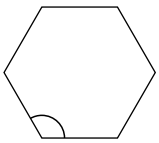
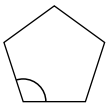
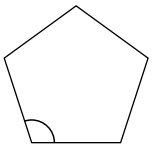
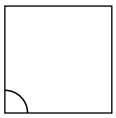
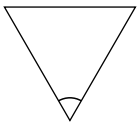
3 points

 # 1. How many of the following four numbers 2, 20, 202, 2020 are prime?

(**A**) 0 (**B**) 1 (**C**) 2 (**D**) 3 (**E**) 4

Solution:

 # 2. In which of the regular polygons below is the marked angle the largest?

(**A**)  (**B**)  (**C**)  (**D**)  (**E**) 

Solution:

 # 3. Miguel solves six Olympiad problems every day and Lázaro solves four Olympiad problems every day. How many days does it take Lázaro to solve the same number of problems as Miguel solves in four days?

(**A**) 4 (**B**) 5 (**C**) 6 (**D**) 7 (**E**) 8

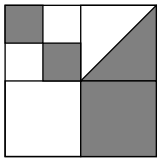
Solution:

 # 4. Which of these fractions has the largest value?

(**A**) $\frac{8+5}{3}$ (**B**) $\frac{8}{3+5}$ (**C**) $\frac{3+5}{8}$ (**D**) $\frac{8+3}{5}$ (**E**) $\frac{3}{8+5}$

Solution:

 # 5. A large square is divided into smaller squares. In one of the squares a diagonal is also drawn. What fraction of the large square is shaded?



(**A**) $\frac{4}{5}$ (**B**) $\frac{3}{8}$ (**C**) $\frac{4}{9}$ (**D**) $\frac{1}{3}$ (**E**) $\frac{1}{2}$

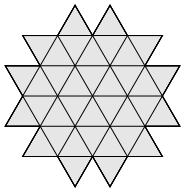
Solution:

 # 6. There are 4 teams in a soccer tournament. Each team plays every other team exactly once. In each match, the winner scores 3 points and the loser scores 0 points. In the case of a draw, both teams score 1 point. After all matches have been played, which of the following total number of points is it impossible for any team to have scored?

(**A**) 4 (**B**) 5 (**C**) 6 (**D**) 7 (**E**) 8

Solution:

 # 7. The diagram shows a shape made up of 36 identical small triangles. What is the smallest number of such triangles that could be added to the shape to turn it into a hexagon?



(**A**) 10 (**B**) 12 (**C**) 15 (**D**) 18 (**E**) 24

SOLUTION:

 # 8. Kanga wants to multiply three different numbers from the following list: -5, -3, -1, 2, 4, and 6. What is the smallest result she could obtain?

(**A**) -200 (**B**) -120 (**C**) -90 (**D**) -48 (**E**) -15

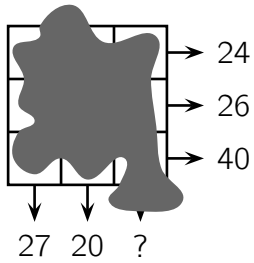
SOLUTION:

 # 9. If John goes to school by bus and walks back, he travels for 3 hours. If he goes by bus both ways, he travels for 1 hour. How long does it take him if he walks both ways?

(**A**) 3.5 hours (**B**) 4 hours (**C**) 4.5 hours (**D**) 5 hours (**E**) 5.5 hours

SOLUTION: Since he needs 1 hour if he goes both ways by bus, it means he needs half an hour for each bus trip. As he needs 3 hours if he goes to school by bus and returns by walking, he needs $3 - \frac{1}{2}$ = 2.5 hours for the walking part. So totally 2x2,5 = 5 hours for both trips on foot.

 # 10. A number is written in each cell of a 3×3 square. Unfortunately the numbers are not visible because they are covered in ink. However, the sum of the numbers in each row and the sum of the numbers in two of the columns are all known, as shown by the arrows on the diagram. What is the sum of the numbers in the third column?

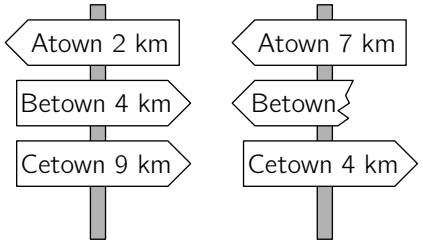


(**A**) 41 (**B**) 43 (**C**) 44 (**D**) 45 (**E**) 47

SOLUTION: Sum of all rows equals sum of all columns, so missing number is $24+26+40-27-20 = 43$. Example: 5 8 11 // 6 8 12 // 16 4 20

4 points

 # 11. The shortest path from Atown to Cetown runs through Betown. The two signposts shown are set up along this path. What distance was written on the broken sign?



