Upper Primary Division
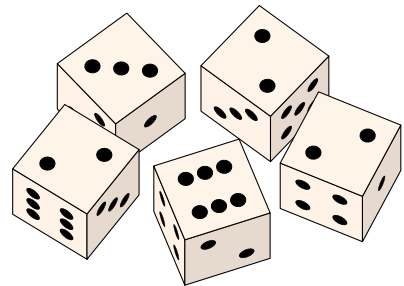
1. Which number is 20 more than 17?

   (A) 3   (B) 27   (C) 37   (D) 217   (E) 2017

2. How many 200 g apple pies will weigh 4 kg?

   (A) 2   (B) 20   (C) 50   (D) 80   (E) 200

3. Five dice were rolled, and the results were as shown.
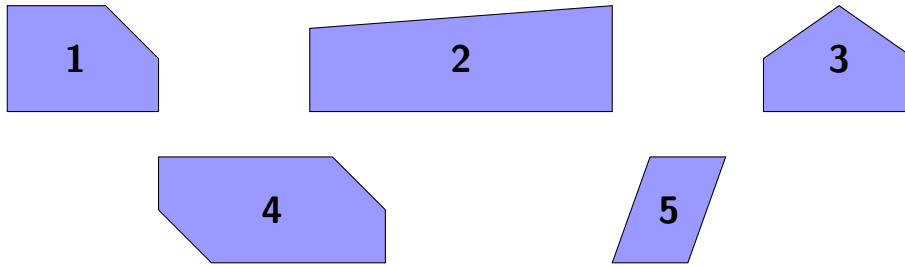
   What fraction of the dice showed a two on top?

   (A) $\dfrac{3}{4}$ (B) $\dfrac{1}{2}$ (C) $\dfrac{2}{3}$

   (D) $\dfrac{2}{5}$ (E) $\dfrac{3}{5}$

4. At the camping shop, Jane bought a rucksack for \$55 and a compass for \$20.

   How much change did she get from \$100?

   (A) \$25   (B) \$35   (C) \$45   (D) \$55   (E) \$65

5. Which of these shapes are pentagons?

(A) all of the shapes   (B) shape 3 only   (C) shapes 3 and 4

(D) shapes 1 and 3   (E) none of the shapes

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6. Mitchell lives 4 km from school. Naomi lives 3 times as far from school as Mitchell. Olivia lives 3 km closer to school than Naomi. How far does Olivia live from school?

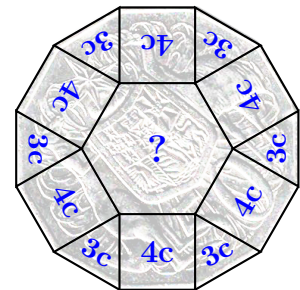(A) 9 km   (B) 3 km   (C) 15 km   (D) 13 km   (E) 21 km

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7. Helen is adding some numbers and gets the total 157. Then she realises that she has written one of the numbers as 73 rather than 37. What should the total be?

(A) 110   (B) 121   (C) 124   (D) 131   (E) 751

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8. In the year 3017, the Australian Mint recycled its coins to make new coins.

Each 50c coin was cut into six triangles, six squares, and one hexagon. The triangles were each worth 3c and the squares were each worth 4c.

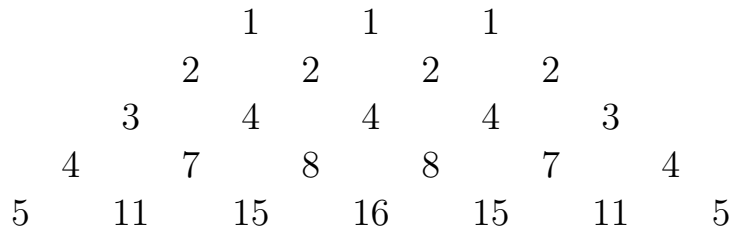How much should the value of the hexagon be to make the total still worth 50c?

