

The π Quiz 2017 – Round 1

Irish Maths Teachers' Association, Cork Branch

Q1. A new car was bought for €22,000. It decreased in value by 18% in its first year. If its value at the end of the second year was €15,153.60 by what percentage did its value decrease by during the second year?

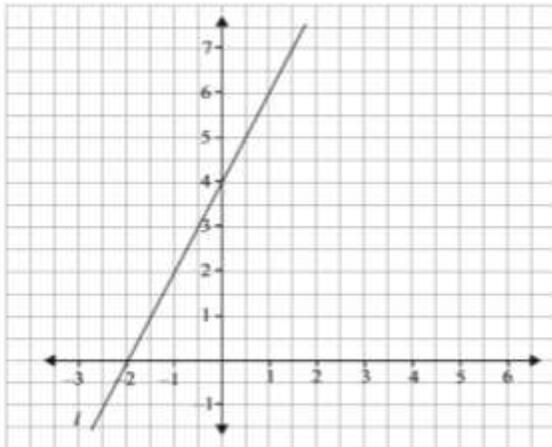
Q2. Use factors to simplify the following: $\frac{2x^2 + 6x}{4x^2 + 4x - 24}$

The π Quiz 2017 – Round 2

Irish Maths Teachers' Association, Cork Branch

Q1. A piece of string is 474 mm long.
Mary wants to cut it into 3 pieces.
If the longest piece will be twice as long as the shortest piece and the middle piece will be 42 mm longer than the shortest piece, what is the length of the longest piece?

Q2.



The line l shown on the coordinate plane has a slope of 2 and intersects the y -axis at 4.

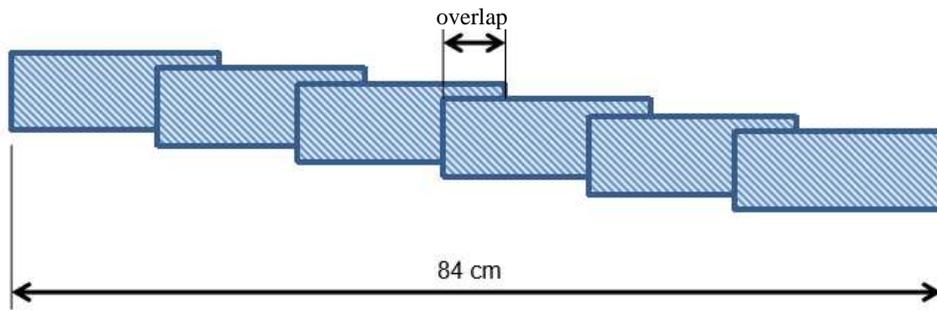
The line k passes through the point of intersection of the line l and the x -axis and is perpendicular to the line l .

Calculate the area of the triangle formed by the line l , the line k and the y -axis.

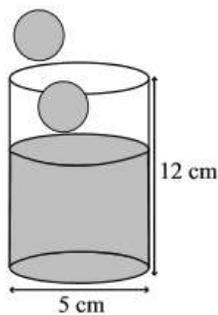
The π Quiz 2017 – Round 3

Irish Maths Teachers' Association, Cork Branch

- Q1.** 6 identical tiles of length 19 cm have been arranged as shown below. The combined length of the overlapped tiles is 84 cm. The tiles have the same amount of overlap for the whole design. Find the length of the overlap.



- Q2.** A spherical ice cube has a diameter of 3 cm. A cylindrical glass has an internal diameter of 5 cm and an internal height of 12 cm as shown in the diagram.

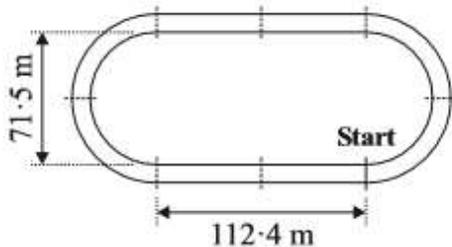


If the glass is to be filled to a height of 8 cm with liquid, how many full ice cubes can a child place in the glass without causing his drink to spill?

The π Quiz 2017 – Round 4

Irish Maths Teachers' Association, Cork Branch

- Q1.** A runner is preparing for a 5000 m race.
How many laps of the running track shown below should he run as part of his training schedule to prepare for the competition. (Note: parts of a lap are included in answer.)
Give your answer correct to 3 significant figures.



