

YEAR 9 TO YEAR 10 TRANSITION BOOKLET

Bridging the Gap to Key Stage 4

This booklet contains a structured collection of practice questions covering a mix of content you have already studied. Mastering these topics is essential for establishing fluency and maintaining a confident start to your GCSE Mathematics course.



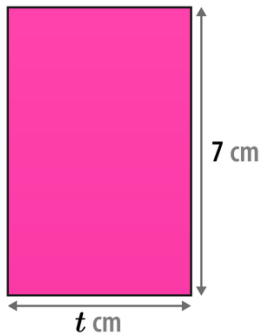


Q1

U337



The rectangle below has an area of **at least** 28 cm^2 .
Write and solve an inequality for the possible values of t .



Not drawn accurately

Answer:

Q2

U594

U456



What is the median value in this list?

$\frac{6}{10}$, $\frac{1}{2}$, 0.9, 75%, 0.03

Answer:

Q3

U881



The original price of a suit was £60.
In a sale, it was **reduced by** $\frac{1}{10}$ of its original price.
What was its sale price?



Original price = £60

Sale price = £



Q4

U337



Samuel thinks of a number, k . He triples it and then subtracts 11 to get an answer that is less than 43.

a) Write an inequality to represent this.

Answer:

b) Solve your inequality to find the possible values of k .

Answer:

Q5

U166



180 people enter a competition.

The probability of winning the competition is $\frac{1}{6}$ and each winner gets a prize of £8.
How much prize money would you expect to be won **in total**?

Answer: £

Q6

U161

U291



Find the mean of the numbers below.

$$3.25 \times 10^7$$

$$6.54 \times 10^5$$

$$8.21 \times 10^6$$

Give your answer in standard form to 3 significant figures.

Answer:



Q7

U683



A spinner has four sections labelled A, B, C and D.

The probabilities of it landing on sections A, B and C are shown in the table below.

Complete the table to show the probability, as a percentage (%), of the spinner landing on section D.

Section	Probability
A	$\frac{1}{20}$
B	0.23
C	37%
D	%

Q8

U556



Make x the subject of

$$\sqrt{x+7} = p$$

Answer:

Q9

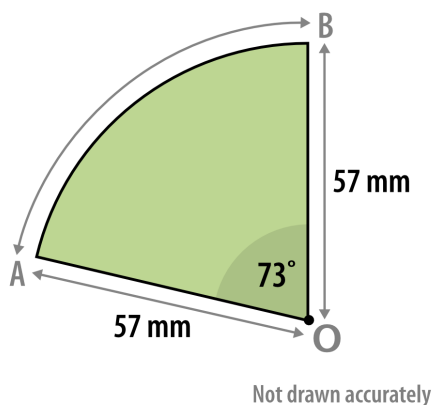
U221



OAB is a sector of a circle as shown below.

Calculate the **perimeter** of the sector OAB.

Give your answer to 1 d.p.



Answer: mm



Q10

U280

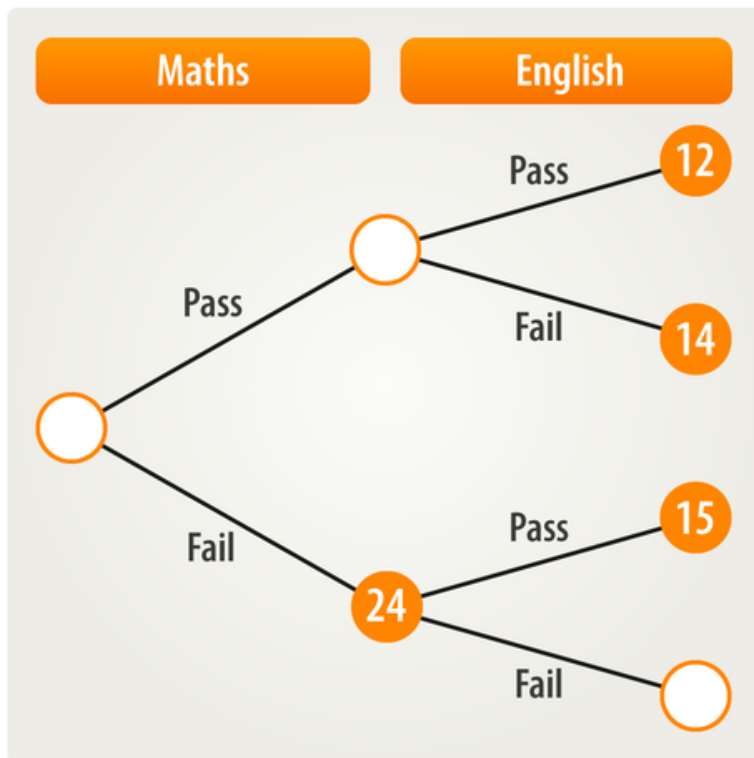


A group of students sat a maths test and an English test.

The frequency tree below shows some information about whether the students passed or failed each test.

A student is chosen at random from the group. What is the probability that they failed **at least** one test?

Give your answer as a fraction in its simplest form.



Answer:

Q11

U963



Fully factorise the expression $9 - f^2$

Answer:



Q12

U161

U526



Find the range of the numbers below

$$6.12 \times 10^7$$

48 300 000

750 000

$$9.42 \times 10^6$$

Give your answer in standard form.

Answer:

Q13

U915

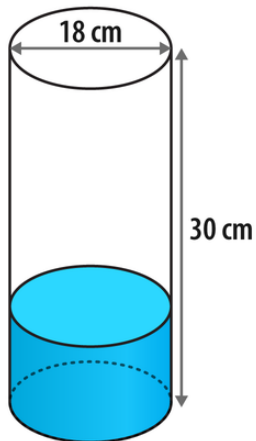
U349



The cylindrical vase below is 23% filled with water.

