

The π Quiz 2014 – Round 1

Irish Maths Teachers' Association, Cork Branch

Q1. $X = \{a, b, c, d, e\}$

$Y = \{b, c, e, f, g\}$

$Z = \{c, f, h, j\}$

List the elements of $(X \cap Y) \setminus (Y \cap Z)$.

- Q2.** There are 5 children in a family. The youngest child is 8 years old and another child is 15 years old. The median of the children's ages is 13 years. The range of the children's ages is 17 years. The mean of their ages is 14 years.

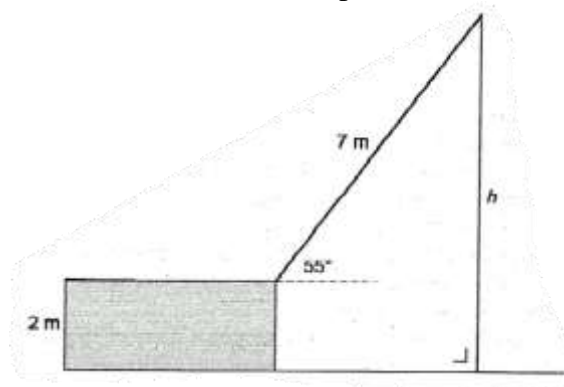
Find the age of the second youngest child.

The π Quiz 2014 – Round 2

Irish Maths Teachers' Association, Cork Branch

- Q1.** A car was bought for €6250. At the end of each year it loses 20% of the value it had at the beginning of that year. Calculate the total loss in the value of the car at the end of three years.

- Q2.** A crane is 7 metres long and is supported on a block 2 metres high. When the crane is at an angle of 55° to the horizontal, find the length h of the steel wire. Give your answer correct to 2 decimal places.



The π Quiz 2014 – Round 3

Irish Maths Teachers' Association, Cork Branch

- Q1.** Seamus decides to buy a new car as a birthday present for himself. After visiting a number of garages, he decides to buy a Volkswagen Beetle with a price of €25,000. He also chooses to get metallic paint at €450, a spoiler at €320 and spot lights for €135. The garage adds on €550 to the total for preparing the car. Seamus is trading in his old Audi which is worth €12000. However the clutch is worn out and needs to be replaced so the garage is taking €1200+VAT at 13.5% from the value of the Audi. How much will Seamus pay?

Q2. Solve $3^{2x-3} = \frac{81}{\sqrt{27}}$, $x \in R$.

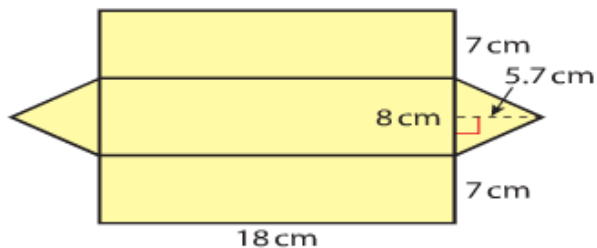
The π Quiz 2014 – Round 4

Irish Maths Teachers' Association, Cork Branch

Q1. $f(x) = 2x^2 + ax - 12$ where $x \in R$.

The graph of $f(x)$ intersects the x -axis at $(-4, 0)$ and $\left(\frac{3}{2}, 0\right)$ and intersects the y -axis at $(0, -12)$. $(t, 3t)$ is also a point on the graph of $f(x)$. Find 2 possible values for t .

- Q2.** This is the net of a triangular prism. Find the surface area of the prism.

