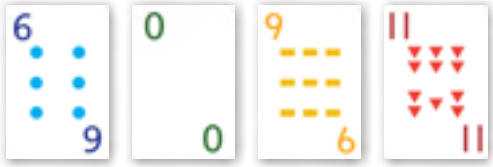
Solving Problems
with
School Friendly Cards



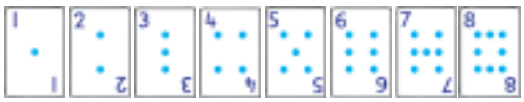
School Friendly Cards

The following puzzles and problems are designed to be used with a standard pack of **School Friendly Cards**, because it includes a zero card and some of the problems require the use of zero. You can substitute a standard pack of playing cards, where Ace = 1, but you will need to make up a zero card (maybe a Joker)

Using the Problem Solving activity cards

The problem-solving cards are designed to be printed onto A4 card or paper and cut in half to form A5 cards. The size of the card means that they may easily be projected onto a screen at the front of the class.

Sum to 16 **8**



Choose three cards with a sum of **16**.

Systematically list all the answers that you can find.

drpaulswan.com.au

Dr Paul Swan
David Dunstan

Solving the Problems

In each of the Problem-solving series of books we have applied the Polya's four step approach to problem solving.

Understand the problem: Students need to read the whole problem carefully, often re-reading the problem to determine what is required.

Devise a plan: For the most part this will require manipulating physical cards on the table.

Carry out the plan: Students will need to group the cards, check their calculation, and record their results in a systematic manner.

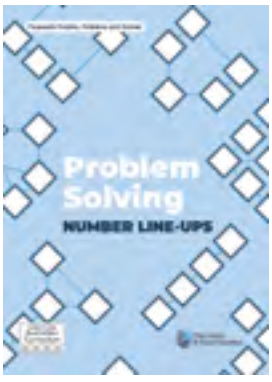
Look back: Students will need to check that they have answered the question and the calculations that were made. During the checking process the 'systematic' manner of solving the problem may be re-examined to check that all solutions have been found.

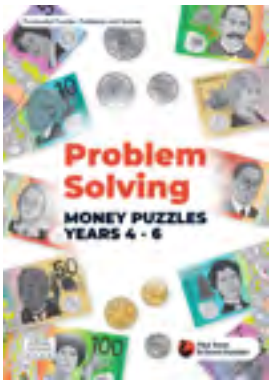
Presenting the Solutions

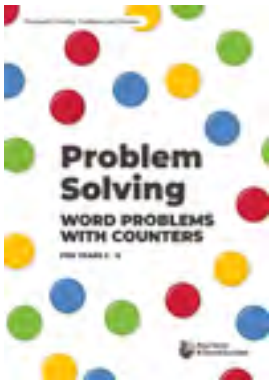
Students can solve the problems using School Friendly Cards:

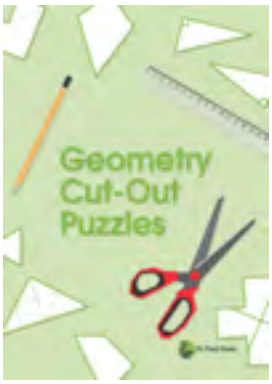
- Individually
- In pairs or groups
- Solutions may then be modelled on the whiteboard using **Jumbo School Friendly Cards.** Adhesive magnets may be placed onto the back of Jumbo School Friendly Cards. As students place the cards onto the whiteboard, they can explain the way they solved the problem.

More Problem Solving Problem Cards





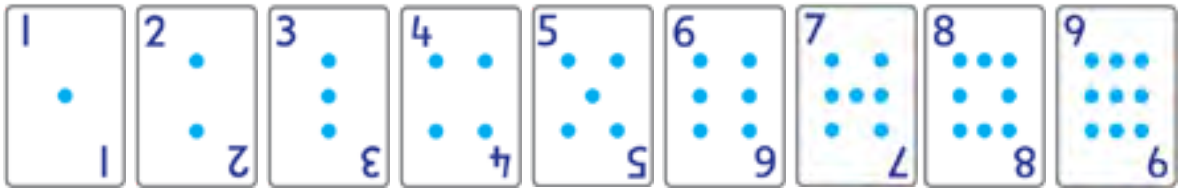




More Card Games and Activities with School Friendly Cards

Buy Books & Cards at www.drpaulswan.com.au

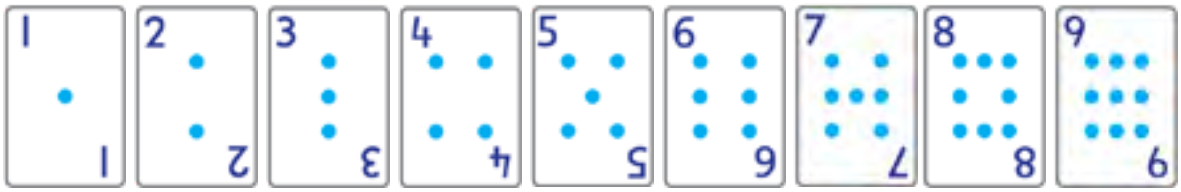
Three Groups A 1



Try forming groups of three cards where the total of each group of three cards is **15**.

There is more than one answer. Try to find them all.

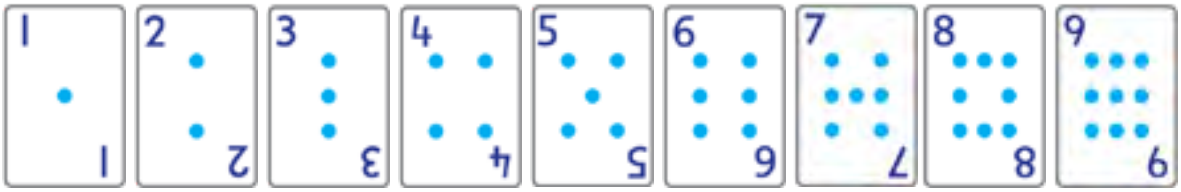
Three Groups B 2



Try forming groups of three cards where the total of the three groups is **14**, **15** and **16**.

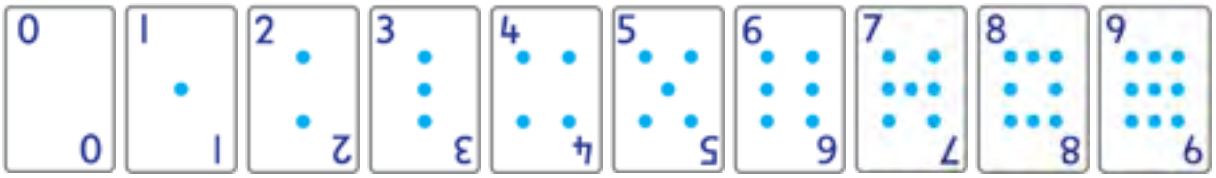
There is more than one answer. Try to find them all.

Three Groups C 3



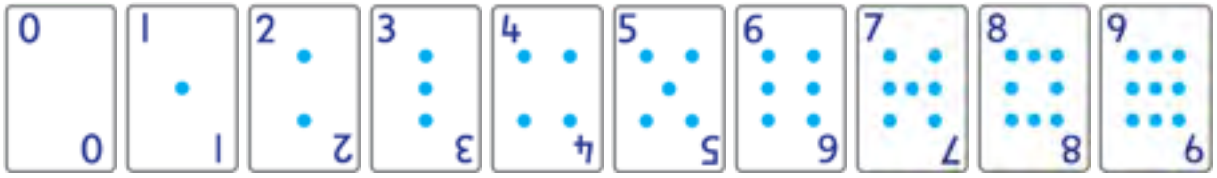
Try forming groups of three cards where the total for one group is **12**, another group **15**, and the third group, **18**.

Total Twelve A 4



Choose any three cards from the set 0 - 9 that add to **twelve**. There are many different ways to do this. Systematically list all that you can find.

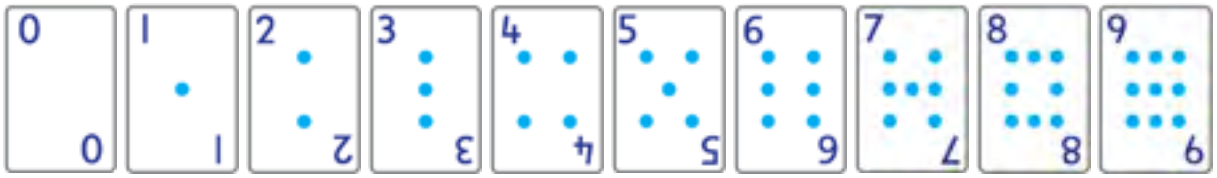
Total Twelve B 5



Choose any four cards that total **12**.

There is more than one answer. Try to find them all.

Total Twelve C 6

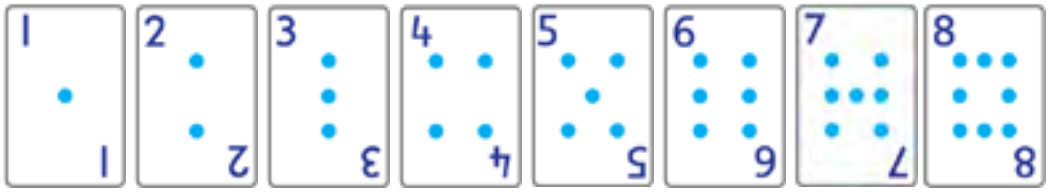


Choose any five cards that total **12**.