(**A**) 1 km (**B**) 3 km (**C**) 4 km (**D**) 5 km (**E**) 9 km

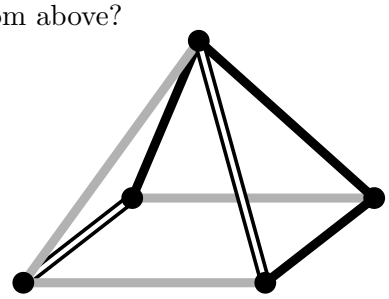
SOLUTION:

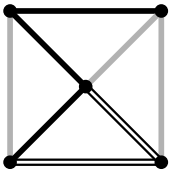
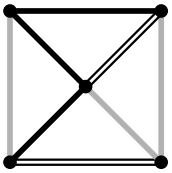
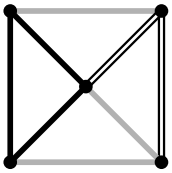
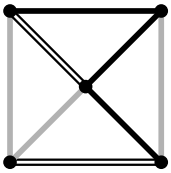
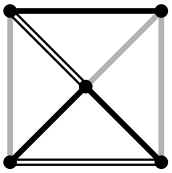
 # 12. Anna wants to walk 5 km on average each day in March. At bedtime on 16th March, she realised that she had walked 95 km so far. What distance does she need to walk on average for the remaining days of the month to achieve her target?

(**A**) 5.4 km (**B**) 5 km (**C**) 4 km (**D**) 3.6 km (**E**) 3.1 km

SOLUTION:

 # 13. Which of the following shows what you would see when the the object in the diagram is viewed from above?



(**A**)  (**B**)  (**C**)  (**D**)  (**E**) 

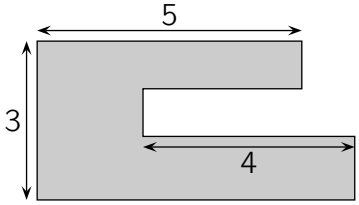
SOLUTION:

 # 14. Every pupil in a class either swims or dances or both. Three fifths of the class swim and three fifths dance. Five pupils both swim and dance. How many pupils are in the class?

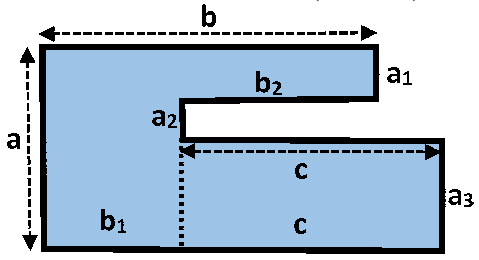
(**A**) 15 (**B**) 20 (**C**) 25 (**D**) 30 (**E**) 35

SOLUTION:

 # 15. Sacha's garden has the shape shown. All the sides are either parallel or perpendicular to each other. Some of the dimensions are shown in the diagram. What is the perimeter of Sacha's garden?



(**A**) 22 (**B**) 23 (**C**) 24 (**D**) 25 (**E**) 26

SOLUTION: More generally the perimeter is $2(a+b+c)$ as is easily seen if you observe that $a_1+a_2+a_3 = a$ and $b_1 + b_2 = b$. 

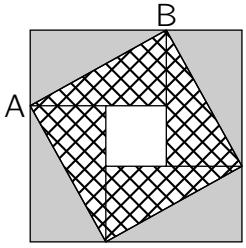
(Don't change the name please. This is a tribute to a Cadet legend!)

 # 16. Andrew buys 27 identical small cubes, each with two adjacent faces painted red. He then uses all of these cubes to build a large cube. What is the largest number of completely red faces of the large cube that he can make?

(**A**) 2 (**B**) 3 (**C**) 4 (**D**) 5 (**E**) 6

Solution: (Don't change the name please. This is a tribute to a Cadet legend!)

 # 17. A large square consists of four identical rectangles and a small square. The area of the large square is 49 cm^2 and the length of the diagonal AB of one of the rectangles is 5 cm. What is the area of the small square?



(**A**) 1 cm^2 (**B**) 4 cm^2 (**C**) 9 cm^2 (**D**) 16 cm^2 (**E**) 25 cm^2

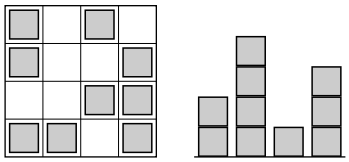
Solution:

 # 18. Werner's salary is 20% of his boss's salary. By what percentage should Werner's salary increase to become equal to his boss's salary?

(**A**) 80% (**B**) 120% (**C**) 180% (**D**) 400% (**E**) 520%

Solution:

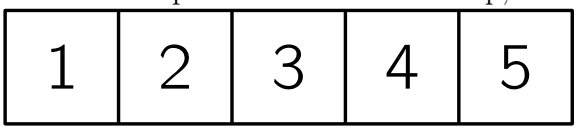
 # 19. Irene made a "city" with identical wooden cubes. One of the diagrams shows the view from above the "city" and the other the view from one of the sides. However, it is not known from which side the side view was taken. What is the largest number of cubes that Irene could have used?



