STATION 1

$P = (n + 1)^3 - n^3$, where n takes the values 0, 1, 2, 3, 4, 5, 6, 7, 8 in turn.

Find the total of all the values of P which are prime numbers.

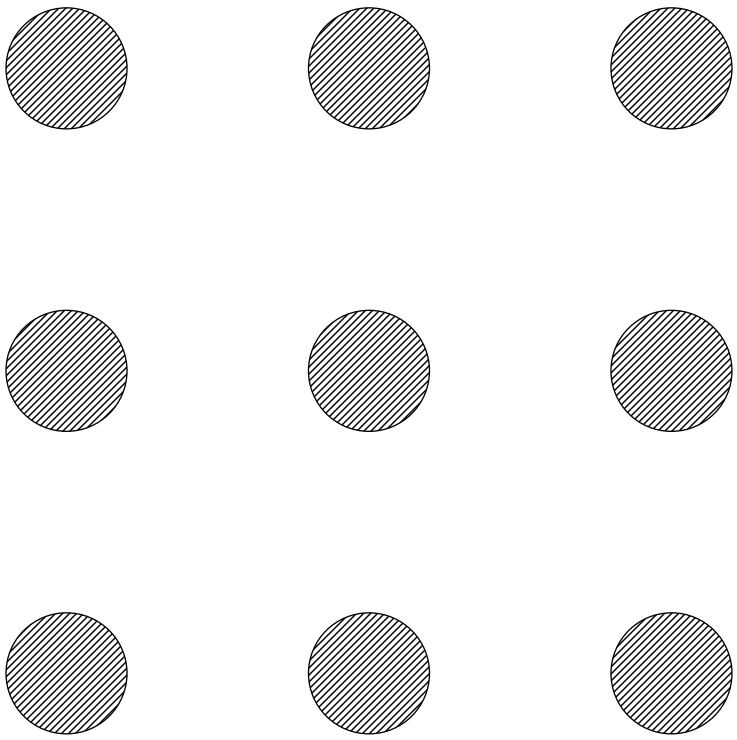
STATION 2

(a) On the worksheet draw all the different straight lines that pass through *exactly two* points.

[3 marks]

(b) You are provided with nine counters arranged in a 3×3 square grid. Move one counter only so that nine different straight lines can be drawn on the grid each passing through *exactly three* counters. [3 marks]

STATION 2



STATION 3

In the equations below the letters A, B, C and D represent different non-negative single digit numbers.

$$\begin{aligned} D &= \tfrac{1}{2}(A - B) \\ D^2 &= A - B \\ D^3 &= A + B + C + D \end{aligned}$$

'$ABCD$' stands for the four-digit number formed by replacing each of A, B, C and D by a single digit.

What is the four-digit number '$ABCD$'?

STATION 4

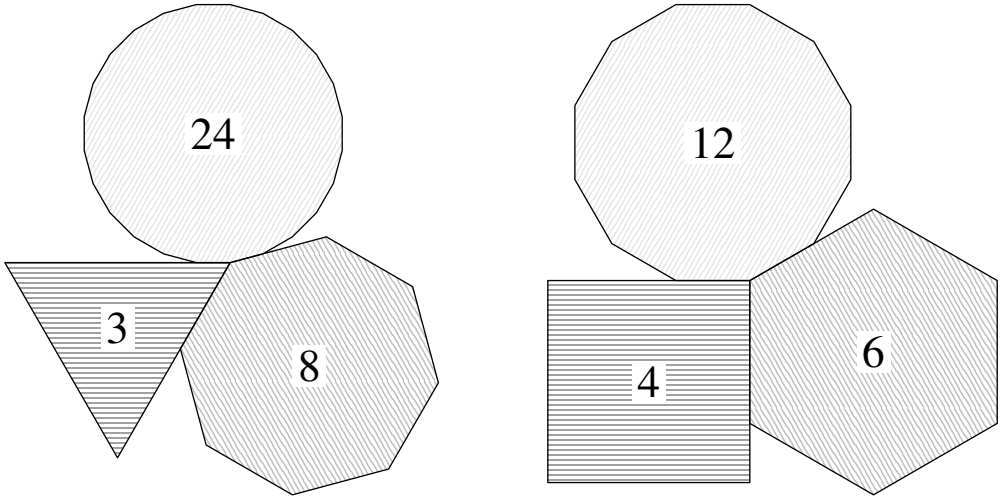
(a) Arrange nine sticks to form five equilateral triangles. You are not allowed to place sticks over others. [3 marks]

