Activity 1

Ask the participants to reduce $\frac{4}{12}$. More than likely they will say $\frac{2}{3}$ is the answer. The follow-up discussion should include the idea that if we want to go literal, $\frac{4}{12}$ reduced is $\frac{4}{12}$. To get to $\frac{2}{3}$, common factors are divided out of the numerator and denominator. That terminology (divide out common factors) is very helpful as a readiness skill for algebra. Is $\frac{2}{3}$ simpler than $\frac{4}{12}$? Why do we insist on expressing fractions so the numerator and denominator are relatively prime? Should we insist on dividing out all common factors?

Activity 2

Discuss this unusual way to do 800 – 372

$$\begin{array}{r} 7\quad 9\quad 9\ +1 \\ -\,3\quad 7\quad 2 \\ \hline \end{array}$$

All regrouping is gone. What are the advantages and disadvantages of doing subtraction this way?

Activity 3

Divide the participants into three subgroups, assigning each group one of the following ways to do addition. They are to perfect the process and then explain it to the rest of the group.

Partial sum addition

```
  8 9 6
+ 7 8 4
  ------
    1 0      (the sum of 6 and 4)
  1 7 0      (90 + 80, not 9 + 8 as is commonly said)
+ 1 5 0 0    (800 + 700, not 8 + 7 as is commonly said)
  ---------
  1 6 8 0
```

Scratch method addition

```
  8 9 6
+ 7 8 4
  -----
1 ~~5~~ ~~7~~ 0
  6 8
```

Low Stress addition

```
    9
    8
  1   7
    9
  1   6      (7 + 9 = 16)
    7
  1   3      (6 + 7 = 13)
+   9
  ---
  1 ____     (10 from 3 + 9)
    2        ( from 3 + 9)
+ 4 0        (sum the 10s at the left)
  -----
  4 2        (partial sum not normally used here).
```

Activity 4

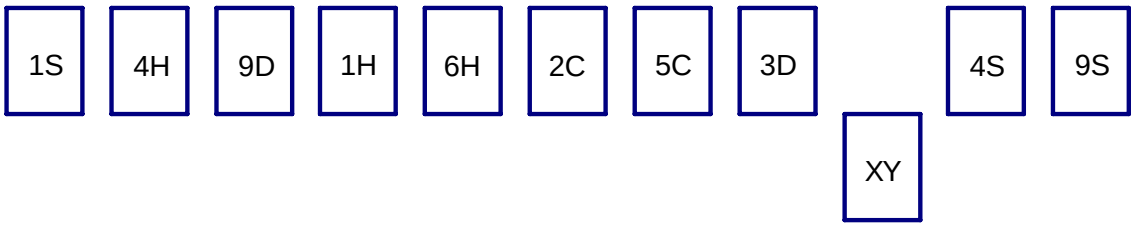
Break the group into at least 2 subgroups and ask each group to express the first 10 counting numbers in terms of:

Group 1 - - four 3s
Group 2 - - four 4s
Group 3 - - four 5s
Etc. for as many subgroups as defined.

Each group is to summarize the different arithmetic skills that are practiced as this task is completed.

Activity 5

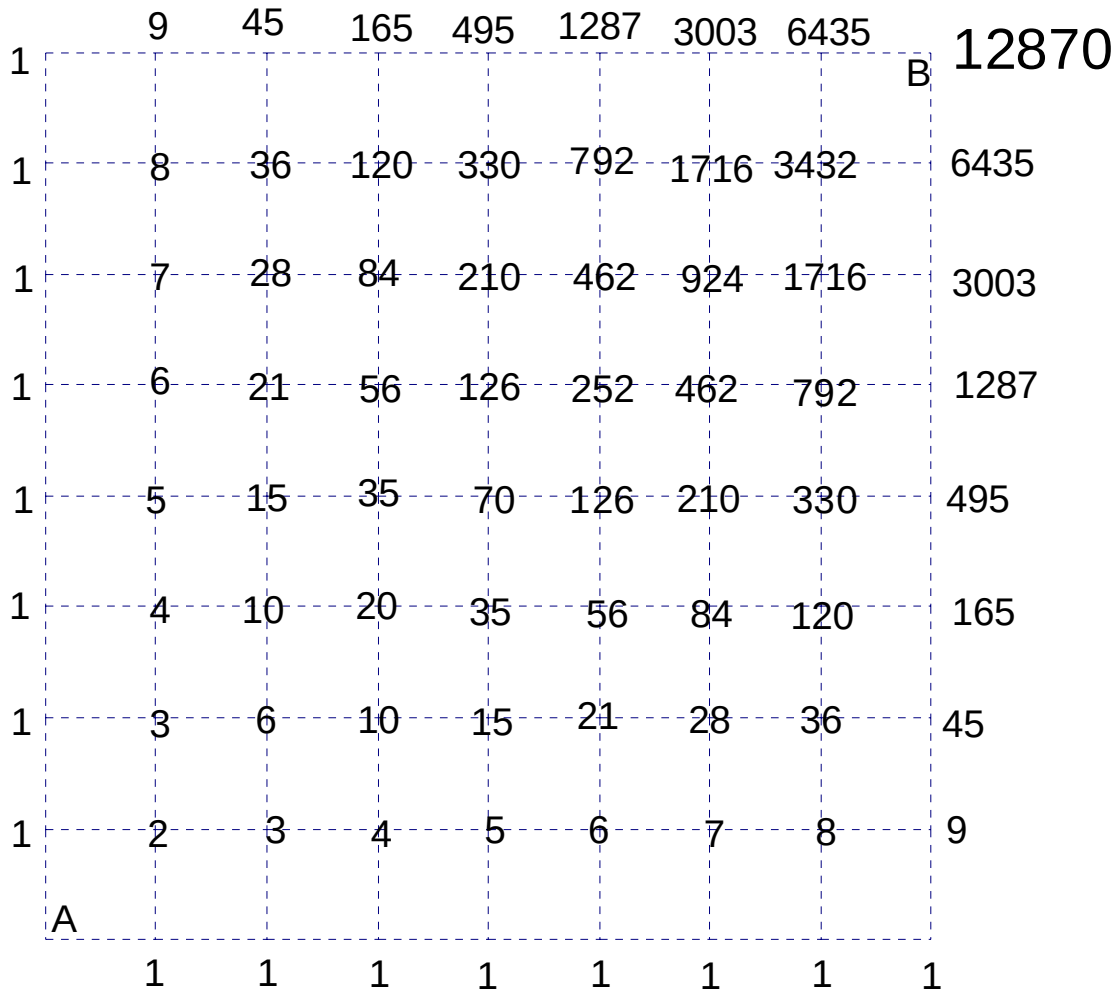
Present the following to the entire group. Which card fell?



