Year 10 Summer Pack

Maths Support Booklet

Intermediate Plus

Name: _____

This booklet is designed to support your learning over the summer period to help support you to be in the best possible position for your exams in 2023. We all know that eating 5 portions of fruit and veg a day is good for us; well so is completing maths questions on a regular basis through the Corbett-Maths 5 a Day Booklet.

How to use this booklet:

You have been issued with a paper copy. We recommend that you complete 50% of the booklet by the time we return in September. While the summer break is a time for rest and relaxation, we recognise that some students enjoy having something to work on. For those who are currently not where they want to be, this is the perfect opportunity to close that gap ready for September.

You are encouraged to do one page every day in August, but of course you can choose to do more or less if you wish. Once you have completed a page, use the web link or QR Code below to check your answers. You may find the first few days more challenging, but the skills are repeated throughout the booklet so you will find similar questions later on, giving you more opportunities to practise and improve.

Please hand your booklet in to your Maths teacher in September
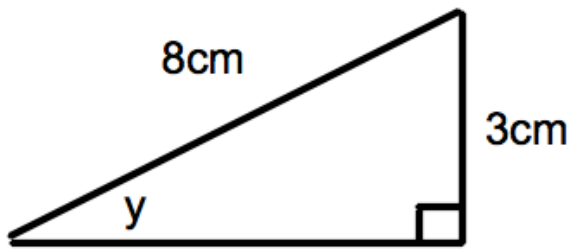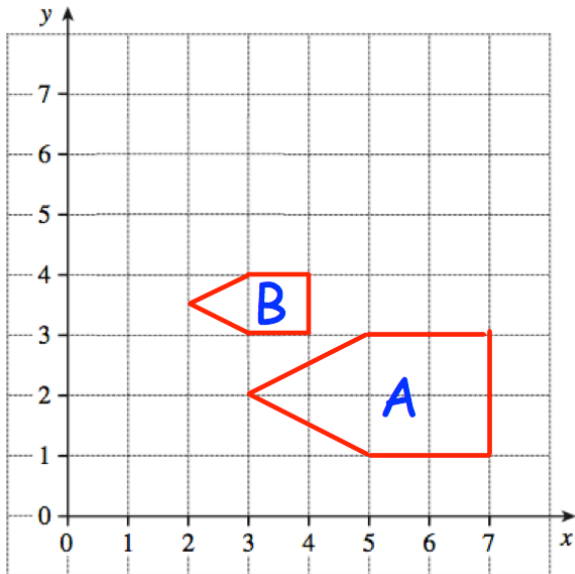
Link to Answers:

https://corbettmaths.com/2016/10/26/august-answers/

1st August

Corbettmaths

Calculate angle y

8cm

3cm

y

Describe fully the single transformation that maps shape A onto shape B.
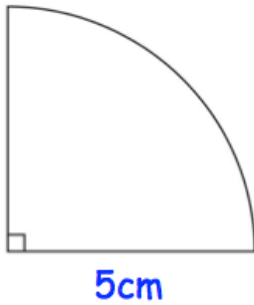

Reflect shape B using x = 4 as the mirror line

There are three colours of beads in a bag.
The ratio of red to yellow beads is 8:3
The ratio of green to yellow beads is 9:2.

What fraction of the beads are green?

Work out the reciprocal of 20.
Give your answer as a decimal

www.corbettmaths.com

2nd August

Corbettmaths

5cm

Calculate the area of this quarter circle

The time, T, taken to serve the guests at a wedding is inversely proportional to the number of waiters, w.
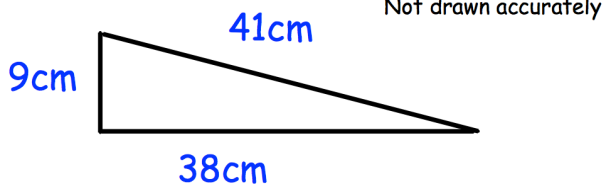
Explain why.

The time is calculated by

$$T = \frac{300}{w}$$

Work out how long it would serve the guests if there were 45 waiters.

The density of Nitrogen is

1.25×10^{-6} kg/cm³

Calculate the mass of one cubic metre of Nitrogen.

41cm   Not drawn accurately
9cm
38cm

Is this triangle a right angled triangle?
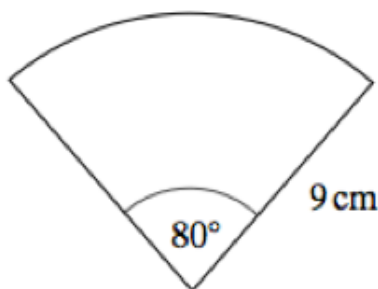
3rd August

Corbettmaths

Solve $(x + 3)(x + 5) = 0$

Mrs Reed buys a car costing £11760
This cost includes VAT at a rate of 20%.

How much is the car without VAT?

---

150 students visit a school canteen.

Some students have packed lunches.
Some students have a cooked lunch.

56 out of the 89 students who have packed lunch are female.
There are 72 boys.

Work out how many females have a cooked lunch.
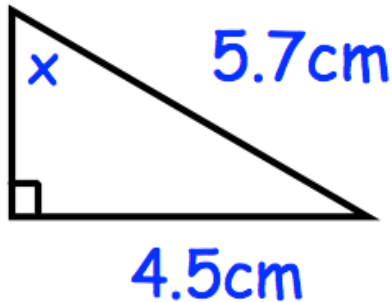

Calculate the area of the sector

4th August

Solve

$$\frac{7x-3}{2} = 2x + 9$$

Find x.

5.7cm

4.5cm

Solve the simultaneous equations

2x – 5y = 1
8x + 3y = 27

Find the volume of a piece of wood that has a mass of 600g and density of 0.75g/cm³

0.84 has been rounded to two decimal places.

Write down an inequality to show the range of possible actual values.

5th August

Corbettmaths

Write in standard form

$$120 \times 10^8$$

Write in standard form

0.0000000000034

In the space below, draw a 80° angle.
Construct the angle bisector.

The circumference of a circle is 60cm.
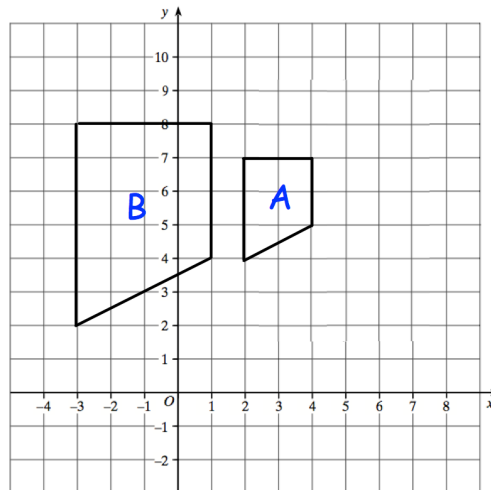Work out the area of the circle.

A rectangular field is 20 metres longer than wide.

The perimeter of the field is 280m.

Find the area of the field.

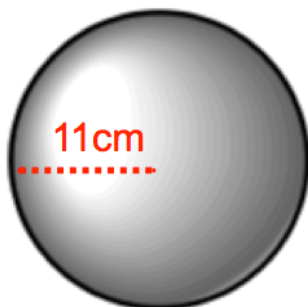**6th August**

Corbettmaths

Solve x² + x - 6 = 0

Describe fully the single transformation that maps shape B onto shape A.

ξ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}
A = {numbers less than 6}
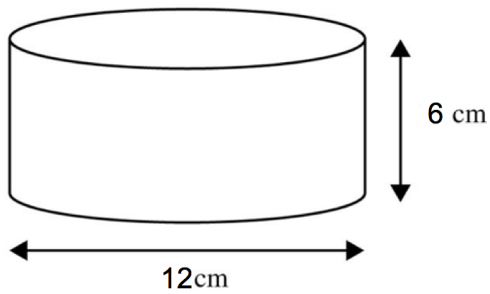B = {prime numbers}

Draw a Venn diagram for this information.