(b) Arrange eight sticks to form a figure which contains two squares, eight triangles and an eight-pointed star. You are allowed to place sticks over others. [3 marks]

STATION 5

Three regular polygons, with different numbers of sides, fit together at a point. Their angles all contain a whole number of degrees.

Two examples of three such regular polygons, showing the numbers of sides, are shown.



There are three other possible cases. The smallest interior angle in each case is either 60° or 90°.

What are the two largest interior angles in these three cases?

[2 marks per case]

The interior angle of an n-sided regular polygon is $180° - \dfrac{360°}{n}$.

STATION 6

You are provided with a pentagon made out of card. The pentagon consists of a square with a right-angled isosceles triangle placed on top of it.

You are required to cut the pentagon into three pieces only and to then rearrange the pieces to produce a right-angled isosceles triangle. Your two cuts must be along completely straight lines and the first one must be along the dashed line shown.

The three pieces of card should not overlap, and there should be no gaps between them.

STATION 7

Using the five digits 1, 2, 3, 4 and 5 once each it is possible to make 120 different five-digit whole numbers ranging from 12345 to 54321.

All 120 of these different five-digit numbers are added up.

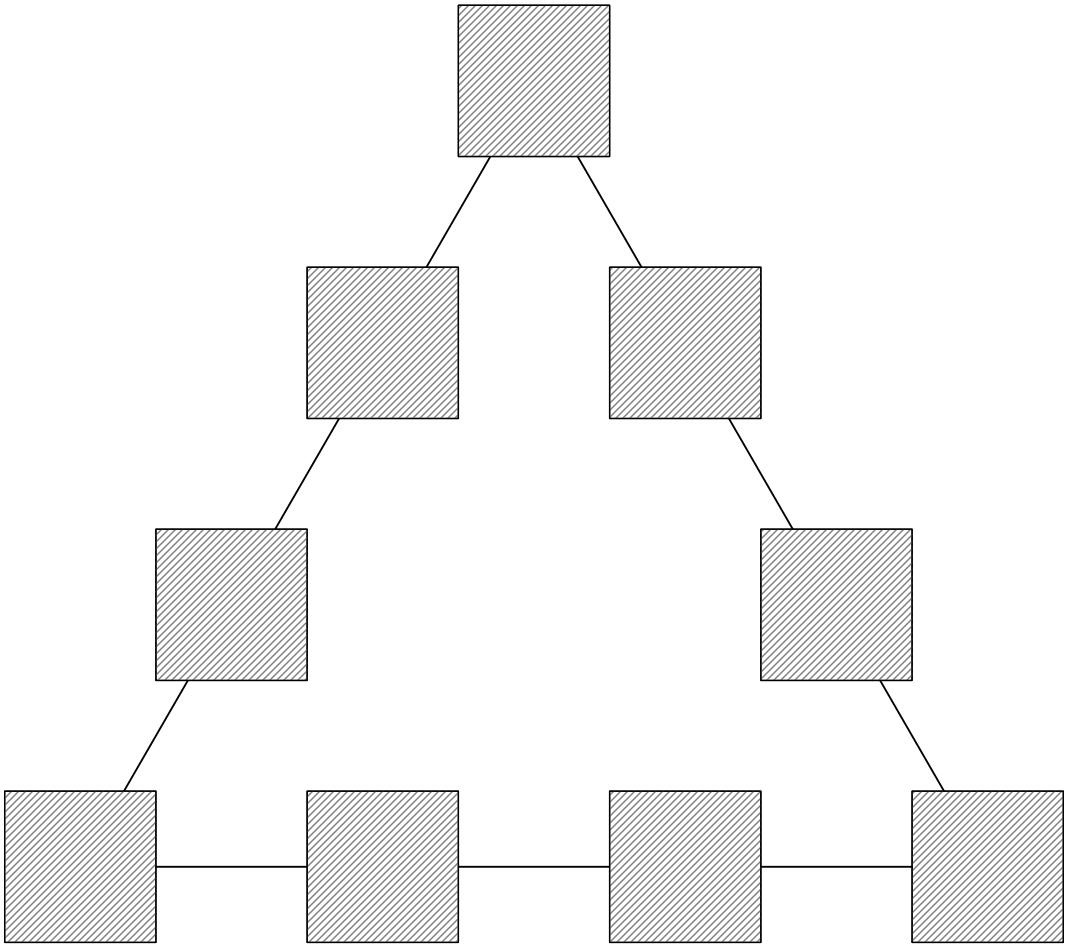
What is the total?