(A) 3c   (B) 8c   (C) 18c   (D) 20c   (E) 43c

9. Felicity has a combination lock for her bike like the one below. It has the numbers 0 to 9 on each tumbler.

It clicks every time she moves the tumblers one number forward or back, including a click as the tumbler moves between 9 and 0.

She found the lock in the position 9–0–4 shown. Her combination is 5–8–7.

What is the *least* number of clicks needed to get the lock to her combination?

(A) 20   (B) 18   (C) 17   (D) 9   (E) 7

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10. Which number multiplied by itself is equal to 5 times 20?

(A) 10   (B) 20   (C) 25   (D) 100   (E) 120

Questions 11 to 20, 4 marks each

11. Greg sees a clock in the mirror, where it looks like this. What is the actual time?

(A) 4:10   (B) 4:50   (C) 5:10

     (D) 6:50   (E) 7:10

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12. In these two number sentences

$$\heartsuit + \heartsuit + \heartsuit + \star = 12$$

$$\star + \star + \star + \heartsuit = 20$$

what is the value of $\heartsuit$?

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

13. In this sum, each of the letters X, Y and Z represents a different digit. Which digit does the letter X represent?

(A) 1   (B) 4   (C) 5   (D) 7   (E) 9

$$\begin{array}{cc} X & X \\ + \; X & Y \\ \hline Y \; X & Z \end{array}$$

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14. A maths student made the following pattern:

```
              1      1      1
          2      2      2      2
        3      4      4      4      3
      4      7      8      8      7      4
    5     11     15     16     15     11     5
```

The numbers down the sides of the pattern increase by 1 and each of the other numbers is found by adding the two numbers above it.
What will be the sum of all the numbers on the next line in this pattern?

(A) 128   (B) 138   (C) 148   (D) 158   (E) 168

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15. The school bought 18 boxes of primary school paint for $900. Each box had a number of bottles, each worth $2.50. How many bottles were in each box?
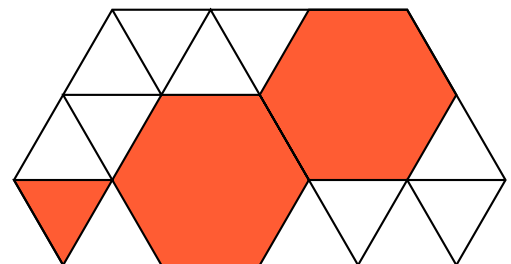
(A) 15   (B) 20   (C) 45   (D) 50   (E) 125

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16. One year in June, there were four Wednesdays and five Tuesdays. On which day was the first of June?

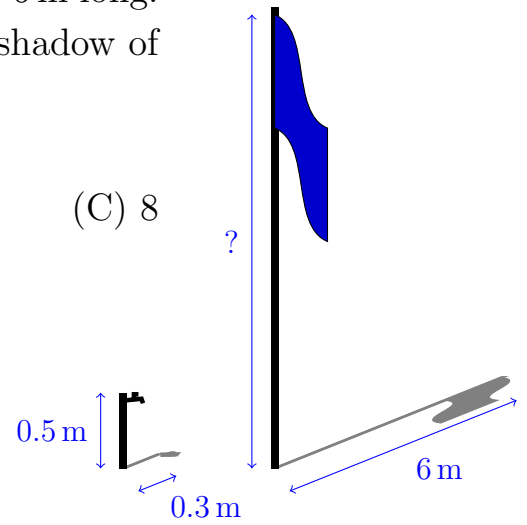(A) Monday (B) Tuesday (C) Thursday (D) Friday (E) Saturday

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17. What percentage of this shape is shaded?