Calculate the volume of the sphere.
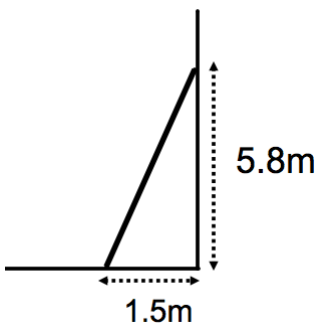Give your answer to 1 decimal place.

11cm

7th August

6 cm

12cm

Calculate the volume.
Give your answer in terms of π

Corbettmaths

A light flashes every 50 seconds.
A buzzer buzzes every 3 minutes.

They both operate, how long until
they both operate again?

Calculate the density of a piece of
wood with a mass of 80g and a
volume of 90cm³

5.8m

1.5m

A ladder is placed against a wall.
To be safe, it must be inclined at
between 70⁰ and 80⁰ to the ground.

Is the ladder safe?

Calculate the length of the ladder.

8th August

Corbettmaths

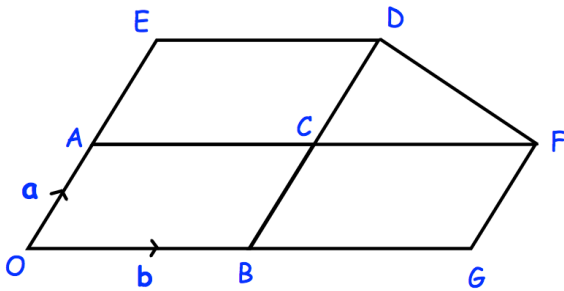Expand and simplify $6(w + 3) - 2(w - 5)$

$6w + 18 - 2w - 10$
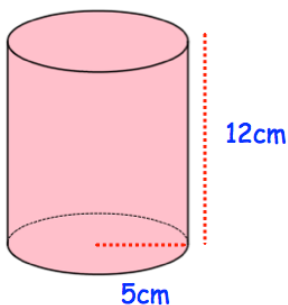
$= 4w + 8$

Can you spot any mistakes?

Four chairs and two tables cost £218.
Six chairs and seven tables cost £587.

Find the cost of buyings twenty chairs and five tables.

Express in terms of **a** and **b** the vector

$\overrightarrow{OC}$

A cube with side length 8cm is placed on the ground. The pressure exerted on the ground is 4N/cm².
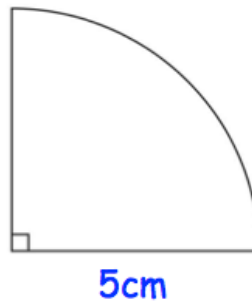
What force does the cube exert on the ground?
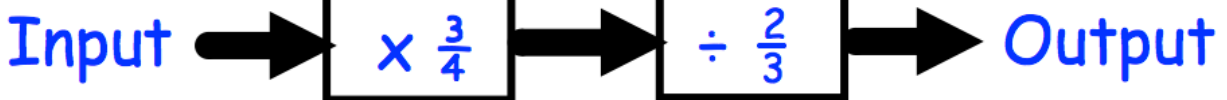

Calculate the surface area

9th August

Corbettmaths

Calculate the perimeter of this quarter circle

5cm

The mean of four numbers is 10.
Three of the numbers are 9, 11 and 7.
Work out the fourth number.

Input → $\times \frac{3}{4}$ → $\div \frac{2}{3}$ → Output

Find the output if the input is 5

Factorise $x^2 + 10x + 9$

Match each of the following

4x + y ——————— Expression

x + x + x = 3x   Equation

5x - 2 = 28   Formula

V = lwh   Identity

10th August

The table shows the probabilities that a sweet taken from a jar will be red, pink or purple.

