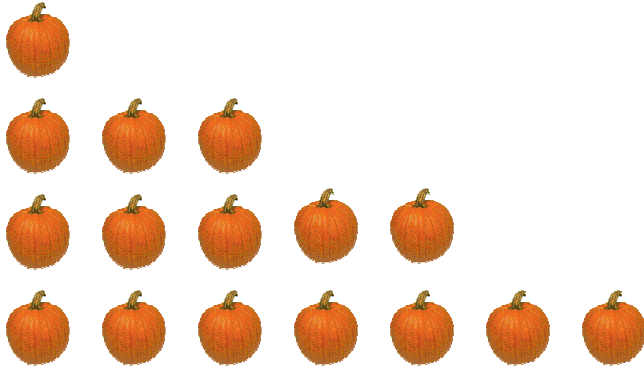


Examples of Different Ways Solving Problems

Problem example 1:

It's October time and Farmer Frank is getting ready for his annual pumpkin sale. To attract attention, he is going to arrange his pumpkins in a triangular display. He put one pumpkin in the first row, 3 pumpkins in the second row, 5 pumpkins in the third row, and so on for 20 rows. How many total pumpkins does he need?



SOLUTIONS

After interpreting the problem (following the steps in “A System for Problem Solving”), most students would know that it is a problem of finding the answer for this sum: “ $1+3+5+7+\dots+39$ ”. However, different level of problem solvers would have different approach in solving this problem.

Beginner's method: Simply adding: $1+3+5+7+\dots+39 = \boxed{400}$

Intermediate's method:

There are total of 10 pairs (20 numbers \div 2) of 40.

Thus, the result is $40 \times 10 = \boxed{400}$.

$ \begin{array}{r} 1 + 3 + 5 + \dots + 37 + 39 \\ + 39 + 37 + \dots + 3 + 1 \\ \hline 40 + 40 + \dots + 40 + 40 \end{array} $
--

Advance's method: Using the “*sum of odds = n^2* ” formula

$$\sum 1+3+5+\dots+39 = 20^2 = \boxed{400}$$

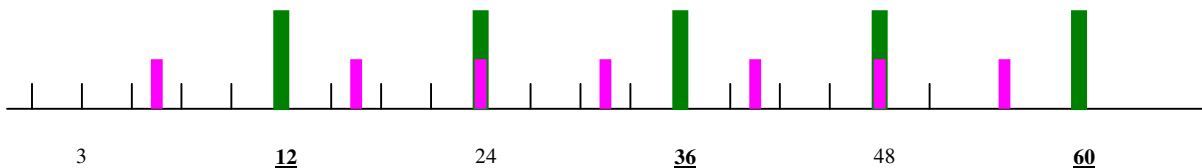
Examples of Different Ways Solving Problems

Problem example 2:

Owl A hoots every 3 hours, Owl B hoots every 8 hours, and Owl C hoots every 12 hours. If they all hoot together at the start, how many times during the next 60 hours will *just two* owls hoot together?

SOLUTIONS

Beginner's method: Draw picture:



Answer: We can see from the graph that there are 3 times that only 2 owls hoot together.

Intermediate's method: Use "table"

	Owl A <i>3's multiples</i>	Owl B <i>8's multiples</i>	Owl C <i>12's multiples</i>
	3		
	6	8	
	9		
√ (2 together)	12		12
	15	16	
	18		
	21		
X (3 together)	24	24	24
	27		
	30	32	
	33		
√ (2 together)	36		36
	39	40	
	42		
	45		
X (3 together)	48	48	48
	51		
	54	56	
	57		
√ (2 together)	60	64	60
	63		
	66		
	69		
X (3 together)	72	72	72
	75		
	78	80	
	81		84

Answer: From the above table, there are only 3 times that two owls hoot together.

Examples of Different Ways Solving Problems

Advance's method: using LCM

Finding the hours that all three owls hoot together is $\text{LCM}(3, 8, 12) = 24$. The problem only wants the answer for *just two* owls hoot together and not three. So we have to find the frequency of the pair(s) of owls that hoot together excluding those that all three are hooting.

First, picking any two owls and find out when they hoot together:

$\text{LCM}(3, 8) = 24$, we can't use this pair at all because it is the same frequency as when 3 hoot together.

$\text{LCM}(8, 12) = 24$, we can't use this pair at all because it is the same frequency as when 3 hoot together.

$\text{LCM}(3, 12) = 12$, we can use this pair and the only pair.

Second, find the frequency in the 80 hours time span by finding the multiples of 12:
12, 24, 36, 48, 60, 72.

Third, exclude those of multiples of 24 (when 3 hoot together) which left with: 12, 36, 60.

ANSWER: *3 times.*