Work out how much water is in the vase.

Give your answer to 1 d.p.



Not drawn accurately

Answer: cm^3



Q14

U286



During a javelin throwing competition, Joseph achieves a new personal best distance by throwing the javelin 92.88 m.

This is an increase of 8% from his previous personal best distance.

Work out Joseph's previous personal best distance.

Answer: m

Q15

U556



Rearrange $y = \frac{n}{z}$ to make

a) n the subject.

Answer:

b) z the subject.

Answer:

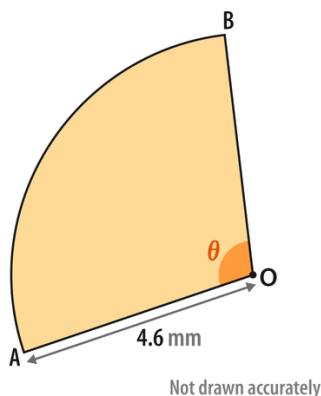
Q16

U373



OAB is a sector of a circle. The area of OAB is 18 mm^2 .

Calculate the central angle, θ , to 1 d.p.



Answer: °



Q17
U228



Use factorising to solve the equation below.
 $x^2 - 5x = 0$

Answer:

Q18
U166



The probability of winning a prize in a competition is 16%. How many people need to enter the competition for the expected number of winners to be 32?

Answer:

Q19
U161



$(a \times 10^b) \times (5.2 \times 10^7) = 4.264 \times 10^3$
Given that $a \times 10^b$ is in standard form, work out the values of a and b .

Answer: $a =$ $b =$



Q20

U245



Draw a circle with radius 5 cm, and then draw any two chords on that circle.
Construct the perpendicular bisector of each of your chords.
You must show all of your construction lines.
Where do the perpendicular bisectors intersect?

Answer:



Q21

U580



Aiden had a six-sided dice numbered from 1 to 6. He rolled it 120 times.

a) If the dice were fair, how many times would you expect it to have landed on 3?

Answer:

b) Aiden recorded that the dice landed on 3 a total of 19 times. Is the dice definitely biased or definitely not biased, or is it impossible to tell? Write a sentence to explain your answer.

Answer:

.....

.....

Q22

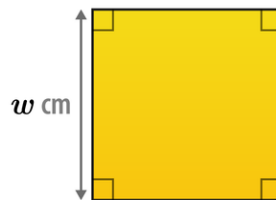
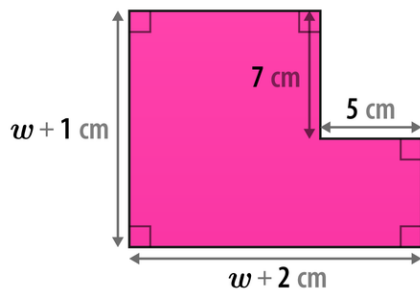
U337



A compound shape and a square are both shown below.

The area of the compound shape is greater than the area of the square.

Work out the smallest possible integer value of w .



Not drawn accurately

Answer:



Q23

U178



a) What is the value of $d^2 + 8d + 7$ when $d = 10$?

Answer:

b) Fully factorise $d^2 + 8d + 7$.

Answer:

c) Using your answer to part b), work out the two prime factors of 187.

Answer: and

Q24

U278



The table below shows the population of a town, recorded in different years.
Calculate the percentage decrease in the population between 2000 and 2005.
Give your answer to the nearest 1%.

Year	Population of the town
2000	24,699
2005	17,958
2010	22,043

Answer:%

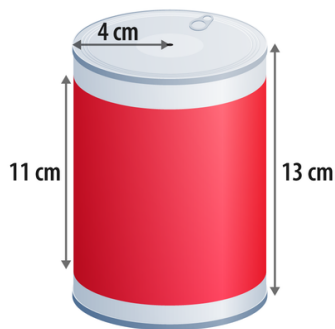


Q25

U464



A red label is wrapped all the way around the curved surface of a cylindrical can, as shown below.



Not drawn accurately

a) What is the area covered by the label?

Give your answer to 1 d.p.

Answer: cm²

b) What percentage of the total surface area of the can is covered by the label?

Give your answer to the nearest 1%.

Answer: %

Q26

U228



Expand and factorise to solve

$$x^2 + 5(3x + 10) = 0$$

Answer:



Q27

U556



a) Which of the equations below is equivalent to $y = x(a + b)$?

$$a = \frac{y - b}{x}$$

$$a + b = \frac{y}{x}$$

Answer:

b) Write down two more equations that are equivalent to $y = x(a + b)$

Answer:

Q28

U161



The mass of a hydrogen atom is 1.67×10^{-24} grams.

The mass of an oxygen atom is 2.66×10^{-23} grams.

A molecule of water contains 2 atoms of hydrogen and 1 atom of oxygen.

a) Calculate the mass of one molecule of water, giving your exact answer in standard form.

Answer: g

b) Calculate the number of molecules in 1 gram of water, giving your answer in standard form to 3 significant figures.

Answer: molecules



Q29

U915

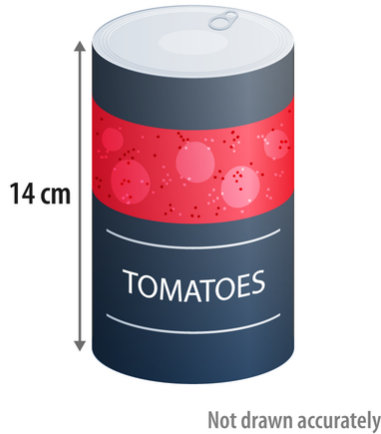
U464



A tin of tomatoes has a volume of $126\pi \text{ cm}^3$. The tin is 14 cm tall, and has a label which covers the entire curved surface area of the tin.

