

The π Quiz 2012 – Round 1

Irish Maths Teachers' Association, Cork Branch

- Q1.** €1000 was divided among Ann, Brian and Connie so that Ann received twice as much as Brian and Brian received three times as much as Connie.
How much did Ann receive?
- Q2.** Solve for x :
 $(x - 3)(x - 2) = 12$.

The π Quiz 2012 – Round 2

Irish Maths Teachers' Association, Cork Branch

- Q1** Jane wishes to renovate her portacabin to make it look like a new classroom. It will take 3 tins of yellow paint at a price of €13.40 per tin and 2 tins of white paint for the ceiling at a price of €10.95 per tin. She also needs 1 roller at €5.45, 3 brushes at €2.15 each and 4 bottles of white spirits at €1.95 each. The painter costs €15.50 per hour and works for 5 and a half hours. VAT must then be added onto the bill at a rate of 23% for all the supplies and 13% for the painter. Calculate how much in total it will cost for Jane to have a new classroom to the nearest cent.
- Q2** If $\cos A = -\frac{1}{\sqrt{2}}$, find A where $0^\circ \leq A \leq 180^\circ$.

The π Quiz 2012 – Round 3

Irish Maths Teachers' Association, Cork Branch

- Q1.** Only two students James and Sarah stood for an election as 'year prefect' in which 104 valid votes were cast.
James won the election.
However, if Sarah had taken 30 more votes from James, she would have won by 20 votes.
How many votes did Sarah receive?
- Q2.** $(-2, 2)$ and $(4, 8)$ are the endpoints of the diameter of a circle.
Find its area, give your answer in the form $a\pi$ where $a \in \mathbb{N}$.

The π Quiz 2012 – Round 4

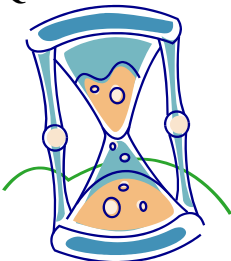
Irish Maths Teachers' Association, Cork Branch

- Q1.** Solve the simultaneous equations:

$$\frac{3}{4}(5x - 6y) = \frac{1}{2}y$$

$$\frac{5}{7}(x + y) = x + 2$$

- Q2.**



An egg timer consists of 2 equal cones each of height 4 cm and base diameter 3 cm. If sand occupies half the volume of 1 cone and flows from this cone into the other cone at a rate of $\frac{1}{4}\pi$ cm³/s, calculate the length of time in seconds it takes for $\frac{1}{3}$ of the sand to flow from one cone to the other.

The π Quiz 2012 – Round 5

Irish Maths Teachers' Association, Cork Branch

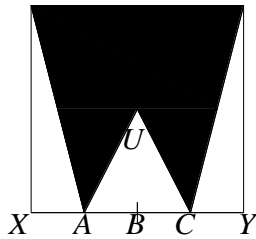
- Q1.** If the solutions of the equation $x^2 - 2x - 1 = 0$ are x_1 and x_2 , find the value of $x_1x_2 - 4$.
- Q2.** Anne and Barry get arrested whilst on honeymoon for stealing a gondola. The police bring them to court where they are fined €1000 each. However Anne and Barry don't pay the fine and get charged interest on the fine at 5% per day cumulative interest. They are found by police 4 days later and pay the total fine (i.e. fine and 4 days of interest) along with a solicitors fee of €185. How much did it cost them, to the nearest cent.
- Q3.** Three numbers have a mean of p .
Four numbers have a mean of q .
These seven numbers have a mean r .
Express q in terms of p and r .
- Q4** Find the equation of the line perpendicular to $4x + y - 1 = 0$ and which passes through the point of intersection of the lines $2x - y + 7 = 0$ and $x + 3y - 7 = 0$.

The π Quiz 2012 – Round 6

Irish Maths Teachers' Association, Cork Branch

Q1. Solve for x :
 $(3x-1)^2 - (3x-1) - 6 = 0.$

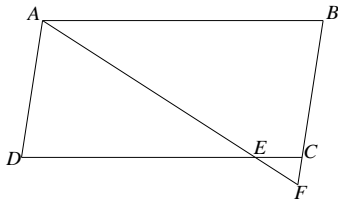
Q2. The side $[XY]$ of the square shown is divided into 4 parts of equal length by the 3 points A, B and C . $|XY| = 4$ cm. The diagonals of the square meet at U .



Express the area of the shaded region as a fraction of the area of the square.
(Give your answer in simplest form possible.)

Q3. A and B are two sets such that $\#(A) = 10$, $\#(B) = 14$ and $\#(B \setminus A) = 2$ $[\#(A \setminus B)]$.
Find $\#(A \cup B)$.

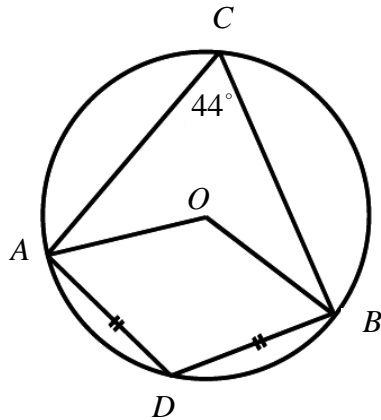
Q4 In the given parallelogram $ABCD$, $|DE| : |EC| = 5 : 1$.
If $|AD| = 12$ cm, find $|CF|$.



The π Quiz 2012 – Round 7

Irish Maths Teachers' Association, Cork Branch

Q1



A, B, C and D are points on a circle as shown.
 O is the centre of the circle.

$$|\angle ACB| = 44^\circ \text{ and } |AD| = |DB|.$$

Find $|\angle OAD|$.

Q2. The angle of elevation of the top of a spire from a point on level ground is 15° .
On walking 50 metres towards the spire, the angle of elevation is then found to be 35° .
Calculate the height of the spire to the nearest half metre.

Q3 $f(x) = x^2 + ax + b$. $a, b \in \mathbb{Z}$.
The function, when graphed, intersects the x -axis at $(3, 0)$ and the y -axis at $(0, -6)$
If p is a positive real number and $(p, 2p + 2)$ is a point on the graph, find the value of p .

Q4 What is the least natural number t such that:

$$\frac{t+1}{2} + \frac{t-3}{7} > \frac{t+11}{14}.$$

The π Quiz 2012 – Round 8

Irish Maths Teachers' Association, Cork Branch

Q1 A cone and sphere have equal curved surface areas. The length of radius of the base of the cone, r is the same as the length of radius of the sphere. Find the height of the cone in terms of r .

Q2. $ABCD$ is a parallelogram where $A = (2, -7)$, $B = (-6, -11)$ and $C = (-8, 4)$. Find the coordinates of the point D .

Q3 Simplify $\frac{\sqrt[3]{27} \times 3^{\frac{3}{2}}}{\sqrt{3} \times 81}$ into the form 3^n where $n \in \mathbb{Z}$.

Q4 A cyclist traveling to Youghal covers a distance of 60 km at a certain average speed. On his return journey to Cork, he travels at an average speed 5 km/hr slower. If the difference between the traveling times for both journeys is 2 hours, find his average speed on the way to Youghal in km/hr.

The π Quiz 2012 – Tie –break

Fill answers onto question page.

Irish Maths Teachers' Association, Cork Branch

- Q1** Make x the subject of $y = \frac{3x-4}{2x+5}$ _____
- Q2** The triangle formed by the x -axis, y -axis and the line $2x + y = k$ has area 4 units². Find $k \in N$. _____
- Q3** $x : y : z = 2 : 4 : 5$ and $z = 35$. Find $x - 2y + 3z$. _____
- Q4** A farmer bought a number of lambs for €1440. Three of the lambs died but he sold the rest at a profit of €40 on each. He found then he had made an overall profit of €192. Calculate how many lambs he bought. _____

Answers

	Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8
Q1	€600	€196.95	32	$x = 8$ $y = 6$	-5	$x = -\frac{1}{3}$ $x = \frac{4}{3}$	68°	$\sqrt{15}r$ or other suitable form
Q2	$x = -1$ $x = 6$	135°	18π	2 seconds	€2616.01	$\frac{5}{8}$	21.5 m	(0, 8)
Q3					$\frac{7r-3p}{4}$	18	4	3^{-2}
Q4					$x-4y+14=0$ or any other suitable form	2.4 cm	2	15 km/hr

Tiebreak

Q1 $\frac{4+5y}{3-2y}$

Q2 4

Q3 63

Q4 15