STATION 8

Place one of the number cards provided over each square in the large triangle.

The four numbers along each side of the triangle must add up to the same total.
There is more than one possible solution, but you only need to find one.

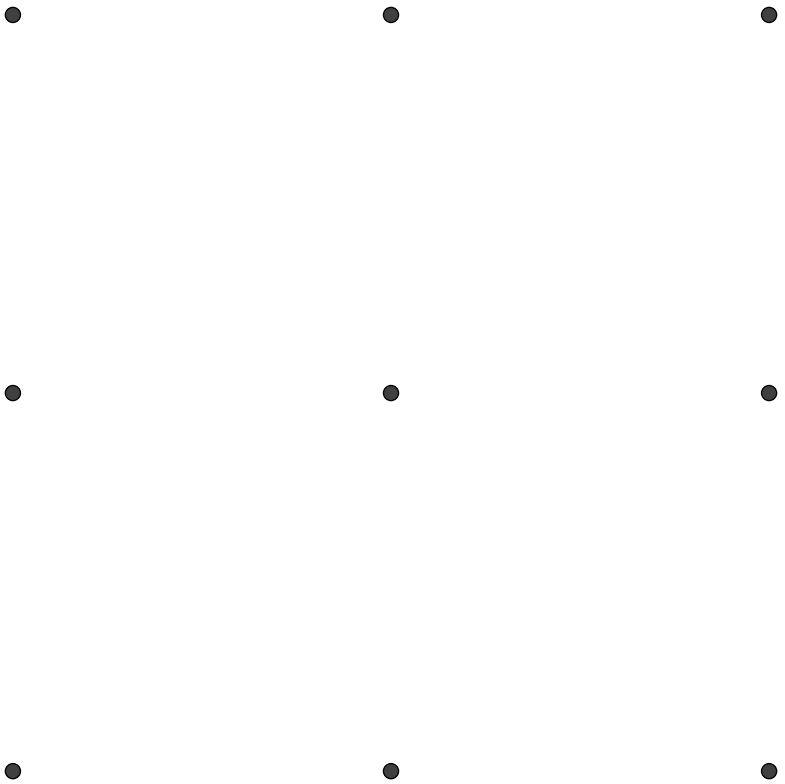
STATION 8



STATION 1 WORKSHEET

TOTAL OF PRIMES:

STATION 2 WORKSHEET



STATION 3 WORKSHEET

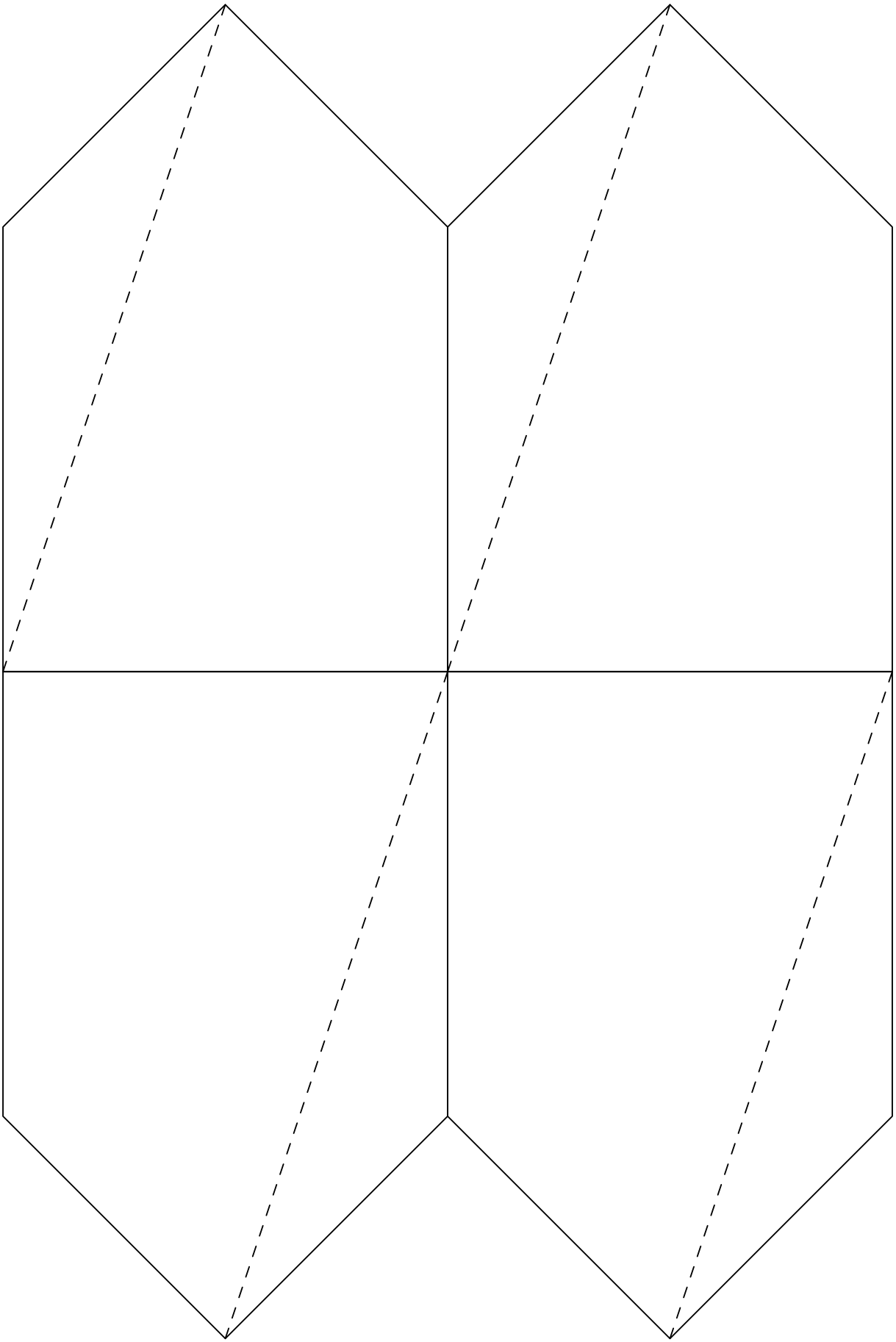
'$ABCD$':

STATION 5 WORKSHEET

THREE PAIRS OF ANGLES:

STATION 7 WORKSHEET

TOTAL OF NUMBERS:



9	9	9	9	9	9
8	8	8	8	8	8
7	7	7	7	7	7
6	6	6	6	6	6
5	5	5	5	5	5
4	4	4	4	4	4
3	3	3	3	3	3
2	2	2	2	2	2
1	1	1	1	1	1

TEAM NUMBER SCHOOL NAME

Station 1 Total of primes

Complete the worksheet and show it to the supervisor.

0 6

Station 2

Show your answer(s) to the supervisor.

0 3 6

Station 3 '*ABCD*'

Complete the worksheet and show it to the supervisor.

0 6

Station 4

Show your answer(s) to the supervisor.

0 3 6

Station 5 Three pairs of angles

Complete the worksheet and show it to the supervisor.

0 2 4 6

Station 6

Show your answer(s) to the supervisor.

0 6

Station 7 Total of numbers

Complete the worksheet and show it to the supervisor.

0 6

Station 8

Show your answer(s) to the supervisor.

0 6

Circle the mark awarded for each question and cross out the others.

FINAL SCORE /48