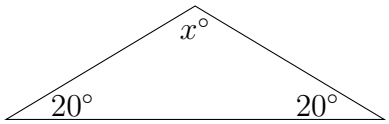
Questions – Junior Division

1. The value of 2016×2 is

(A) 4026 (B) 4212 (C) 4022 (D) 432 (E) 4032

2. In the diagram, the value of x is



(A) 30 (B) 20 (C) 90 (D) 140 (E) 100

3. Today is Thursday. What day of the week will it be 30 days from today?

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

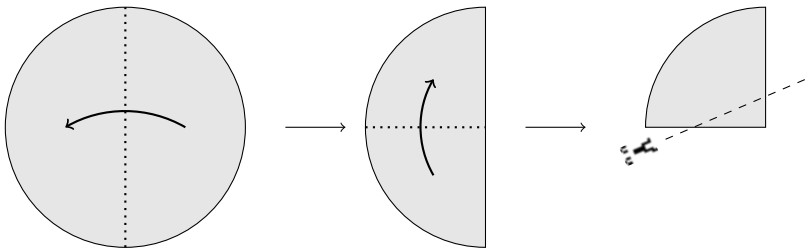
4. Today in Berracan, the minimum temperature was $-5°$C and the maximum was 8°C warmer than this. What was the maximum temperature?

(A) $-3°$C (B) 8°C (C) $-13°$C (D) 13°C (E) 3°C

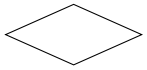
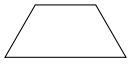
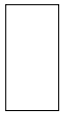
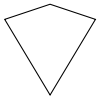
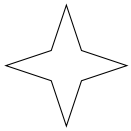
5. What is 25% of $\frac{1}{2}$?

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

6. A circular piece of paper is folded in half twice and then a cut is made as shown.



When the piece of paper is unfolded, what shape is the hole in the centre?

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

7. I used a \$100 note to pay for a \$29 book, a \$16 calculator and a packet of pens for \$8.95. What change did I get?

(A) \$56.05 (B) \$45.05 (C) \$46.05 (D) \$37.05 (E) \$57.05

8. Which of the following numbers is between 0.08 and 0.4?

(A) 0.019 (B) 0.009 (C) 0.109 (D) 0.91 (E) 0.409

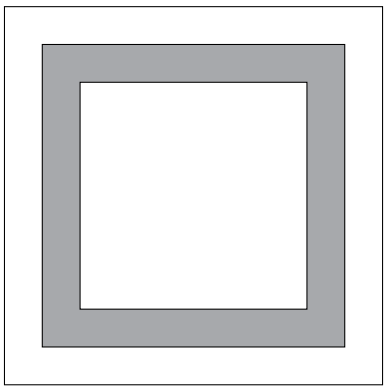
9. The cycling road race through the Adelaide Hills started at 11:50 am and the winner took 74 minutes. The winner crossed the finishing line at

(A) 1:24 pm (B) 12:54 pm (C) 12:04 pm
(D) 1:04 pm (E) 12:24 pm

10. The fraction $\frac{720163}{2016}$ is

(A) between 0 and 1 (B) between 1 and 10 (C) between 10 and 100
(D) between 100 and 1000 (E) greater than 1000

11. The three squares shown have side lengths 3, 4 and 5. What percentage of the area of the largest square is shaded?

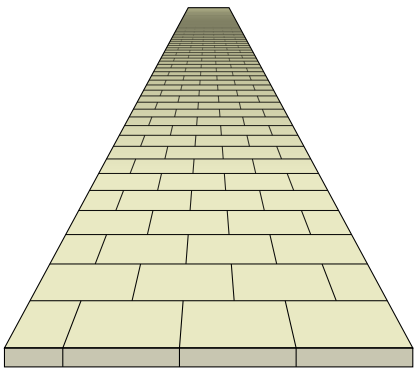


(A) 27% (B) 28% (C) 25%
(D) 24% (E) 20%

12. Jan has three times as many marbles as Liana. If Jan gives 3 of her marbles to Liana, they will have the same number. How many marbles do they have between them?

(A) 18 (B) 6 (C) 8 (D) 12 (E) 16

13. One of the pedestrian walkways in Hyde Park is exactly $3\frac{1}{2}$ sandstone pavers wide. The pavers are arranged as shown.
The information sign says that 1750 pavers were used to make the walkway. How many pavers were cut in half in the construction of this walkway?



(A) 250 (B) 350 (C) 175
(D) 125 (E) 500

14. On Monday, I planted 10 apple trees in a row. On Tuesday, I planted orange trees along the same row and noticed at the end of the day that no apple tree was next to an apple tree. On Wednesday, I planted peach trees along the same row and noticed at the end of the day that no apple tree was next to an orange tree. What is the smallest number of trees that I could have planted?

(A) 28 (B) 43 (C) 37 (D) 40 (E) 36

15. Adrienne, Betty and Cathy were the only three competitors participating in a series of athletic events. In each event, the winner gets 3 points, second gets 2 points and third gets 1 point. After the events, Adrienne has 8 points, Betty has 11 points and Cathy has 5 points. In how many events did Adrienne come second?

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

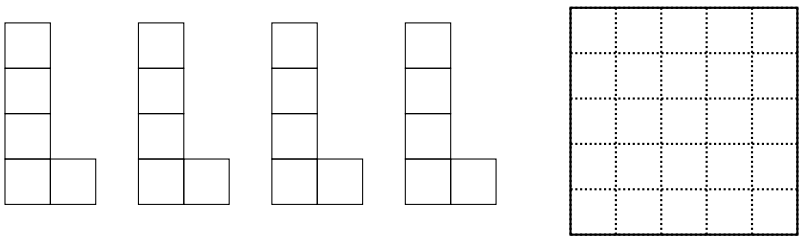
16. In the expression below, the letters A, B, C, D and E represent the numbers $1, 2, 3, 4$ and 5 in some order.

$$A \times B + C \times D + E$$

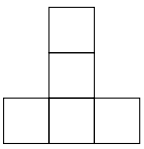
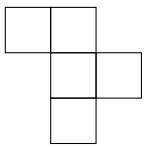
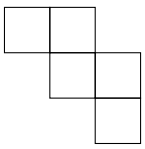
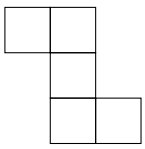
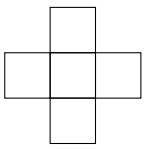
What is the largest possible value of the expression?

(A) 24 (B) 27 (C) 26 (D) 51 (E) 25

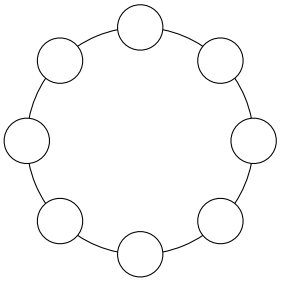
17. Llewellyn uses four of these L-shaped tiles plus one other tile to completely cover a 5 by 5 grid without any overlaps.



Which one of the following could be the other tile?

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

18. Andy has a number of red, green and blue counters.
He places eight counters equally spaced around a circle according to the following rules:



- No two red counters will be next to each other.
- No two green counters will be diagonally opposite each other.
- As few blue counters as possible will be used.

How many blue counters will Andy need to use?

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

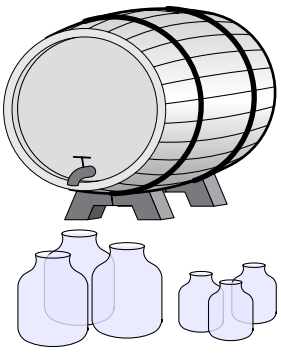
19. In a packet of spaghetti, one-third of the strands of spaghetti are intact, but the rest have each been snapped into two pieces. Of all the pieces of spaghetti from the packet (broken and whole), what is the largest fraction guaranteed to be at least as long as half an unbroken strand?

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

20. Mary has four children of different ages, all under 10, and the product of their ages is 2016. What is the sum of their ages?

(A) 30 (B) 34 (C) 28 (D) 29 (E) 32

21. Angelo has a 50 L barrel of water and two sizes of jug to fill, large and small. Each jug, when full, holds a whole number of litres.
He fills three large jugs, but does not have enough to fill a fourth. With the water remaining he then fills three small jugs, but does not have enough to fill a fourth.
In litres, what is the capacity of the small jug?



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

22. How many 5-digit numbers contain all the digits 1, 2, 3, 4 and 5 and have the property that the difference between each pair of adjacent digits is at least 2?

(A) 24 (B) 14 (C) 18 (D) 20 (E) 10

23. A number of people are standing in a line in such a way that each person is standing next to exactly one person who is wearing a hat. Which of the following could *not* be the number of people standing in the line?

(A) 98 (B) 99 (C) 100 (D) 101 (E) 102

24. Josh, Ruth and Sam each begin with a pile of lollies. From his pile Josh gives Ruth and Sam as many as each began with. From her new pile, Ruth gives Josh and Sam as many lollies as each of them then has. Finally, Sam gives Josh and Ruth as many lollies as each then has.

If in the end each has 32 lollies, how many did Josh have at the beginning?

(A) 64 (B) 96 (C) 28 (D) 16 (E) 52

25. A poem can have any number of lines and each line may rhyme with any of the other lines.

For poems with only two lines, there are two different rhyming structures: either the lines rhyme or they do not.

For poems with three lines, there are five different rhyming structures: either all three lines rhyme, exactly one pair of lines rhyme (occurring in three ways), or none of the lines rhyme.

How many different rhyming structures are there for poems with four lines?

(A) 18 (B) 15 (C) 12 (D) 20 (E) 26

26. Digits a, b and c can be chosen to make the following multiplication work. What is the 3-digit number abc?

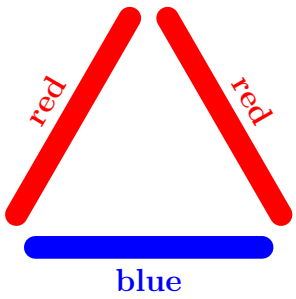
$$\begin{array}{cccc} & a & b & c \\ \times & & 2 & 4 \\ \hline 1 & c & b & a & 2 \end{array}$$

27. You have an unlimited supply of five different coloured pop-sticks, and want to make as many different coloured equilateral triangles as possible, using three sticks.

One example is shown here.

Two triangles are not considered different if they are rotations or reflections of each other.

How many different triangles are possible?



28. What is the largest 3-digit number that has all of its digits different and is equal to 37 times the sum of its digits?

29. Lucas invented the list of numbers 2, 1, 3, 4, 7, ... where each number after the first two is the sum of the previous two. He worked out the first 100 numbers by hand, but unfortunately he made one mistake in the 90th number, which was out by 1. How far out was the 100th number?

30. To match my hexagonally paved path, I built a *Giant's Causeway* garden feature from 19 hexagonal stone columns, arranged in a hexagonal pattern with three different levels, as shown.

In how many ways can I climb from S to F if I only step to an adjacent column, never step on any column twice and never step down a level?