There is more than one answer. Systematically list all the answers that you can find.

Sum to 20

7



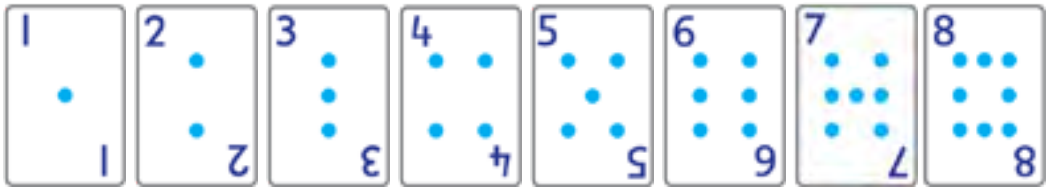
Choose four cards that add to **20**.

Try finding more groups of four cards that total **20**.

Systematically list all that you can find.

Sum to 16

8

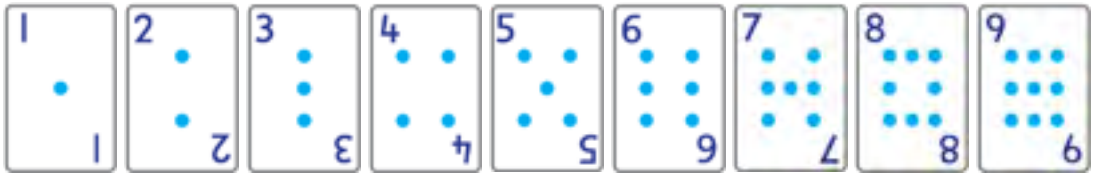


Choose three cards with a sum of **16**.

Systematically list all the answers that you can find.

Two Numbers 9

You will need half a pack of School Friendly Cards from 1 to 9.



Choose two cards (digits), e.g. 3 and 6.

The digits are arranged to create the largest number, 63 and the smallest number, 36.

Calculate the **difference** between the two numbers.

$$\begin{array}{r} 6\ 3 \\ -\ 3\ 6 \\ \hline = \\ \hline \end{array}$$

Choose another two cards to form a pair of numbers and try again. For example, 21 - 12 = 9.

There are over thirty calculations that you can create this way. What do you notice about the difference that is formed each time?

What happens if you include zero?

Answers

1. 9 + 5 + 1 = 15; 9 + 4 + 2 = 15; 8 + 6 + 1 = 15; 8 + 4 + 3 = 15; 7 + 6 + 2 = 15; 7 + 5 + 3 = 15
2. 7 + 4 + 3 = 14; 9 + 5 + 1 = 15; 8 + 6 + 2 = 16
   6 + 5 + 3 = 14; 9 + 4 + 2 = 15; 8 + 7 + 1 = 16
3. 6 + 5 + 1 = 12; 8 + 4 + 3 = 15; 9 + 7 + 2 = 18
4. 9, 3, 0 9, 2, 1 8, 4, 0 8, 3, 1 7, 5, 0 7, 4, 1 6, 5, 1 6, 4, 2 5, 4, 3 7, 3, 2
5. 9, 2, 1, 0 8, 3, 1, 0 7, 4, 1, 0 7, 3, 2, 0 6, 5, 1, 0 6, 4, 2, 0 5, 4, 3, 0 5, 4, 2, 1
6. 9 cannot be used because 9 and 0 would require two cards and with the remaining cards you cannot make 3, which is required to reach 12. Similarly, starting with eight or seven the same problem occurs. Working systematically, try starting with 6 and then 5.
   6, 3, 2, 1, 0 5, 4, 2, 1, 0
7. Starting with the largest card and then next largest card and so on we get:
   8, 7, 4, 1 8, 7, 3, 2 8, 6, 5, 1 8, 6, 4, 2 8, 5, 4, 3 7, 6, 5, 2 7, 6, 4, 3
8. 8, 7, 1 8, 6, 2 8, 5, 3 7, 6, 3 7, 5, 4

9

Difference	*9*	*18*	*27*	*36*	*45*	*54*	*63*	*72*
Problems	98 - 89	97 - 79	96 - 69	95 - 59	94 - 49	93 - 39	92 - 29	91 - 19
	87 - 78	86 - 68	85 - 58	84 - 48	83 - 38	82 - 18	81 - 18	
	76 - 67	75 - 57	74 - 47	73 - 37	72 - 27	71 - 17		
	65 - 56	64 - 46	63 - 36	62 - 26	61 - 16			
	54 - 45	53 - 35	52 - 15	51 - 15				
	43 - 34	42 - 24	41 - 14					
	32 - 23	31 - 13						
	21 - 12							

The difference is always a multiple of nine.

Multiplying the difference between the two cards by nine gives you the difference between the two numbers.

There are nine extra calculations if you include zero, that is, 45 in total.