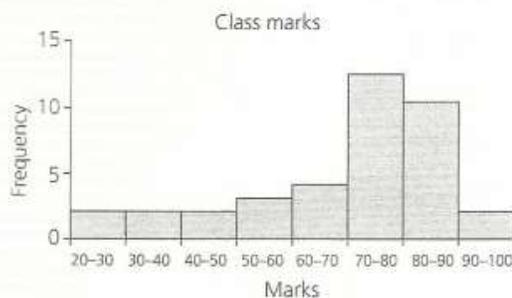
- Q2.** Jane and Joan decide to build their own house. They buy a 2.5 hectare site at a rate of €53,000 per hectare. They must also pay stamp duty on the site at a rate of 1.75% of the site value along with a solicitors fee of 1.2% of the site value.
The builder has given a price of €178,000 to build a house on their site and this is subject to 14% VAT. There is also extras including a kitchen at €8,740, a bathroom at €3,650 and furniture at €5470. These prices include VAT. They also need carpet at €23.50 per square metre and they need 67 square metres. Fitting is included. They need tiles at €45.30 per square metre and they need 34 square metres. However fitting the tiling costs €7.60 per square metre.
Find how much their house will cost them.

The π Quiz 2017 – Round 5

Irish Maths Teachers' Association, Cork Branch

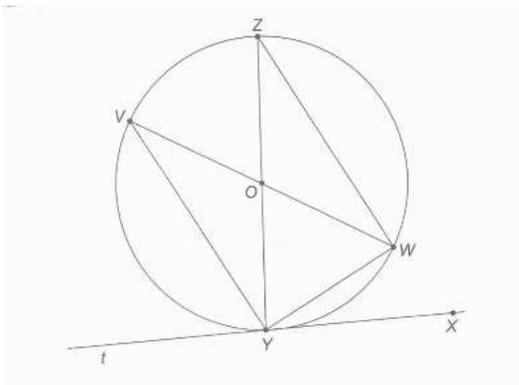
- Q1.** The Murphy family of 2 adults and 3 children plan to visit Fota Wildlife Park. The total cost of admission for the whole family is €62. On the same day the Browne family of 3 adults and 4 children will pay €88 to visit the wildlife park. What is the difference in cost between an adult and a child's ticket?

- Q2.** Describe the shape of this distribution.



- Q3.** From a rooftop on one side of the street, Michael observes the angle of elevation of the top of a building to be $21^{\circ}48'$. From the same position, the angle of depression of the bottom of the building is $50^{\circ}11'$. The building is a distance of 24 m from Michael. Find the height of the building correct to 2 decimal places.

- Q4.**



t is a tangent to the circle and O is the centre of the circle.

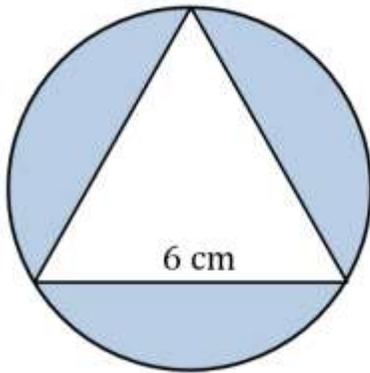
$$|\angle XYW| = 40^{\circ} \text{ and } |\angle ZYW| = 50^{\circ}.$$

Find $|\angle YZW|$.

The π Quiz 2017 – Round 6

Irish Maths Teachers' Association, Cork Branch

- Q1.** The diagram shows an equilateral triangle of side length 6 cm drawn inside a circle so that each vertex touches the circumference of the circle. Find the area of the shaded region. Give your answer correct to 1 decimal place.



Q2.
$$\frac{5w - p}{w} = bu$$

Write w in terms of b , p and u .

Q3. Express $\frac{2x+1}{6} - \left(\frac{x-3}{8}\right)$ in its simplest form.

