

Question 1:

If $\frac{n}{24}$ lies between $\frac{1}{6}$ and $\frac{1}{4}$ and n is an integer, what is the value of n ?

Question 2:

Tane buys 4 double ice-creams and 2 single ice-creams and pays \$16. The next day he buys 2 double ice-creams and 4 single ice-creams and pays \$14.

What is the cost of a double ice-cream?

Question 3:

Mum, Dad and their two children (*Lily* and *Amelia*), arrive at the river where there is a boat that will hold one adult or two children. What is the minimum number of trips across the river in either direction to get the family across?

Question 4:

Our water supply comes from rainwater tanks filled by the rain which lands on the roof.

We find that 25mm of rain puts 5000 litres of water in our tanks. If 80% of the water which lands on the roof reaches the tanks, what is the ground area, in square metres, covered by our roof? ($1000\text{cm}^3 = 1 \text{ litre}$)

Question 5:

In a mathematical competition consisting of 12 problems, 8 marks are given for each correct response, 0 marks for each incorrect response and each no response is awarded 3 marks.

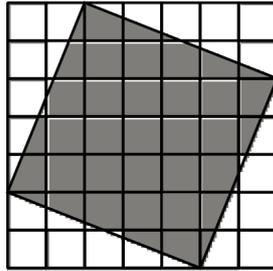
Mia scored 35 marks in the competition. What is the largest number of incorrect responses she could have had?

Question 6:

If $[a[b]c]$ means $\frac{ab}{c} + \frac{bc}{a} + \frac{ac}{b}$, what is the value of $[4[12]3]$?

Question 7:

What is the ratio of the shaded square to the largest square shown in the diagram?



Question 8:

A sheet of glass absorbs 20% of the red light which passes through it.

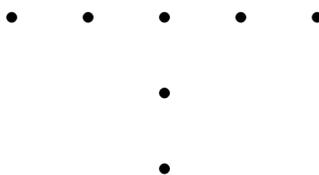
What is the least number of sheets which must be placed one over the other so that the red light is reduced to one half or less of its original strength?

Question 9:

If $\frac{a+b}{a-b} = \frac{5}{4}$, what is the value of $\frac{a^2}{b^2}$?

Question 10:

How many triangles can be drawn using the points in the diagram as vertices?

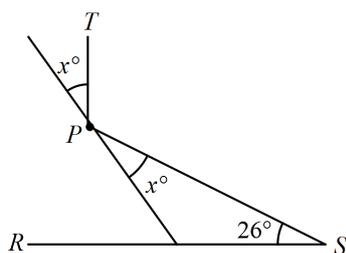


Question 11:

The faces of a cube are coloured so that if two faces share an edge, they have different colours. What is the least number of colours needed to do this?

Question 12:

A beam of light shines from a point S , reflects off a reflector at P , and reaches a point T so that PT is perpendicular to RS . What is the value of x ?



Question 1:

What is the 2018th digit to the right of the decimal point in the decimal expansion of $\frac{3}{7}$?

Question 2:

A ball bounces back to half the height of its previous bounce. It is dropped from a height of 32m. It is caught at the top of the fifth bounce. How many metres has it travelled since being dropped?

Question 3:

The numbers from 1 to 7 inclusive are to be placed one per square in the figure so that the total of the three numbers in the horizontal row is the same as the totals of the three numbers in each vertical column. Given that the numbers 1 and 2 are in the positions shown, how many possible values of x are there?

		2
1		x

Question 4:

Tickets to a concert cost \$4.50 for an adult and \$3 for a child. If a total of 120 adults and children attended the concert and \$420 was collected, how many children were in attendance?

Question 5:

What is the value of: $250 - 249 + 248 - 247 + 246 - \dots + 2 - 1$?

Question 6:

Suppose the New Zealand dollar is worth 55 US cents. A New Zealand tourist in the USA buys an item worth \$US100 and pays \$NZ200. What should the change be in \$US?

Question 7:

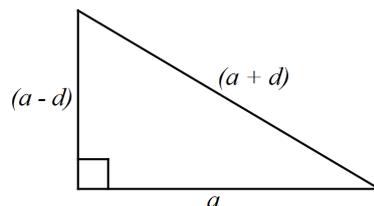
The mean weight of the potatoes in a bag is doubled when one extra-large potato is added to the four potatoes already in the bag. What is the ratio of the weight of this large potato to the total weight of the other four potatoes?

Question 8:

In a copying problem involving multiplication of two numbers, Oliver mistakenly wrote one of the numbers as 54 instead of 45. His answer was 198 larger than it should have been. What is the correct answer to the multiplication problem?

Question 9:

In the diagram, what is d in terms of a ?



Question 10:

In $\triangle PQR$, $\angle PQR = \angle PRQ = 70^\circ$, and S and T are points on PQ and PR respectively, so that $\angle RQT = 55^\circ$ and $\angle QRS = 40^\circ$. What is the size of $\angle PST$?

Question 11:

For all positive integers x and y such that $\frac{1}{x} + \frac{1}{y} = \frac{1}{12}$, what is the greatest value that y can have?

Question 12:

If a square of side 1 unit is inscribed in an equilateral triangle as shown, what is the length of the side of the triangle?