Colour	Red	Pink	Purple
Probability	0.4	0.25	

There are 4000 sweets
How many are purple?

Simplify

$$2a^3c^3 \times 3a^2c$$

$$y = x^3$$

Complete the table of values and draw a graph

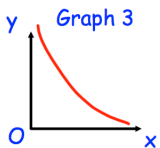| x	-2	-1	0	1	2
y					
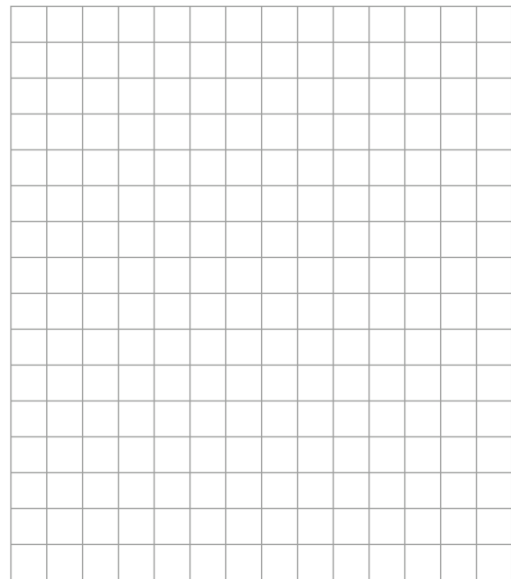
Solve

$$2x - 3y = 7$$

$$3x + 5y = 1$$

11th August

Corbettmaths

Make x the subject of

$$\sqrt[3]{\dfrac{x}{k}} = w$$

Graph 1   Graph 2
Graph 3   Graph 4
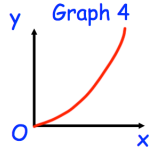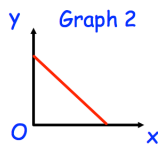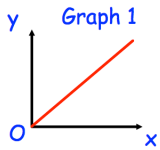
One of the graphs shows that y is inversely proportional to x.

Which graph?

10m
2m
1.5m
2m
6m
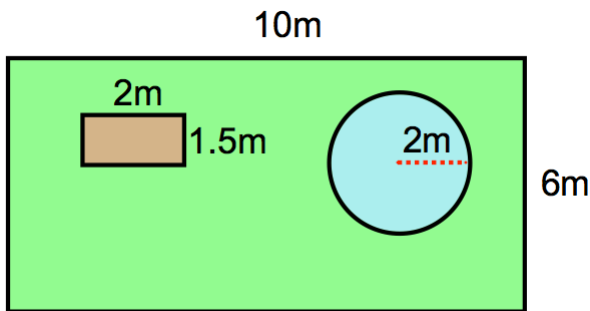
There is a circular pond that has radius 2 metres.
The remainder of the garden is grass.
Each bag of grass seed costs £4.60 and covers 10m².
Work out the total cost to re-seed the garden.

Belle wants to re-seed the grass in her garden.
The garden is 10 metres long and 6 metres wide.
There is a vegetable patch that is 2 metres long and 1.5 metres long.

The sum of Rosemary's age and Hannah's age is 102 years.
The difference between their ages is 52 years.
Hannah is younger than Rosemary.
Find the age of each woman.
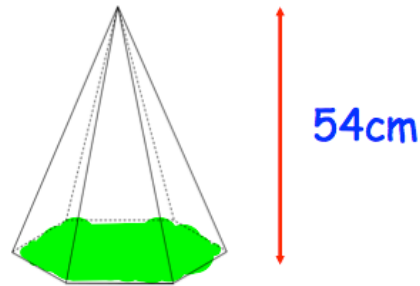
12th August

Corbettmaths

An internet company collected data about the number of internet devices in each of 50 households.
The table shows the results.

Number of devices	Number of households
0	1
1	1
2	2
3	4
4	9
5	13
6	10
7	7
8	3

Work out the total number of internet devices in these 50 households

Calculate the mean number of internet devices per household.