Work out the area covered by the label.

Give your answer in terms of π .



Answer: $\pi \text{ cm}^2$

Q30

U278



A number was decreased by 38%.

By what percentage would the new value need to be increased in order to return to its original value?

If your answer is a decimal, then round it to 1 d.p.

Answer: %



Q31
U245
U787



Use a ruler and a pair of compasses to construct a 45° angle.
You must show all of your construction lines.

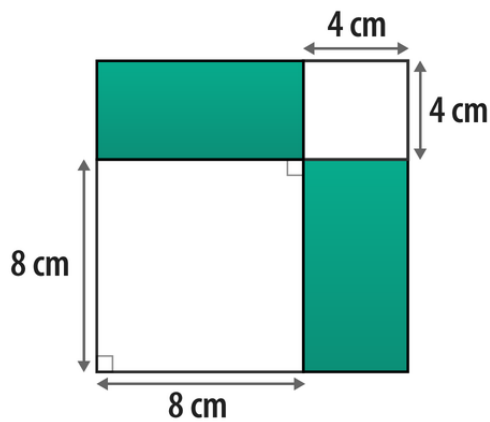


Q6

U687



Two parts of this square are shaded. The other two parts are unshaded. What is the ratio of the shaded area to the unshaded area? Give your answer in its simplest form.



Not drawn accurately

Answer:

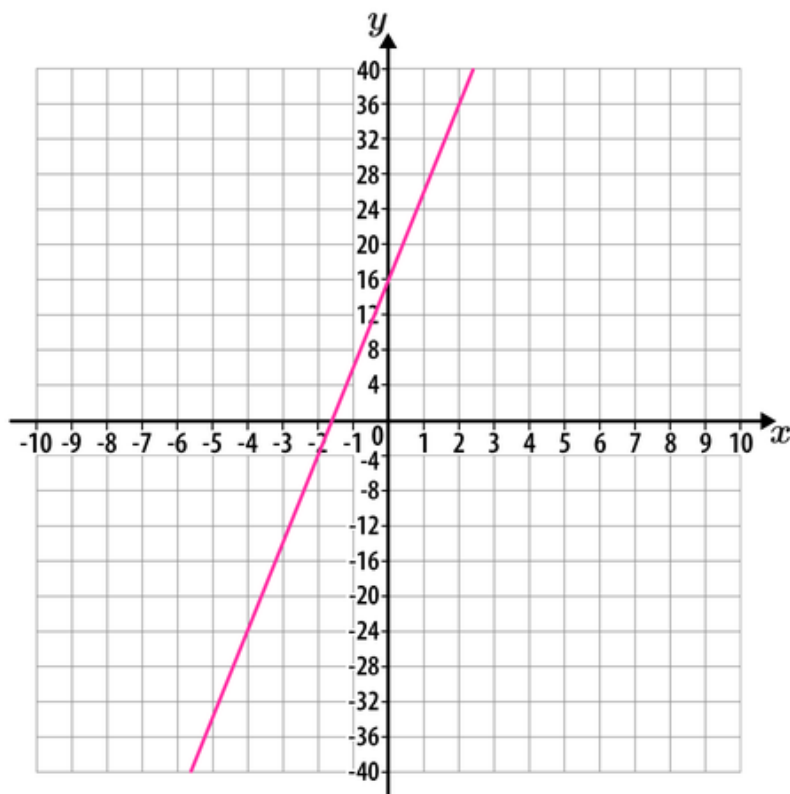
Q7

U315



What is the equation of the straight line shown below?

Give your answer in the form $y = mx + c$, where m and c are integers or fractions in their simplest forms.



Answer:



Q8

U301



Safa chooses a number, r , which satisfies the inequality

$$16.2 \leq r < 16.3$$

What is r truncated to 1 decimal place?

Answer:

Q9

U577



The angles in a triangle are in the ratio 3 : 1 : 2

Calculate the size of each angle.

Answer: ° ° °

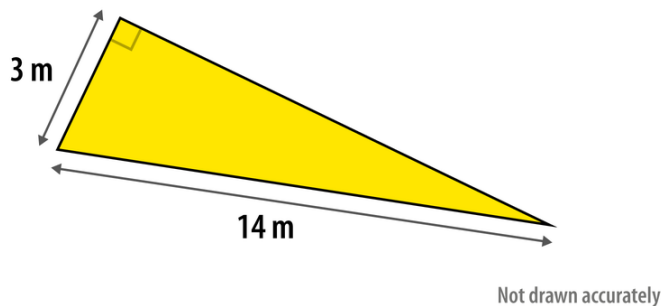
Q10

U385



Calculate the **area** of this right-angled triangle.

Give your answer to 1 d.p.



Answer: m²



Q11

U721



Emilie wants to travel 240 miles. How much would the **cheaper** taxi journey cost her?



Taxi A
Was £45 per 40 miles
Now 15% off!



Taxi B
90p per mile

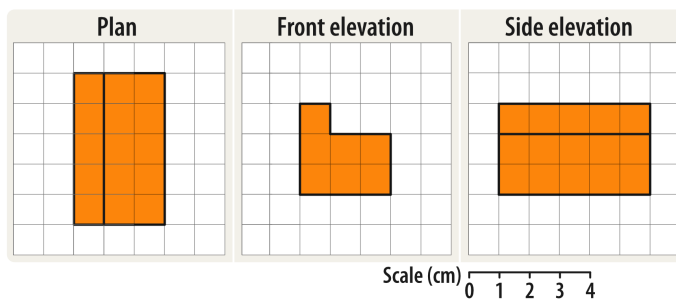
Answer: £

Q12

U743



The plan, front elevation and side elevation of a prism are shown.
Sketch the solid prism. Write the dimensions of the prism on your sketch.





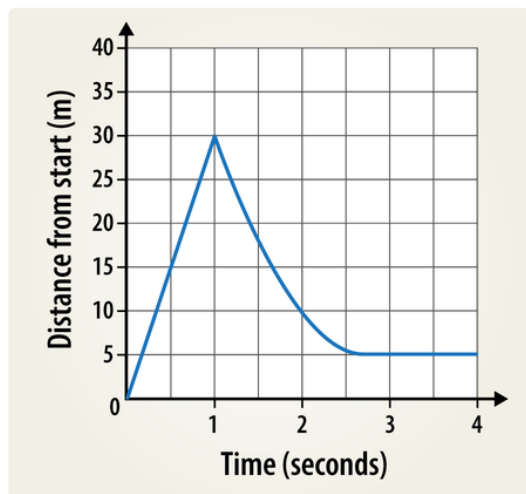
Q13

U914



An ice hockey player hits a puck at a wall. The puck rebounds and then comes to a stop. This distance-time graph shows the journey of the puck.

What is the total distance that the puck travels?



Answer: m

Q14

U669



Circle the equations below which describe straight lines.

$$y = 7x^2 + 1$$

$$y = 5$$

$$4y = 8x$$

$$y + 3 = \frac{2}{x}$$

$$3y - 7 = 6x$$

Q15

U657



The length, l , of a plank of wood is 6.3 m when rounded to the nearest 10 cm.

Write down the error interval, in centimetres (cm), for l .

Answer:



Q16

U256



Megan's standard pay is £17.70 per hour. She gets paid 1.5 times this rate for working overtime.

How much will Megan get paid for working 11 hours of overtime?

Give your answer to the nearest pound.

Answer: £

Q17

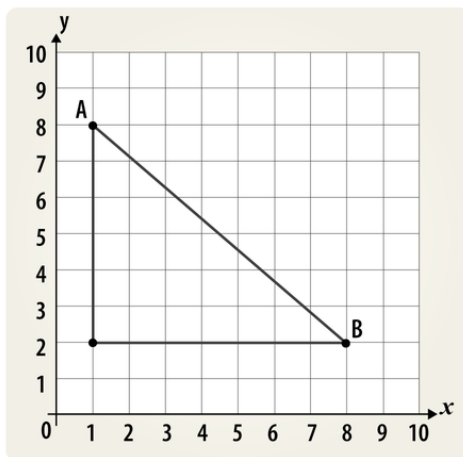
U385



Point A and point B have been plotted on a centimetre square grid. Point A has coordinates (1, 8) and point B has coordinates (8, 2), as shown below.

Using Pythagoras' theorem, calculate the distance from A to B.

Give your answer to 1 d.p.



Answer: cm

Q18

U151



An eagle travelled 6 km in 400 seconds.

Calculate the average speed of the eagle in **metres per second** (m/s).

Answer: m/s



Q19

U610



Harry bought a watch in Singapore for 68 Singapore dollars.
Lexie bought the same model of watch in Hong Kong for 357 Hong Kong dollars.
Using the exchange rates below, calculate the difference between the amounts that Harry and Lexie paid for their watches.
Give your answer in pounds.

1 Singapore dollar = £0.53

£1 = 10.50 Hong Kong dollars

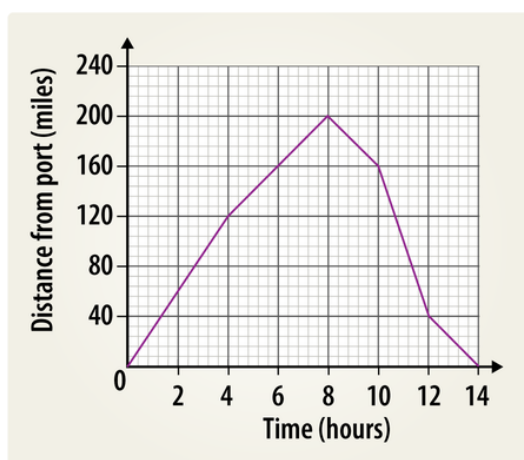
Answer: £

Q20

U462



This distance-time graph shows the journey a boat made when it travelled away from a port and then returned.
What was the **fastest** speed that the boat reached during the journey?



Answer: miles per hour

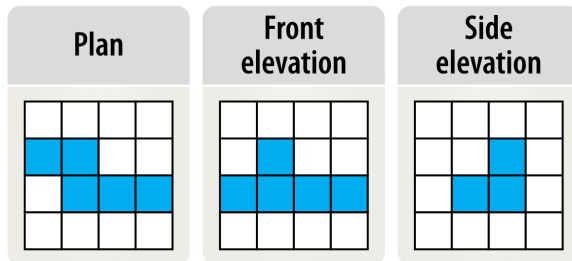


Q21

U743



A solid is made from identical cubes.
Its plan, front elevation and side elevation are shown below.
How many cubes is the solid made from?



Answer:

Q22

U357



A stationery shop orders a batch of pens from a factory.
The factory could make the batch of pens in 20 days using 12 machines.
Due to a fault, only 3 machines were used for the first 8 days.
All 12 machines were used from day 9 onwards.
Work out the total number of days taken to make the batch of pens.

Answer: days



Q23

U669



Line N has an equation of $2y = 4x + 3$

Line Q has an equation of $4y + x - a = 0$, where a is a number.

If line N and line Q have the same y -intercept, what is the value of a ?

Answer: $a =$

Q24

U151



A car is travelling at 48.6 km/h.

Convert this speed into m/s.

Answer: m/s

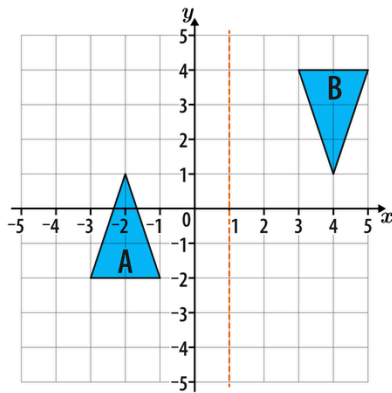


Q1

U799



Triangle A is reflected twice to give triangle B.
It is first reflected in the line $x = 1$.
Work out the equation of the second line of reflection.



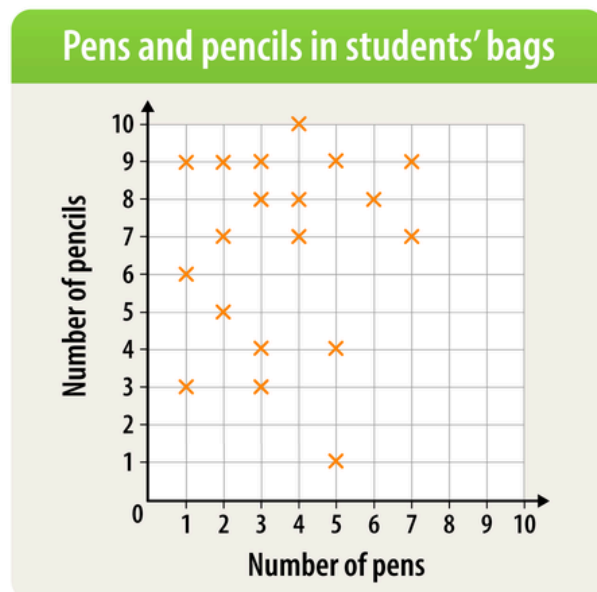
Answer:

Q2

U277



The scatter graph shows information about the number of pens and pencils in students' bags.



a) What is the modal number of pencils in the students' bags?

Answer:

b) What is the modal number of pens in the students' bags?

Answer:



Q3

U632



R is the point with coordinates $(7, 5)$.

S is the point with coordinates $(2, 8)$.

Work out the column vector $\overrightarrow{RS}$.

Answer:

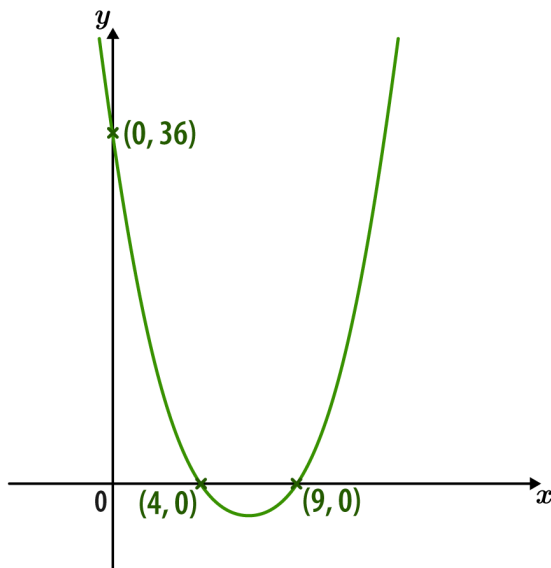
Q4

U667



The quadratic function $y = x^2 - 13x + 36$ is drawn below.

Use the symmetry of the quadratic curve to find the **coordinates** of the minimum.



Answer: (..... ,)

Q5

U427



Each exterior angle of a regular polygon is 30°

How many sides does it have?

Answer:



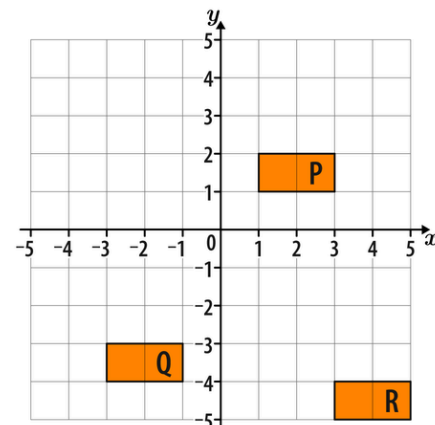
Q6

U196



Shape P is translated by $\begin{pmatrix} -4 \\ -5 \end{pmatrix}$ to give shape Q.

Shape Q is translated by $\begin{pmatrix} 6 \\ -1 \end{pmatrix}$ to give shape R.



a) Using the grid, work out the vector that describes the translation from shape P to shape R.

Answer:

b) Can you work out this vector without using the grid? Write a sentence to explain your answer.

Answer:

.....

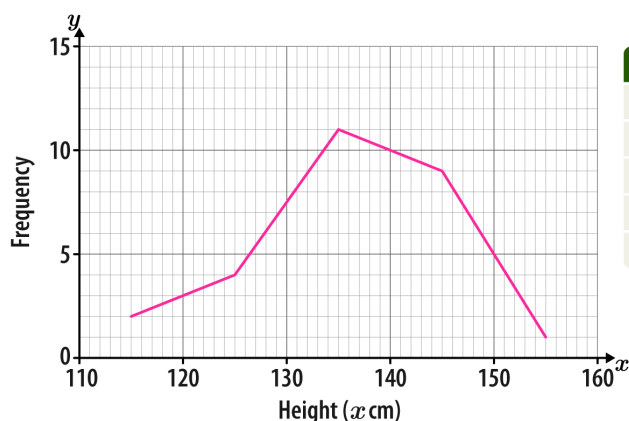
Q7

U840



The table and corresponding frequency polygon show information about the heights of members of a tennis club.

What fraction of members were between 120 and 130 cm tall?



Height (x cm)	Midpoint
$110 < x \leq 120$	115
$120 < x \leq 130$	125
$130 < x \leq 140$	135
$140 < x \leq 150$	145
$150 < x \leq 160$	155

Answer:



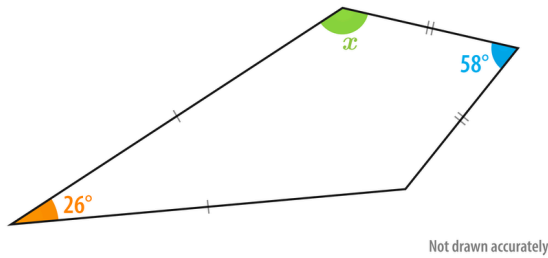
Q8

U329



A kite is shown below.

Work out the size of angle x .



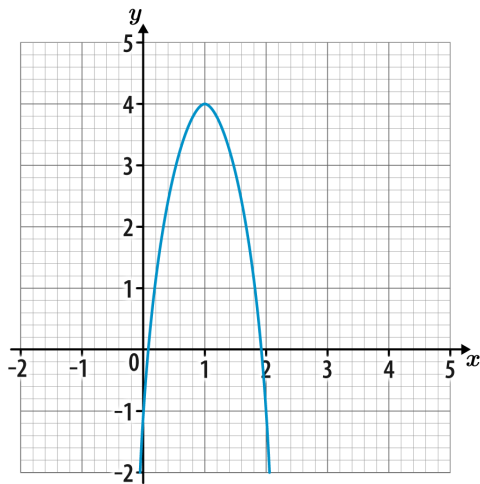
Answer: _____

Q9

U601



The diagram below shows the graph of $y = 10x - 5x^2 - 1$



Use the graph to estimate the solution to $10x - 5x^2 - 1 = 2.4$
Give your answer to 1 decimal place.

Answer: _____

Q10

U903



$$k \begin{pmatrix} x \\ 7 \end{pmatrix} + \begin{pmatrix} 8 \\ -9 \end{pmatrix} = \begin{pmatrix} -36 \\ 19 \end{pmatrix}$$

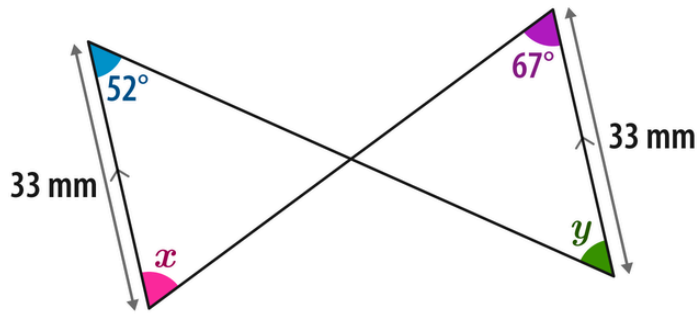
Work out the value of k and the value of x .

Answer: $k =$ _____ $x =$ _____



Q11

U866



Not drawn accurately

a) Which single angle fact can be used to show that $x = 67^\circ$ and $y = 52^\circ$?

Answer:

b) Which congruence condition can then be used to show that the two triangles are congruent?

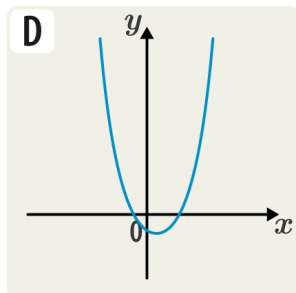
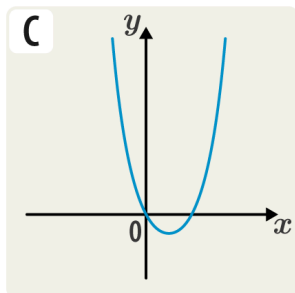
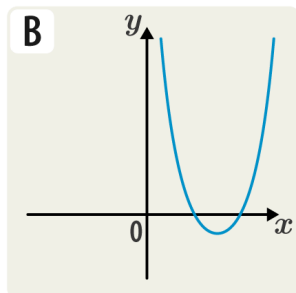
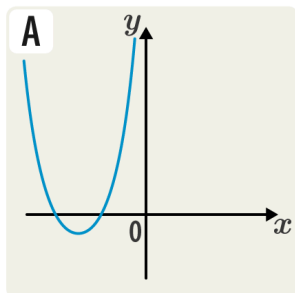
Answer:

Q12

U601



When $y = 0$, a given quadratic equation has the solutions $x = -2$ and $x = 5$. Which of the sketches below could represent the graph of this function?



Answer:



Q13

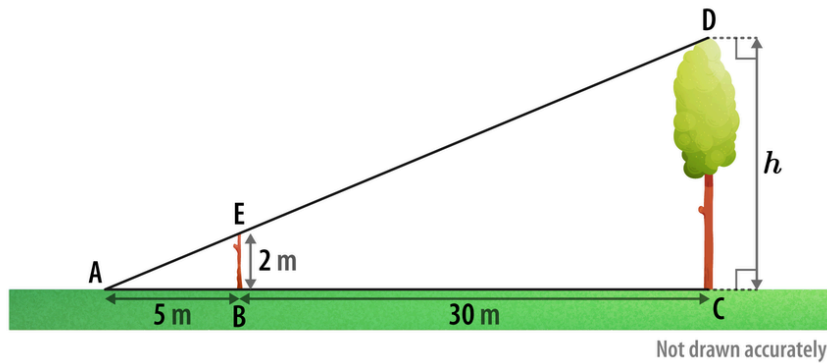
U578



The diagram below shows how to use a stick to measure the height of a tree. The shadows of the stick and the tree both end at the same point, A.

