

Irish Mathematics Teachers Association, Cork Branch.
Junior Cert Maths Quiz 2009

Round 1

1.

€12,000 was invested at compound interest; the rate for 1st year was 4% p.a. At the end of the second year, the investment amounted to €13,041.60. Calculate the rate per annum for the second year, in decimal form.

2.

John pays a standing charge of €6.50 per month to his phone company. This allows him 22 mins peak time calls, 83 mins off peak and 14 text messages. Any calls over this time, he is charged at the rate of €1.03 per minute peak time, 67c per min off peak and 13.5c for each text message. One month he makes 37 mins peak time calls, 97 mins off peak and sends 57 text messages.

VAT is then charged at 21.5% on his total bill. Find his final bill, giving your answer correct to the nearest cent.

3.

Tommy invests €4,000 in the bank for 2 years compound interest at a rate of 5.5% p.a. At the end of the second year, he withdraws €1,500. He leaves the rest in the bank for a further year at a rate of 4.5% p.a. If he pays tax at rate of 30% on his interest, how much does he have in the bank at the end of the 3rd year, giving your answer to the nearest cent.

4.

A Manageress pays €8,900 income tax for the year. Her tax credits amount to €3,800 and her standard rate cut off point is €2,000. The standard rate of income tax is 20% and the higher rate is 35%. Find her gross salary for the year.

**Irish Mathematics Teachers Association, Cork Branch.
Junior Cert Maths Quiz 2009**

Round 2

1.

A prize of €5,000 is divided among a number of winners, each getting the same amount. If there had been 15 fewer winners, each would have received €75 more. How many winners were there originally?

2.

Solve for x:

$$\frac{x-2}{x+2} + \frac{x+2}{x-2} = \frac{5x}{x+2}$$

giving your answers in fraction form.

3.

Evaluate

$$\frac{64^{\frac{1}{3}} \times 2^3}{8 \times 4^{-\frac{1}{2}}}, \text{ giving your answer in the form } 2^p$$

4.

Solve for k

$$12(k-1)^2 - 28(k-1) + 15 = 0$$

Give your answers in fraction form

Irish Mathematics Teachers Association, Cork Branch.
Junior Cert Maths Quiz 2009

Round 3

1.

L is the line $3x - 4y + 7 = 0$ and M is the line $4x + 3y - 24 = 0$. Find the equation of the line with slope -3 which goes through the point of intersection of L and M.

2.

J is the line $x - 2y - 3 = 0$. K is perpendicular to J and passes through $(-2, 5)$. Find the co-ordinates of the point of intersection of J and K.

3.

P is the line $3x + 2y - 4 = 0$ and Q is the line $2x - 3y - 7 = 0$. Find area of the triangular region enclosed by P, Q and the y axis, giving your answer correct to one decimal place. (Hint : P is perpendicular to Q)

4.

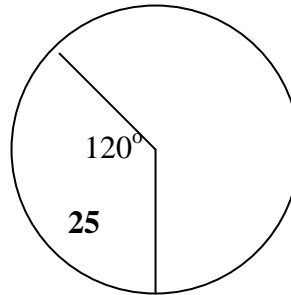
The line $4x = 12 - ty$ is perpendicular to the line $8 + y = 8x$. Find the value of t.

**Irish Mathematics Teachers Association, Cork Branch.
Junior Cert Maths Quiz 2009**

Round 4

1.

A pie chart, contrasting the values 25, 35 and x , shows 25 with an angle of 120° at the centre.
Find the value of x .



2.

People attending a course were asked to choose one of the following whole numbers from 1 to 12. The results were recorded as follows:

Number	1-3	4-6	7-9	10-12
No. of People	3	x	2	8

6.5 was calculated as the mean of the numbers chosen. Find the value of x .

3.

Over a period of one month, the year head recorded the number of days that each of her 50 junior cert students were late for school. The following table shows the results

No. days late	0	1	2	3	4	5
No. Students	7	9	11	12	7	4

Find the percentage of students who were late for more than the mean number of days

4.

A survey was taken of 54 students, each of whom was studying one or more of the three subjects French, German and Business Studies.

6 students studied German and Business Studies

5 students studied French and Business Studies

3 times as many students studied French and German as studied all three subjects

20 students altogether studied German

17 studied Business Studies only and 14 students studied French only.

Find the number of students who studied all 3 subjects.

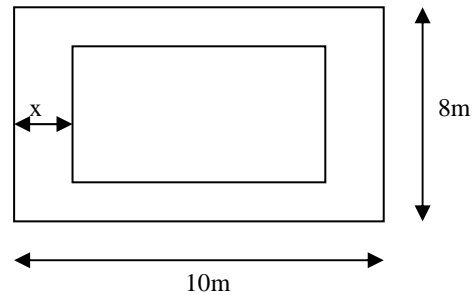
Irish Mathematics Teachers Association, Cork Branch.
Junior Cert Maths Quiz 2009
Round 5

1. A rectangular garden measured 10m by 8m.

There is a flower bed in the centre of the garden.

The flower bed is surrounded on all sides by a path which is x m wide, as shown in the diagram.

Calculate the value of x , if the path covers 40% of the total area of the garden

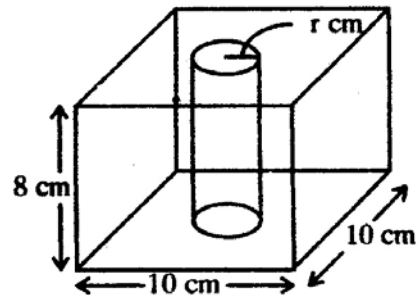


2. When the height of a cylinder is halved and its radius length is doubled, the volume is increased k times. Find k .

3. A solid rectangular block has a square base of side 10cm and is 8cm high.

A cylindrical hole is drilled all the way through the block as shown, that is, the cylindrical hole is of height 8cm and has radius of length r cm. The volume of the block remaining is 56% of the total volume of the block.

Calculate the radius length r of the cylindrical hole, taking $\pi = 3.14$. Give your answer correct to 2 decimal places.



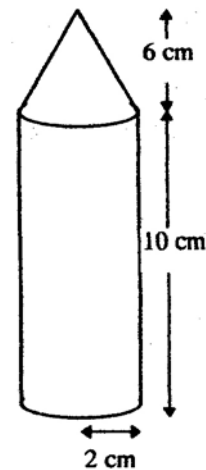
4.

A candle is in the shape of a solid cone of height 6cm on top of a solid cylinder of height 10cm. The cone and the cylinder each have radius of 2cm.

Four of these candles are packed, cone parts uppermost, into the smallest possible rectangular box.

Find, in cm^3 , the volume of empty space in the box, correct to one place of decimal.

Take $\pi = 3.14$.



**Irish Mathematics Teachers Association, Cork Branch.
Junior Cert Maths Quiz 2009**

Round 6

1.

$$g(x) = ax^2 + bx + 1.$$

If $g(1) = 0$ and $g(2) = 3$, calculate the value of a and of b .

2.

$f(x) = x^2 + bx + c$. The function, when graphed, intersects the x axis at $(-3, 0)$ and $(1, 0)$.

If $(p, -p + 15)$ is a point on the graph, find the values of p .

3.

A person rowed a loaded boat across a lake, a distance of 5km, and rowed the return journey empty. The total journey took 3 hours.

The boat travelled at a speed of $(x - 4)$ km/hr on the outward journey and at a speed of $(x + 4)$ km/hr on the return.

Calculate the speed on the outward journey.

4.

If

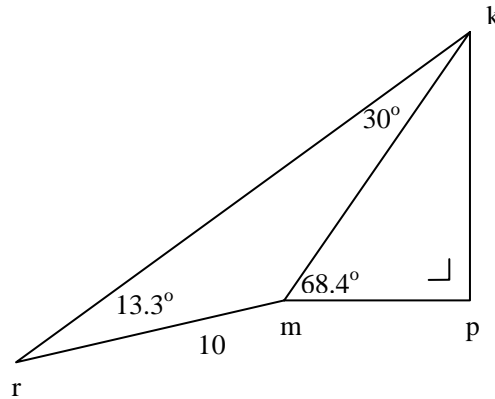
$$\frac{1}{h^2} - 8p = m^2,$$

determine the values of h , in fraction form, when $m = 10$ and $p = -8$

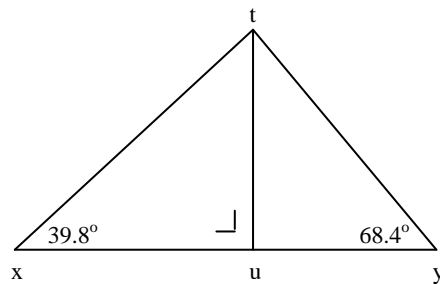
Irish Mathematics Teachers Association, Junior Cert Maths Quiz 2009
Round 7

1. In the diagram,
 $|\angle krm| = 13.3^\circ$,
 $|\angle rkm| = 30^\circ$,
 $|\angle kmp| = 68.4^\circ$,
 kp is perpendicular to mp and $|rm| = 10$.

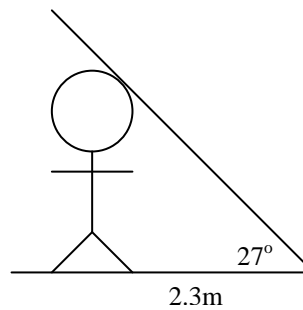
Calculate $|kp|$ correct to the nearest whole number.



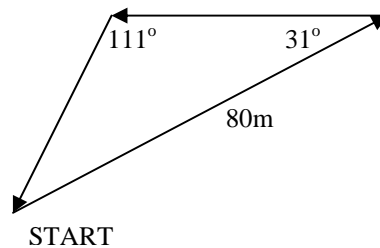
2. t , x , u and y are points on level ground; x , u and y are in a straight line.
 From x , the direction of t is East 39.8° North.
 From y , the direction of t is West 68.4° North.
 u is directly South of t .
 $|xy| = 95\text{m}$.
 Find $|tu|$, correct to the nearest metre.



3. A girl, standing on level ground, casts a shadow 2.3m long.
 The angle of elevation of the sun is 27° .
 Calculate the girls height to the nearest cm.



4. A rabbit, escaping from a dog, ran in a triangular pattern.
 The diagram shows the path of the escape.
 Calculate, to the nearest m, the distance run by the hare

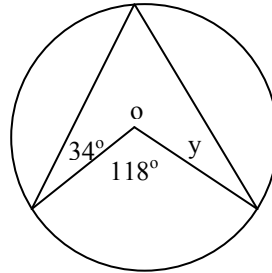


Irish Mathematics Teachers Association, Junior Certificate Mathematics Quiz 2009

Round 8

1. The circle in the diagram has centre o.

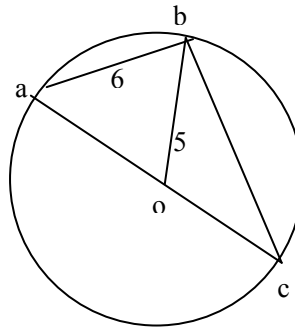
Find the value of y



2.

The centre of a circle is o, with $|ab| = 6$ and $|bo| = 5$.

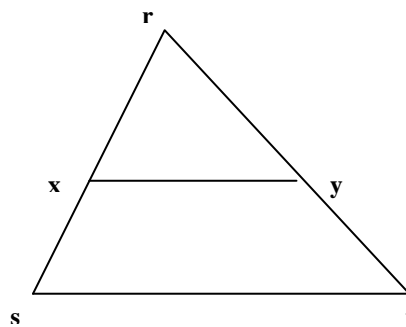
Find the value of $|bc|$



3. In the triangle rst, xy is parallel to st .

If $|xs| = 5$, $|yt| = 6$ and $|rs| = 2|yt|$,

Find $|rt|$ in the form $\frac{p}{q}$, where p and q are both natural numbers



4. k is the centre of the circle.

If $|ab| = 8$ cm

and the perpendicular distance from k to ab is 3 cm,

find the area of the circle, in terms of π