A hexagon-based pyramid has a height of 54cm.
The volume of the pyramid is 1080cm³.
Calculate the area of the base of the pyramid.

54cm

7.8 has been truncated to one decimal place.

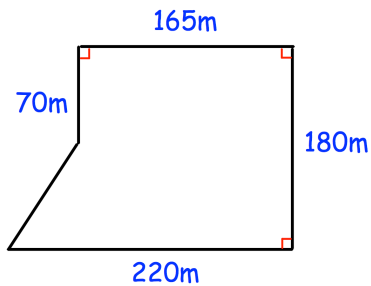Write down an inequality to show the range of possible actual values.

A line has gradient 3 and passes through the point (1, 8)

Find the equation of the line.

13th August

Corbettmaths

Write 708% as a simplified fraction

165m

70m

180m

220m

Farmer Richards owns this field.
The crop he plants earns him £7 for each square metre
How much money does he earn in total?

Solve
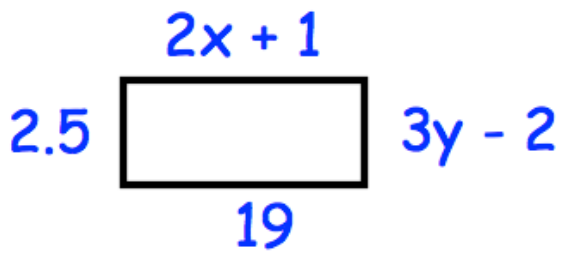
$x^2 + 5x - 14 = 0$

$(a + c)^2 = t$

make c the subject

Charlene and Danielle share some money in ratio 2 : 5
Danielle gets £216 more than Charlie.

How much does each girl receive?

14th August

$$2x + 1$$

$$2.5 \qquad \boxed{} \qquad 3y - 2$$

$$19$$

Find x

Find y

Perimeter

Solve

$$x^2 + 6x + 9 = 0$$

Expand and simplify

$$(5y - 1)(y - 2)$$

The speed limit on a road is 40mph. A scooter drives 9 miles in 13 minutes.
Is the scooter breaking the speed limit?
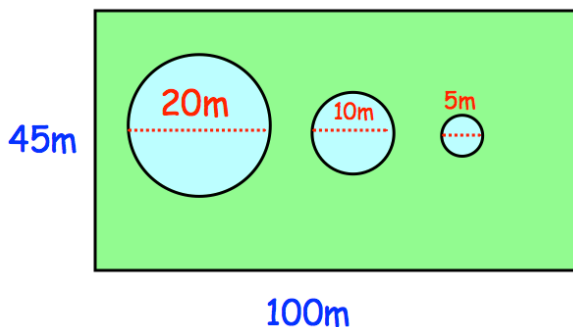
15th August

Corbettmaths

The price (P, in £) of hiring a car is
P = 20d + 70, where d is the number
of days.

Rearrange the formula to make d the
subject

Use your formula to find how many
days a car was hired for if the final
price is £370

Expand

(9 – 2x)(8 – x)

A rectangular lawn is 100m long and
45m wide.
There are 3 circular ponds, with radii
20m, 10m and 5m respectively.
Mrs Jones wants to cover the lawn
with grass seed.
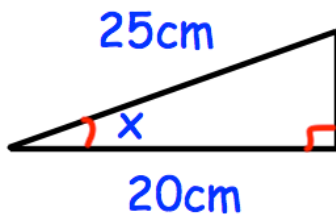Each packet of grass seed covers 5m²
and costs £3.49

How much will it cost Mrs Jones to
cover the lawn with grass seed?

16th August

Corbettmaths

A farmer says he has 2,500 sheep, to the nearest 100.

What is the greatest possible number of sheep he has?

Find x

The bearing of A from B is 025°
Find the bearing of B from A.

A car decreases in value 15% a year.

