\
7 & 29 \\
\downarrow & \downarrow \\
7 & 11 \\
\end{array}
\]

\[ \text{A 7 x 7 SQUARE IS THE LARGEST POSSIBLE DIMENSIONS FOR THE PATTERN. A 7 x 7 SQUARE YIELDS A 49 ft^2 AREA. AND THE ROOM HAS AN AREA OF 15,631 ft^2 SO THE ROOM WILL NEED} \]

319 TILES

\[
\begin{array}{c}
49 | 15,631 \\
-147 \\
93 \\
-49 \\
491 \\
-491 \\
0
\end{array}
\]

[Handwritten notes:]
- Good explanation
- Great use of drawings
- To understand the problem