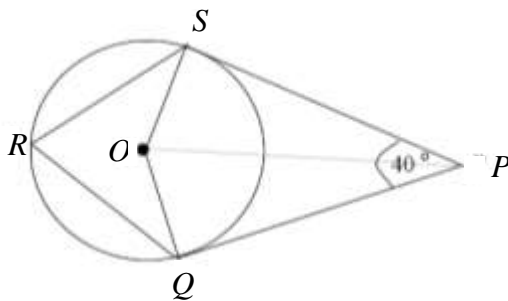


The π Quiz 2014 – Round 5

Irish Maths Teachers' Association, Cork Branch

- Q1.** A drinking straw is used to transfer milk from a carton to a cup. The straw, in the shape of a cylinder, is 10 cm long and has a diameter of 0.4 cm. The carton contains 0.1 litre of milk.
Calculate the least number of times the straw has to move between carton and cup if all the milk is transferred.
- Q2.** In one month John makes a total of 106 calls on his mobile phone and home phone. Each mobile phone call, on average, costs 60 cent and each home phone call, on average, costs 24 cent. He spends €48.12 on calls in the month.
Find the number of home phone calls he makes.
- Q3.** Set F is the set of integers that satisfy the inequality $-6 < 3 - 3x \leq 15$.
Solve the inequality and hence list out the elements of set F.

Q4.



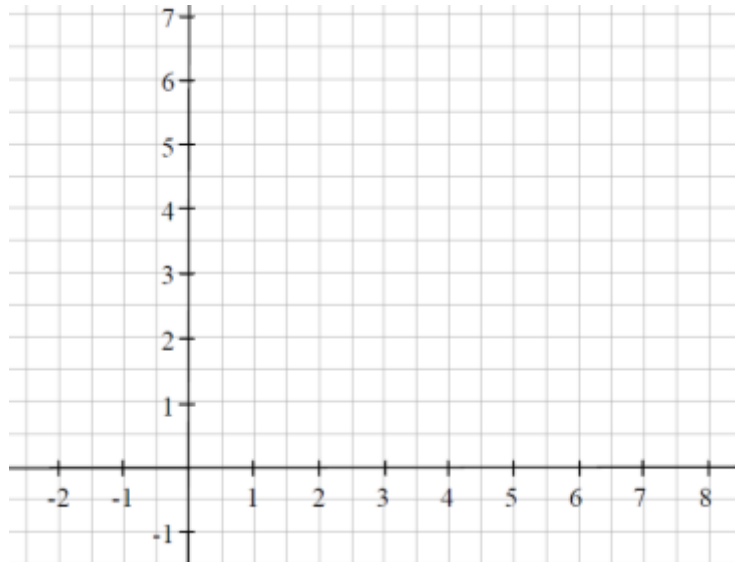
In the diagram below, O is the centre of the circle with $|PS| = 12$ cm and $|OP| = 13$ cm. Calculate $|\angle QRS|$ given that $|\angle QPS| = 40^\circ$.

The π Quiz 2014 – Round 6

Irish Maths Teachers' Association, Cork Branch

Q1. Factorise fully: $(2y - 1)^2 - (y - 1)^2$.

Q2. P is the point $(2, 3)$. 2 lines l and m pass through P . l has a slope of $\frac{3}{2}$ and m has a slope of -3 . Draw the point P and the 2 lines on the diagram below and hence or otherwise find the area enclosed between the 2 lines and the x -axis.



Q3. A survey was done of the number of text messages made by mobile phone users over a weekend.

Number of texts	0-4	4-10	10-20	20-30	30-50
Number of users	15	6	6	x	9

(Note 10-20 means 10 texts or more but less than 20 texts.)

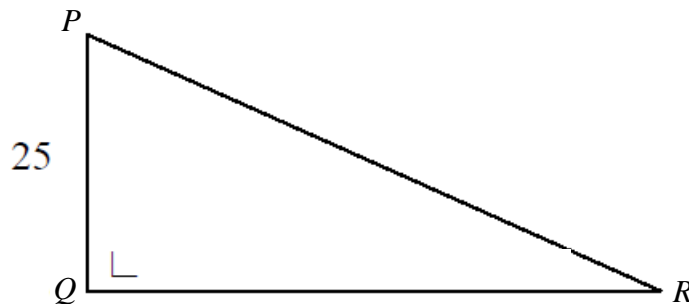
Taking mid-interval values, it was found that the mean number of texts made per user was 16. Find the value of x .

Q4. Two numbers have a difference of 7. Twice the bigger number added to five times the smaller number makes 42. Find the product of the two numbers.

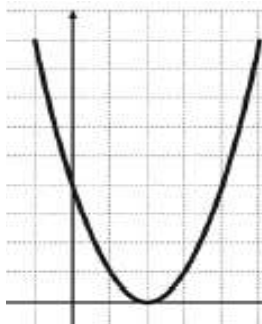
The π Quiz 2014 – Round 7

Irish Maths Teachers' Association, Cork Branch

- Q1.** A pole PQ , 25 metres in height casts a shadow QR .
The angle of elevation of the top of the building is $26^\circ 42'$.
Find the length of the shadow, $|QR|$ correct to 3 significant figures.



- Q2.** A cone has a radius of 2 cm and has a slant height of $\sqrt{260}$ cm.
One quarter of the volume of the cone drips into a hemisphere and fills it.
Find the diameter of the hemisphere.
- Q3.** Given that $y + 2a = 3$, find the 2 values of a which satisfy the equation $5ay + 8a^2 = 0$.
- Q4.** The graph of a quadratic function $f(x)$ is given below.
Write down an expression for the function $f(x)$ in its simplest form.
Note that each square in the grid represents 1unit^2 .



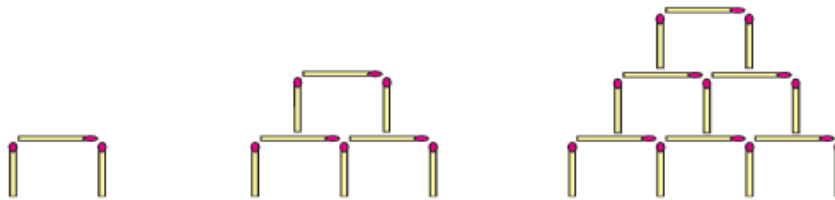
The π Quiz 2014 – Round 8

Irish Maths Teachers' Association, Cork Branch

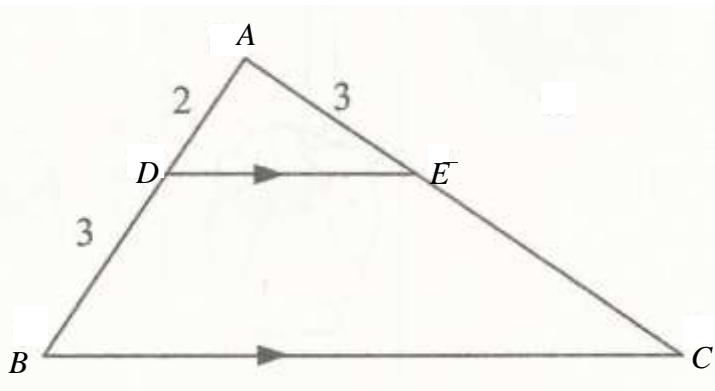
- Q1.** Brendan has a coin which is weighted so that the probability that it lands on a head is $\frac{3}{4}$ and on a tail is $\frac{1}{4}$.
He tosses the coin three times.
Find the probability of getting 2 heads and 1 tail.

- Q2.** M is the point $(-3, 5)$. N is the point $(2, -1)$.
The point $(q, -2q + 5)$ is on the line NM . Find the value of q .

- Q3.** Here are the first 3 diagrams of a matchstick pattern. Given that the sequence is quadratic, find an expression for the n^{th} term of the sequence.



- Q4.** ABC is a triangle and DE is parallel to BC as shown. $|AD| = 2$, $|DB| = 3$ and $|AE| = 3$. Given that the $|\angle BAC| = 90^\circ$, find the ratio area $\triangle ADE$: area $BCED$.
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	b, e	€3050	€15,817	$t = -3$ and 2	80	$y(3y-2)$	49.7 m	$\frac{27}{64}$
Q2	9 yrs	7.73 m	2.75 or $\frac{11}{4}$	441.6 cm^2	43	4.5 sq units	4 cm	$\frac{9}{2}$ or 4.5
Q3					-4, -3, -2, -1,0,1,2	6	0 and 7.5 or 0 and 15/2	$n^2 + 2n$
Q4					70°	44	$f(x) =$ $x^2 - 4x + 4$	4:21