(**A**) 25 (**B**) 24 (**C**) 23 (**D**) 22 (**E**) 21

Solution:

 # 20. Aisha has a strip of paper with the numbers 1, 2, 3, 4 and 5 written in five cells as shown. She folds the strip so that the cells overlap, forming 5 layers.



Which of the following configurations, from top layer to bottom layer, is it not possible to obtain?

(**A**) 3, 5, 4, 2, 1 (**B**) 3, 4, 5, 1, 2 (**C**) 3, 2, 1, 4, 5 (**D**) 3, 1, 2, 4, 5 (**E**) 3, 4, 2, 1, 5

Solution:

5 points

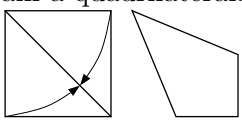
 # 21. Twelve coloured cubes are arranged in a row. There are 3 blue cubes, 2 yellow cubes, 3 red cubes and 4 green cubes but not in that order. There is a yellow cube at one end and a red cube at

the other end. The red cubes are all touching. The green cubes are also all touching. The tenth cube from the left is blue. What colour is the cube sixth from the left?

(**A**) green (**B**) yellow (**C**) blue (**D**) red (**E**) red or blue

Solution:

 # 22. Zaida took a square piece of paper and folded two of its sides to the diagonal, as shown, to obtain a quadrilateral. What is the size of the largest angle of the quadrilateral?



(**A**) 112.5° (**B**) 120° (**C**) 125° (**D**) 135° (**E**) 150°

Solution:

 # 23. How many four-digit numbers A are there, such that half of the number A is divisible by 2, a third of A is divisible by 3 and a fifth of A is divisible by 5?

(**A**) 1 (**B**) 7 (**C**) 9 (**D**) 10 (**E**) 11

Solution:

 # 24. In the final of the dancing competition, each of the three members of the jury gives the five competitors 0 points, 1 point, 2 points, 3 points or 4 points. No two competitors get the same mark from any individual judge. Adam knows all the sums of the marks and a few single marks, as shown. How many points did Adam get from judge III?

	Adam	Berta	Clara	David	Emil
I	2	0			
II		2	0		
III					
Sum	7	5	3	4	11

(**A**) 0 (**B**) 1 (**C**) 2 (**D**) 3 (**E**) 4

Solution:

 # 25. Saniya writes a positive integer on each edge of a square. She also writes at each vertex the product of the numbers on the two edges that meet at that vertex. The sum of the numbers at the vertices is 15. What is the sum of the numbers on the edges of the square?

(**A**) 6 (**B**) 7 (**C**) 8 (**D**) 10 (**E**) 15

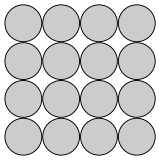
Solution:

 # 26. Sophia has 52 identical isosceles right-angled triangles. She wants to make a square using some of them. How many different sized squares can she make?

(**A**) 6 (**B**) 7 (**C**) 8 (**D**) 9 (**E**) 10

Solution:

 # 27. Cleo builds a pyramid with metal spheres. The square base consists of 4×4 spheres as shown in the figure. The floors consist of 3×3 spheres, 2×2 spheres and a final sphere at the top. At each point of contact between two spheres, a blob of glue is placed. How many blobs of glue will Cleo place?



(**A**) 72 (**B**) 85 (**C**) 88 (**D**) 92 (**E**) 96

Solution:

 # 28. Four children are in the four corners of a 10 m×25 m pool. Their trainer is standing somewhere on one side of the pool. When he calls them, three children get out and walk as short a distance as possible round the pool to meet him. They walk 50 m in total. What is the shortest distance the trainer needs to walk to get to the fourth child?

(**A**) 10 m (**B**) 12 m (**C**) 15 m (**D**) 20 m (**E**) 25 m

Solution:

 # 29. Anne, Boris and Carl ran a race. They started at the same time, and their speeds were constant. When Anne finished, Boris had 15 m to run and Carl had 35 m to run. When Boris finished, Carl had 22 m to run. What is the distance they ran?

(**A**) 135 m (**B**) 140 m (**C**) 150 m (**D**) 165 m (**E**) 175 m

Solution:

 # 30. The statements below give clues to the identity of a four-digit number.

4 1 3 2 Two digits are correct but in the wrong places.

9 8 2 6 One digit is correct and in the right place.

5 0 7 9 Two digits are correct with one of them being in the right place and the other one in the wrong place.

2 7 4 1 One digit is correct but in the wrong place.

7 6 4 2 None of the digits are correct.

What is the last digit of the four-digit number?

(**A**) 0 (**B**) 1 (**C**) 3 (**D**) 5 (**E**) 9

Solution: