

The π Quiz 2015 – Round 1

Irish Maths Teachers' Association, Cork Branch

Q1. Make x the subject of $y = \sqrt{\frac{5(3-x)}{7}}$.

Q2. A is the set of prime numbers between 1 and 12. B is the set of factors of 12. List the subsets of the set $A \setminus B$.

The π Quiz 2015 – Round 2

Irish Maths Teachers' Association, Cork Branch

Q1. L is the line $3x + 2y + 12 = 0$. M is the line that passes through the point $(7, 3)$ and is perpendicular to L . Find the point of intersection of L and M .

Q2. Jane is busy planning her wedding and spots a lovely wedding dress in a shop. The dress costs €1,350. Unfortunately Jane is smaller than the dress so it needs some modification which will cost €247 and she also wants 13 diamonds added to the front of the dress at a cost of €45.25 each. She also buys shoes at a cost of €120 and a veil for €115. She buys a handbag off eBay for €56.64 plus postage of €4.76. Find how much Jane's wedding outfit cost?

The π Quiz 2015 – Round 3

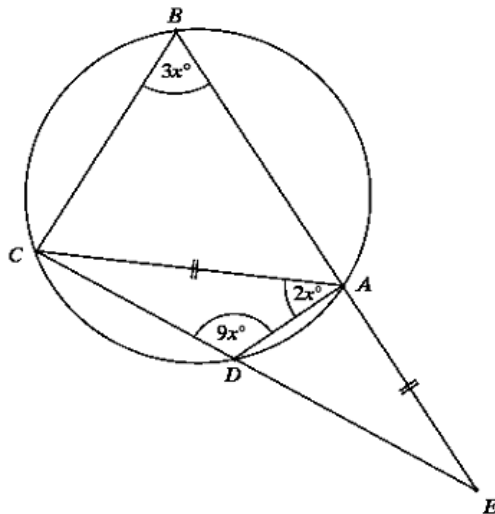
Irish Maths Teachers' Association, Cork Branch

- Q1. Find the reciprocal of $\frac{x^2 - 3x}{x^2 + 2x - 15}$. Give your answer in its simplest form.
- Q2. Kevin wishes to calculate the height of the Spire monument on O'Connell Street in Dublin. He is 1.62 m tall. When he stands 99 m away from the structure, he finds using a clinometer that the angle of elevation to the top of the Spire is 54° . If Kevin's clinometer overestimates angles by 8 %, find the difference between Kevin's measurement for the height of the Spire and its actual height. Give your answer to the nearest metre.

The π Quiz 2015 – Round 4

Irish Maths Teachers' Association, Cork Branch

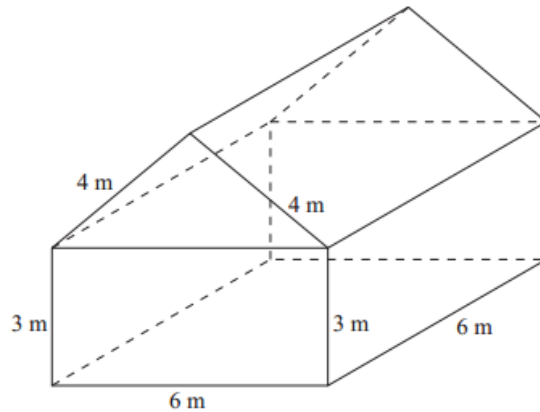
- Q1. The width of a rectangular garden is x metres. Its length is 4 m longer than its width. Find the perimeter of the garden if its area is 26.25 m^2 .
- Q2. Find $|\angle EAD|$.



The π Quiz 2015 – Round 5

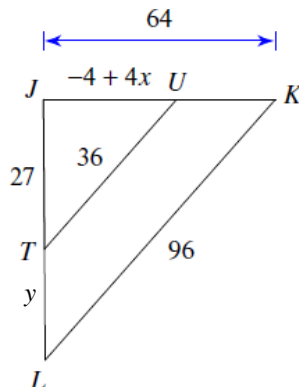
Irish Maths Teachers' Association, Cork Branch

- Q1.** John wishes to construct a shed for his farm. After visiting the architect, they agreed on the following set of plans.



Calculate the external surface area of the shed (excluding the floor area). Give your answer correct to two decimal places.

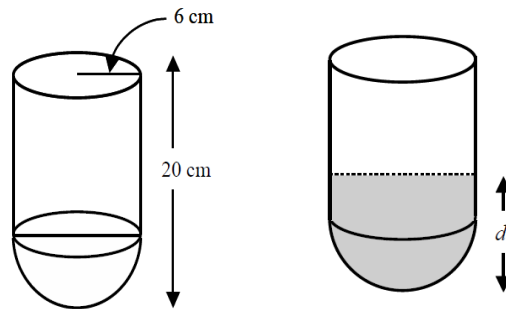
- Q2.** Caroline wins a prize in a special lottery to mark Pi day and is given two options. The first option is that she is given €150,000 on the 14th of March. The second option is that she takes €300 on the 14th of March, €600 on the 14th of April, with each instalment doubling until the final payment on the 14th of November. If she decides to take the second option, how much more prize money will she ultimately receive than if she decided on the first option.
- Q3.** Calculate the interquartile range of the following list of data:
{17, 15, 8, 9, 14, 20, 6, 11, 17, 8}
- Q4.** Solve for x and y .