The answer is the 6 of diamonds. The numbers are 1, 4, 9, 16, 25, 36, 49 and if a 2-digit number is expressed, the suit is the same for both cards.

Activity 6

Break into subgroups and ask each one to solve the following: Visualize a checkerboard. Assuming you can travel only up or right, and only along sides of the little squares, turning or going straight through any small square's corner, how many different routes are available to go from the lower left corner of the board to the upper right corner of the board? Each subgroup should be prepared to explain how they solved the problem.



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+ 1 5 0 0   (800 + 700, not 8 + 7 as is commonly said)
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```

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```
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+ 7 8 4
1 5 7 0
  6 8
```

Low Stress addition

```
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    8
  1   7
    9
  1   6     (7 + 9 = 16)
    7
  1   3     (6 + 7 = 13)
+   9
  1_____    (10 from 3 + 9)
    2       ( from 3 + 9)
+ 4 0       (sum the 10s at the left)
  4 2       (partial sum not normally used here).
```

Using four 3s to express digits

$1 = \frac{33}{33}$ or $\frac{3+3}{3+3}$ or $\frac{3+3-3}{3}$ or $\frac{3^3}{3^3}$ (and others)

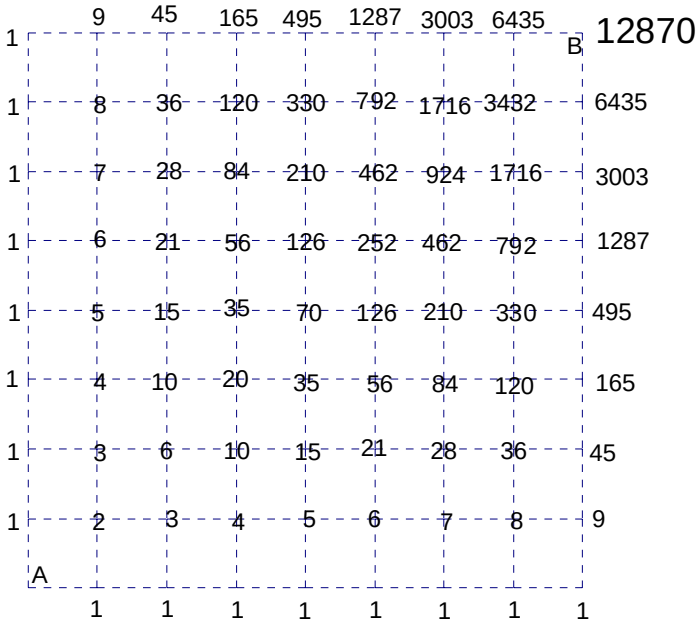
$2 = \frac{3}{3} + \frac{3}{3}$

$3 = (3)\left(3^{3-3}\right)$

$4 = \left(3^{3-3}\right) + 3$

$5 = 3 + \frac{3+3}{3}$

$6 = 33 - 3^3$


9 45 165 495 1287 3003 6435
12870
B
1 8 36 120 330 792 1716 3432 6435
1 7 28 84 210 462 924 1716 3003
1 6 21 56 126 252 462 792 1287
1 5 15 35 70 126 210 330 495
1 4 10 20 35 56 84 120 165
1 3 6 10 15 21 28 36 45
1 2 3 4 5 6 7 8 9
A
1 1 1 1 1 1 1 1