Calculate h , the height of the tree.

Give your answer as an integer or as a fraction in its simplest form.



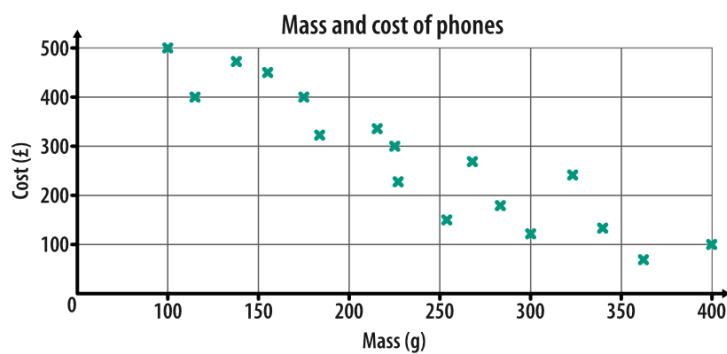
Answer: m

Q14

U571



Identify all of the conclusions that are correct for the data in the scatter graph.



A Phones are getting heavier

D Lighter phones cost more

B Heavier phones cost less

E Heavier phones cost more

C Phones are getting lighter

F Lighter phones cost less

Answer:



Q15

U107



Leyla is facing towards a museum, which is at a bearing of 230° from her.
If she turns 75° anticlockwise she will be facing towards a cafe.
What is the bearing of the cafe from Leyla?

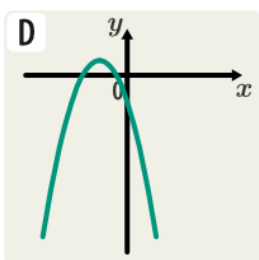
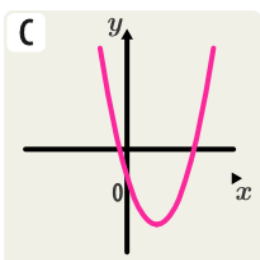
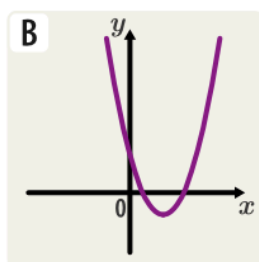
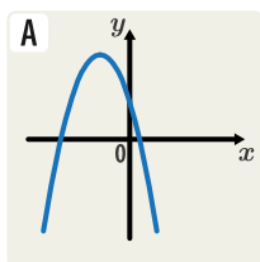
Answer: _____

Q16

U667



Match each of the following graphs to its equation:



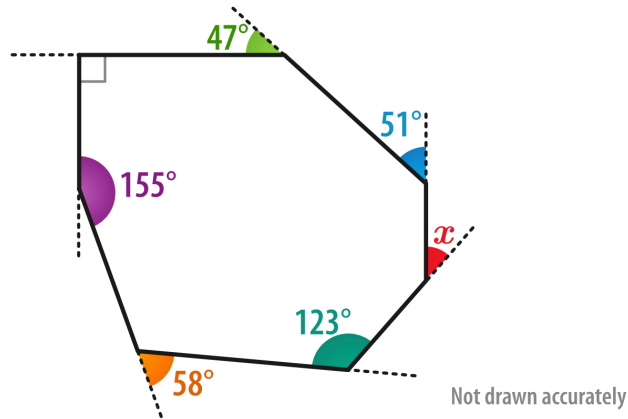
Equation	Graph
$y = x^2 - 5x + 4$	
$y = x^2 - 5x - 4$	
$y = -x^2 - 5x + 4$	
$y = -x^2 - 5x - 4$	

**Q17**

U427



Work out the size of angle x .



Answer: _____

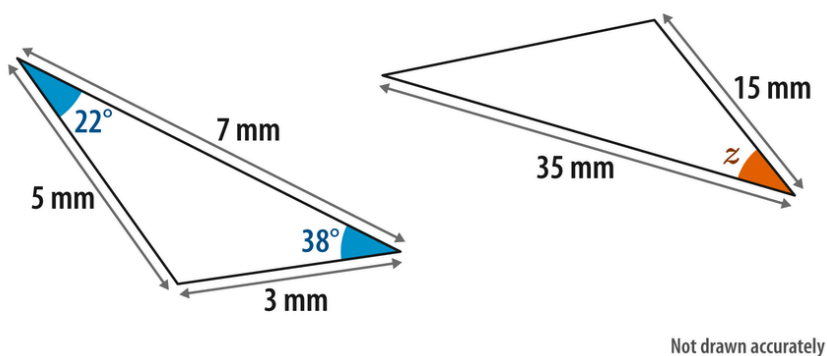
Q18

U551



These two triangles are similar.

Work out the size of angle z .