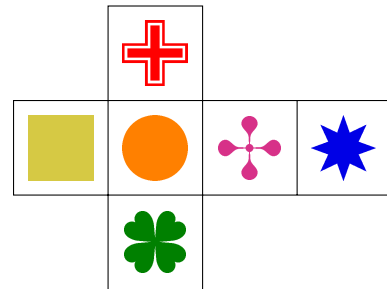(A) 40%   (B) 48%   (C) 50%

    (D) 52%   (E) 66%

18. At 10 am the school flagpole cast a shadow 6 m long. Next to the flagpole, the 0.5 m tap cast a shadow of 0.3 m.

How tall is the flagpole in metres?

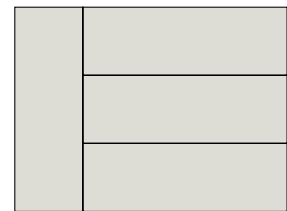(A) 3   (B) 5   (C) 8

       (D) 10   (E) 12

?

0.5 m

0.3 m

6 m

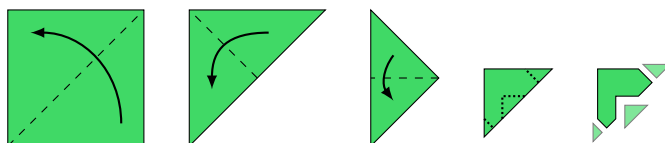**19.** This shape can be folded up to make a cube.

Which cube could it make?

(A)

(B)

(C)

(D)

(E)

20. The area of the large rectangle is 300 square metres. It is made up of four identical smaller rectangles. What is the width of one of the small rectangles in metres?

(A) 2   (B) 5   (C) 8   (D) 10   (E) 12

Questions 21 to 25, 5 marks each

21. Which one of the patterns below would be created with these folds and cuts?
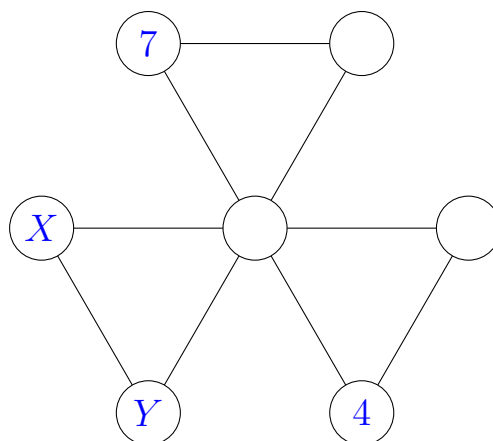
(A)   (B)   (C)   (D)   (E)

22. The whole numbers from 1 to 7 are to be placed in the seven circles in the diagram. In each of the three triangles drawn, the sum of the three numbers is the same.
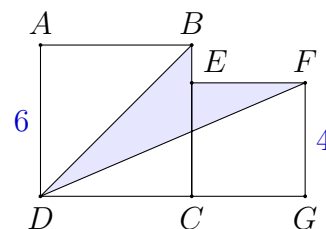
Two of the numbers are given.

What is $X + Y$?

(A) 5   (B) 6   (C) 7

(D) 8   (E) 9

23. A square $ABCD$ with a side of 6 cm is joined with a smaller square $EFGC$ with a side of 4 cm as shown.

What is the area of the shaded shape $BDFE$?

(A) $12 \, \text{cm}^2$ (B) $14 \, \text{cm}^2$ (C) $16 \, \text{cm}^2$

(D) $18 \, \text{cm}^2$ (E) $24 \, \text{cm}^2$

24. In this year of 2017, my family is *in its prime*: I am 7, my brother is 5, my mother is 29 and my father is 31. All of our ages are prime numbers.

What is my father's age the next year that my family is *in its prime*, when all of our ages are again prime?

(A) 37   (B) 41   (C) 43   (D) 47   (E) 61

25. A triangular prism is to be cut into two pieces with a single straight cut. What is the smallest possible total for the combined number of faces of the two pieces?

(A) 6   (B) 8   (C) 9

       (D) 10   (E) 11
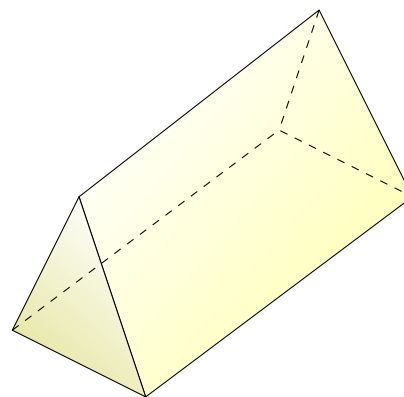
For questions 26 to 30, shade the answer as a whole number from 0 to 999 in the space provided on the answer sheet.

Question 26 is 6 marks, question 27 is 7 marks, question 28 is 8 marks, question 29 is 9 marks and question 30 is 10 marks.

26. Two rectangles overlap to create three regions, each of equal area. The original rectangles are 6 cm by 15 cm and 10 cm by 9 cm as shown. The sides of the smaller shaded rectangle are each a whole number of centimetres.

What is the perimeter of the smaller shaded rectangle, in centimetres?
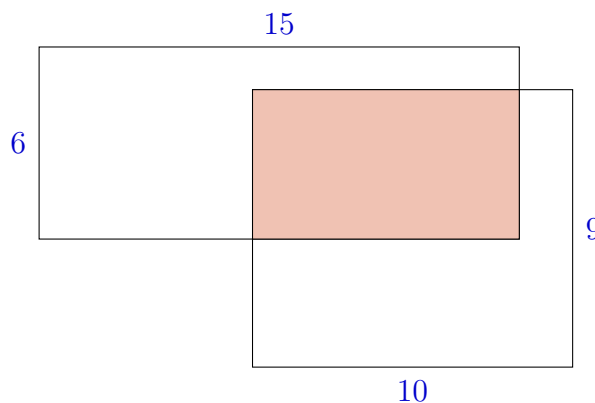
27. Jonathan made a tower with rectangular cards $2\,\mathrm{cm}$ long and $1\,\mathrm{cm}$ wide, where each row has one more card than the row above it.
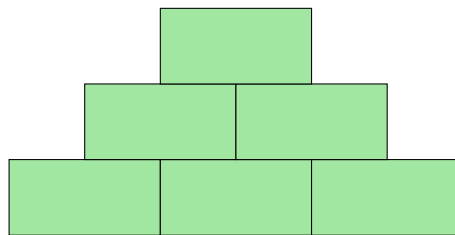
The perimeter of a tower with 3 levels is $18\,\mathrm{cm}$, as shown.

What will be the perimeter of a tower with 10 levels, in centimetres?

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28. All of the digits from 0 to 9 are used to form two 5-digit numbers. What is the smallest possible difference between these two numbers?

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29. A jigsaw piece is formed from a square with a combination of 'tabs' and 'slots' on at least two of its sides.
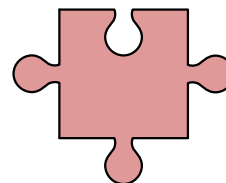
Pieces are either corner, edge or interior, as shown.
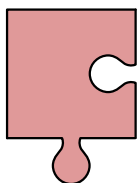
corner piece
(two straight sides at right angles)
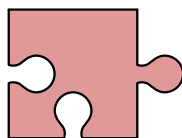
edge piece
(one straight side)

interior piece
(no straight sides)

We treat two shapes as the same if one is a rotation of the other, without turning it over. How many different shapes are possible?

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30. A 3×3 grid has a pattern of black and white squares.

A pattern is called *balanced* if each 2×2 subgrid contains exactly two squares of each colour, as seen in the first example.
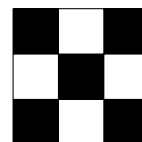
balanced

The pattern in the second example is *unbalanced* because the bottom-right 2×2 subgrid contains three white squares.
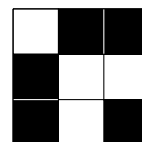
Counting rotations and reflections as different, how many balanced 3×3 patterns are there?

unbalanced