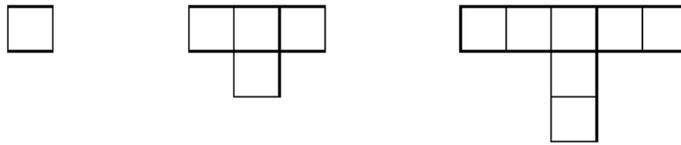
- Q4.** A bag contains 7 red and 5 blue counters. 3 counters are selected from the bag without replacement. What is the probability that either 2 or 3 of the counters are red? Express your answer in fraction form.

The π Quiz 2017 – Round 7

Irish Maths Teachers' Association, Cork Branch

Q1. Let f be the function $f : x \rightarrow x^2 - 5$, where $x \in R$.
Find the values of p for which $f(2p - 1) = f(2)$.

Q2. The diagram of the pattern below shows the first 3 shapes made using square blocks.
Which shape in the pattern will need 379 blocks?



Q3. The perimeter of a square wall is 9.6 m.
A paint roller, in the shape of a cylinder, has a diameter of 4 cm and is 20 cm in length.



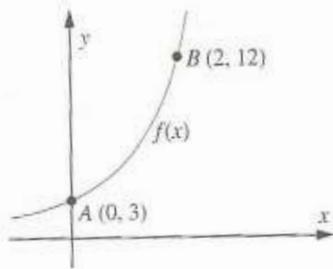
What percentage of the wall will be rolled (painted) when the roller has completed 50 revolutions? Give your answer correct to 3 significant figures.

Q4. Jackie and Henry are expecting a baby and must buy several items before the birth. They buy a cot for €400, a mattress for €100, a buggy and car seat for €800 and a bouncer for €60. They bought all these in the same shop so the owner gave them a 12% discount on the 2 dearest items and 20% off the 2 cheapest items. Jackie buys a baby monitor from an online shop in the interest of safety. However this shop is in the UK and the price is in sterling. The monitor's cost is £123 with postage of £12 and the exchange rate is €1.19 = £1. Jackie's credit card also adds on a commission fee of 1.75%. When the monitor arrives, Jackie finds that it is broken and returns it. She must pay the postage which is €15 to the UK and the shop gives her a full refund. However the exchange rate is now €1.17 = £1. How much did the total shopping cost after the refund to the nearest euro

The π Quiz 2017– Round 8

Irish Maths Teachers' Association, Cork Branch

- Q1.** Part of the graph of the exponential function $f(x) = p(q)^x$, where $x \in R$ and $p, q \in N$ is shown below.

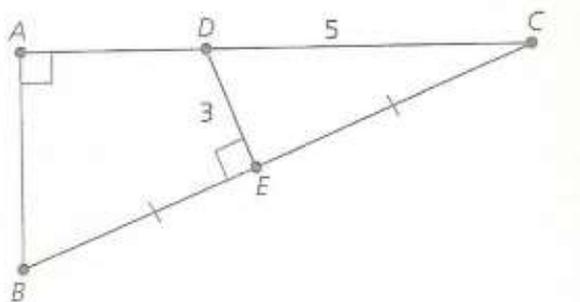


The points $A(0, 3)$ and $B(2, 12)$ are on the graph of $f(x)$.

Find the values of p and q .

- Q2.** 80 students responded to a survey about sports they played.
30 played basketball.
26 played rugby.
28 played hockey.
12 played basketball and rugby.
8 played hockey and rugby.
 x played basketball and hockey only.
4 played all 3 sports.
Twice as many played none of the 3 games as played basketball and hockey only.
If a student is picked at random from the whole group, what is the probability that the student plays only 1 of the 3 sports?

Q3.



ABC is a right-angled triangle.

E is the midpoint of $[BC]$.

DE is perpendicular to BC.

$|DE| = 3$ and $|DC| = 5$.

Find $|AB|$.