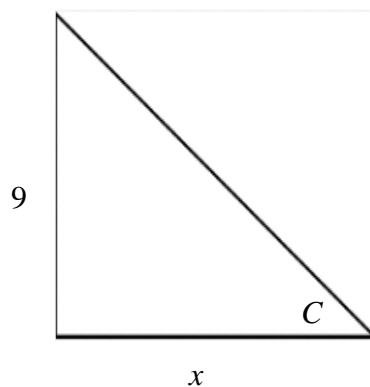
The π Quiz 2015 – Round 6

Irish Maths Teachers' Association, Cork Branch

- Q1.** $(1, -2)$, $(2, -1)$ and $(3, 0)$ are three couples of a function f . Find $f(6)$.
- Q2.** The standard rate of income tax is 20 % and the higher rate is 40 %. Sinéad has tax credits amounting to €3,300 and a standard rate cut off point of €32,800. What would Sinéad's gross income have to be in order to have an after tax income of €35,750.
- Q3.** A container is in the shape of a cylinder on top of a hemisphere. The cylinder has a radius of 6 cm and the container has a height of 20 cm. $\frac{7}{12}$ of the container is filled with water. Calculate, d , the depth of the water in the container.



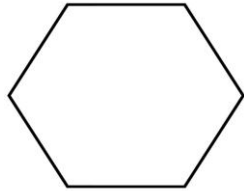
- Q4.** Given that $\cos C = \frac{2}{3}$, find the value of x . Give your answer in the form $\frac{a\sqrt{b}}{b}$ where $a, b \in \mathbb{N}$.



The π Quiz 2015 – Round 7

Irish Maths Teachers' Association, Cork Branch

- Q1.** How many axes of symmetry does the following shape have?



- Q2.** The probability that Mary will have tea at her 11 a.m. break is $\frac{2}{3}$. She always eats at this time, and has either a bun or an apple. If she does not have tea, then the probability that she will have a bun is $\frac{1}{4}$. If Mary does have tea, then the probability that she will have an apple is $\frac{3}{5}$. What is the probability that Mary will have tea and a bun at her break?
- Q3.** Jamie has at most €70 to spend on clothes. She wants to buy a pair of jeans for €42 and to spend the rest on t-shirts costing €8. Letting the number of the t-shirts be represented by x , express this situation as an inequality.
- Q4.** Jacinta and Stacey agree a divorce settlement whereby all assets are sold and split in a 3:1 ratio for property, 4:1 ratio for cars, 2.4:1.4 for cash. After sales, they sell their house for €324,645; they sell their cars for €21,435 and €12,432 and they have €2,543.12 in cash. Before the money is split, the auctioneers take a percentage of the funds as their fee: 1 % of the property value and 1.4 % of the car value. Find out how much Stacey has after their divorce to the nearest euro.

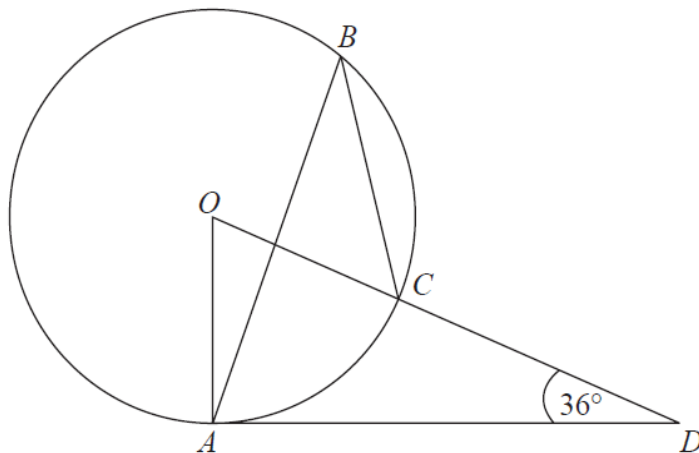
The π Quiz 2015 – Round 8

Irish Maths Teachers' Association, Cork Branch

Q1. Solve $8^{\frac{2}{3}} = \frac{2^{3x-4}}{2\sqrt{2}}$, $x \in R$.

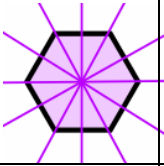
Q2. The speed of light is approximately 300 million metres per second. How many kilometres will it have travelled in half an hour? Give your answer in the form $a \times 10^n$ where $1 \leq a < 10$ where $n \in N$.

Q3. Calculate $|\angle ABC|$.



Q4. Timothy invests €31,000 in stocks. He buys € x worth of shares in Euclid's Enterprises and € y worth of shares in Pythagoras' Properties. The shares in Euclid's Enterprises return a percentage profit of 11 % and the shares in Pythagoras' Properties return a percentage loss of 4 % and at the end of the year he makes an overall profit of €560. Find the ratio of the money he invested in Euclid's Enterprises to the money he invested in Pythagoras' Properties. Express your answer in its simplest form $x : y$ where $x, y \in N$.

Answers

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8
Q1	$x = \frac{15-7y^2}{5}$ or $x = 3 - \frac{7}{5}y^2$	(-2, -3)	$\frac{x+5}{x}$ or $1 + \frac{5}{x}$	22 m	135.87 m ²	3		$\frac{5}{2}$
Q2	{5,7,11}, {5,7}, {5, 11}, {7,11}, {5}, {7}, {11} the null set.	€2481.65	18 m	120°	€3,300	€43,150	$\frac{4}{15}$	5.4×10^8 km
Q3					9	12.5 cm	Any of these: $8x + 42 \leq 70$ $8x \leq 28$ $2x \leq 7$ $x \leq 3.5$ $x \leq \frac{7}{2}$	27°
Q4					$x = 7$ $y = 45$	$\frac{18\sqrt{5}}{5}$	€87,965	12:19