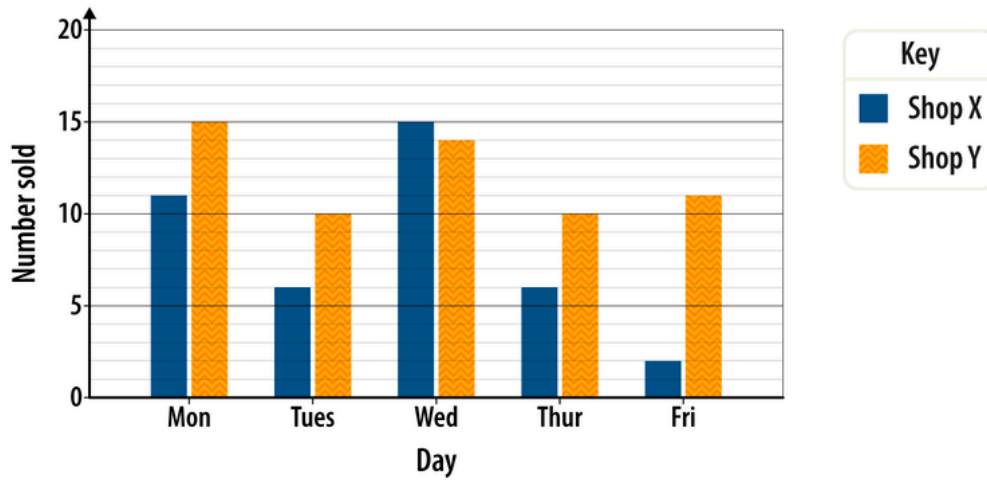
Answer: _____

**Q19**

U520



The chart below shows how many TVs two different shops sold last week.



a) Which shop sold a higher mean number of TVs per day?

Answer:

b) Use your answer to part a) to work out how many more TVs this shop sold on average per day.

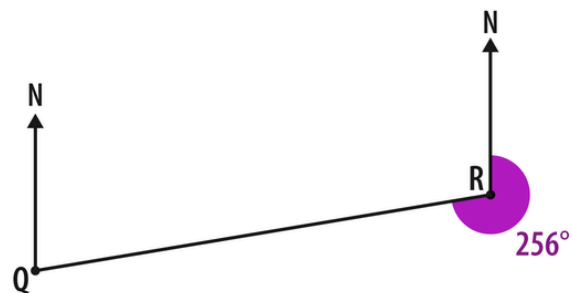
Answer:

Q20

U107



Work out the bearing of R from Q.



Not drawn accurately

Answer:

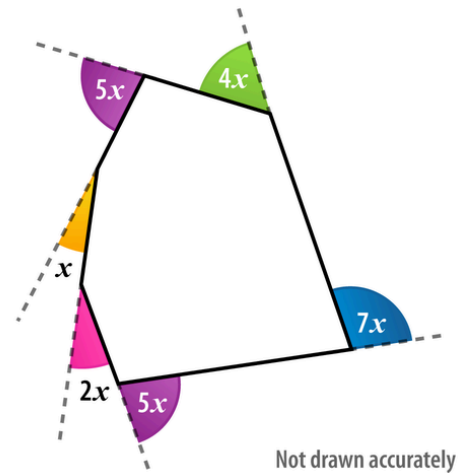


Q21

U427



Exterior angles have been marked on the irregular hexagon below.
Calculate the value of x .



Answer: _____

Q22

U187



Using a ruler and a pair of compasses make an accurate drawing of an equilateral triangle ABC with side lengths 8 cm

Q23

U660



$\mathbf{a}$ and $\mathbf{b}$ are vectors that are not parallel.

$$\overrightarrow{XY} = 2\mathbf{a} - 5\mathbf{b}$$

Circle **all** of the vectors which are parallel to $\overrightarrow{XY}$.

$$2\mathbf{a} - 5\mathbf{b} - 4\mathbf{a}$$

$$-4\mathbf{a} + 10\mathbf{b}$$

$$2\mathbf{a} + 5\mathbf{b}$$

$$\mathbf{a} - \frac{5}{2}\mathbf{b}$$

$$10\mathbf{a} - 25\mathbf{b}$$

$$4\mathbf{a} - 20\mathbf{b} + 2\mathbf{a} + 5\mathbf{b}$$

$$5\mathbf{a} - 2\mathbf{b}$$

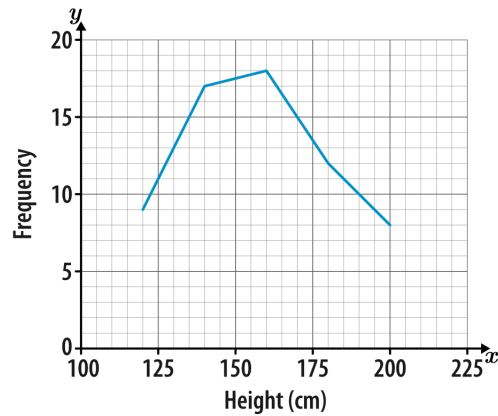


Q24

U840



This frequency polygon shows information about the heights of the members of a netball club. Calculate an estimate for the mean height. Give your answer to 1 d.p.



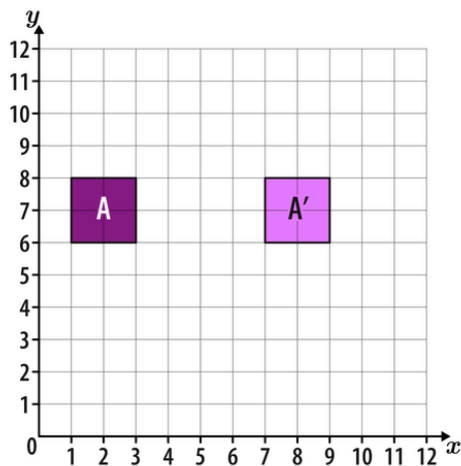
Answer: cm

Q25

U696



Fully describe each of the **three** different clockwise rotations that map shape A onto shape A'. Do not consider angles of rotation more than 360°



Answer:

.....

.....