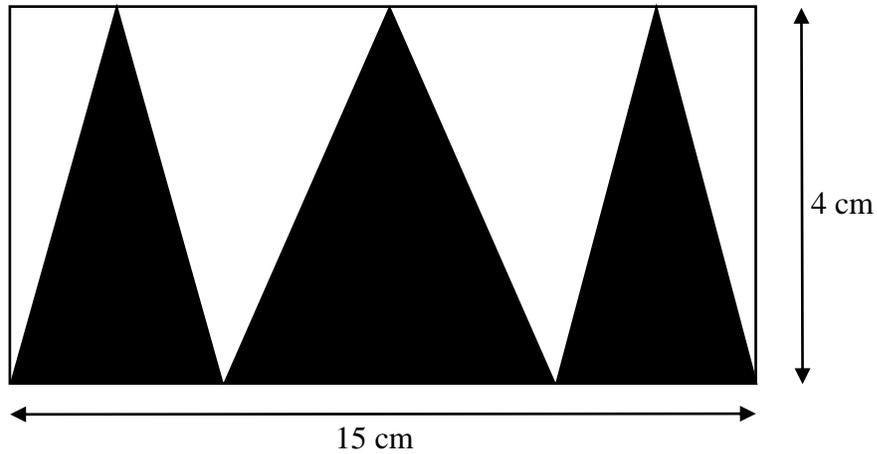
- Q4.** l is the line $3x + 2y + 18 = 0$. The line k is perpendicular to l and cuts the x -axis at the point $(7, 0)$.
Find the point of intersection of the lines k and l .

The π Quiz 2017 – Tie –break 1

Fill answers onto question page.

Irish Maths Teachers' Association, Cork Branch

Q1.



What is the area of the shaded region in the rectangle?

Q2. $P(0, 4)$, $Q(3, -k)$ and $R(9, k)$ are 3 collinear points.
Find k . _____

Q3. Solve for x : $9^{3-x} = \frac{\sqrt{27}}{81}$ _____

Q4.

Name	Alan	Brian	Colm	David
Age	9	n	19	$2n + 3$

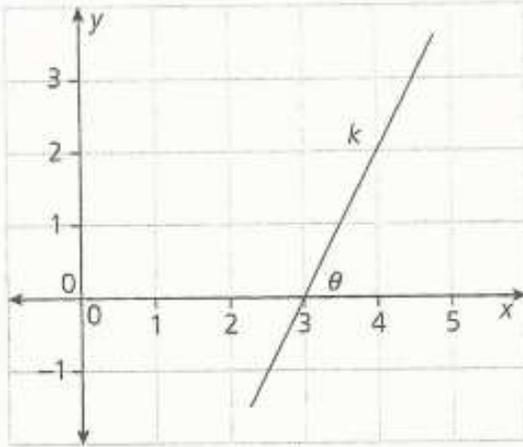
David is older than Alan but younger than Colm.
Find the median of the set of Brian's possible ages.

The π Quiz 2017 – Tie –break 2

Fill answers onto question page.

Irish Maths Teachers' Association, Cork Branch

Q1.



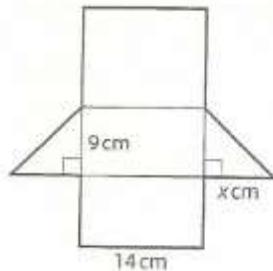
What is the angle θ which the line k makes with the positive x -axis?
Give your answer correct to the nearest degree. _____

Q2. Solve for x and y :

$$y = 2x - 3$$

$$\frac{4x - 2y}{x + y} = 1$$

Q3.



This is the net of a 3-D object.

If the volume of the figure is 315 cm^3 ,
find the value of x . _____

Q4 The human eye blinks about 1.71×10^4 times each day. How many times has the eye of a person born in 2001 blinked by their 16th birthday?

Express your answer in the form $a \times 10^n$, where $n \in \mathbb{Z}$ and $1 \leq a < 10$.

Answers

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8
Q1	16 %	216 mm	6 cm	11.1	€6	22.1 cm ²	$-\frac{1}{2}$ and $\frac{3}{2}$	$p = 3$ $q = 2$
Q2	$\frac{x}{2x-4}$ or $\frac{x}{2(x-2)}$	5 sq units	5	€360,561.85	Skewed left or Negatively skewed	$w = \frac{p}{5-bu}$	127 th	$\frac{1}{5}$
Q3					38.39 m	$\frac{5x+13}{24}$	21.8 %	$\frac{24}{5}$ or 4.8
Q4					40°	$\frac{7}{11}$	€1219	(-2,-6)

Tiebreak 1

Q1. 30 cm²

Q2 -2

Q3 4.25

Q4 5.5

Tiebreak 2

Q1 63°

Q2 $x = 3, y = 3$

Q3 5

Q4 9.99324×10^7