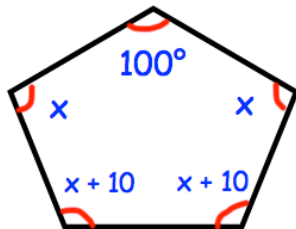If it was bought for £5000, how much will it be worth after 2 years?

A fair coin is flipped three times.
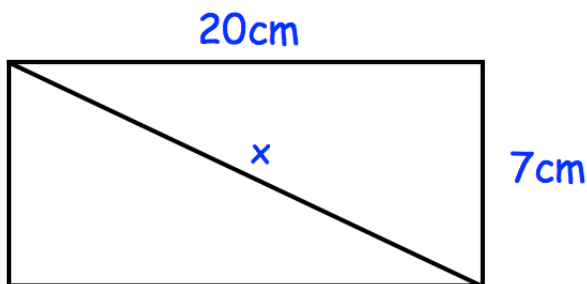Write down the probability of getting three tails.

17th August

Corbettmaths

$\frac{99}{100}, \frac{97}{95}, \frac{95}{90}, \frac{93}{85}, \ldots \ldots$

Find the nth term

100°
x   x
x + 10   x + 10

Find x

20cm
x
7cm

Find the length of the diagonal of the rectangle.

The mass of Earth is 5.97×10^{24}

The mass of Jupiter is 1.898×10^{27}

Work out how many times heavier Jupiter is than Earth.
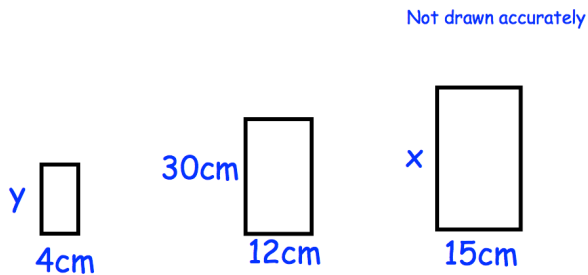Give your answer to one decimal place.

A line has equation y = –4x

Write down the gradient of the line

Write down the y-intercept of the line

18th August

Corbettmaths

Solve the inequality $2x - 1 < 9$

Not drawn accurately

y   4cm

30cm   12cm

x   15cm

The diagram shows three similar rectangles.

Work out the value of x.

Work out the value of y.

Bank of Maths

Double your money in 15 years.

The average annual growth for your investment is 4.5%

Martyn has some money to invest and sees this advert.
Will Martyn double his money in 15 years by investing his money with "Bank of Maths?"

There are 6000 people at an ice hockey match.
The announcer says this is exactly 40% more people that the previous match.

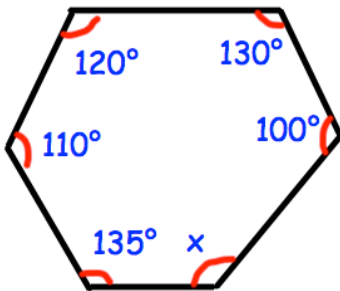Explain why the announcer is incorrect.

19th August

Corbettmaths

Ian truncates a number, y, to one decimal place.

The result is 8.1.

Write down the error interval for y

120°   130°
110°   100°
135°   x

Find x

Solve the inequality $9x + 4 < 5x - 22$

A rectangle has one side 4cm longer than the other. Write an expression for the area.

Write down the equation of the line that is parallel to $y = 5x + 2$ and passes through (0, 7)
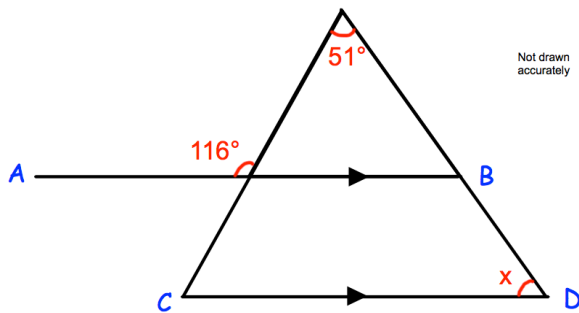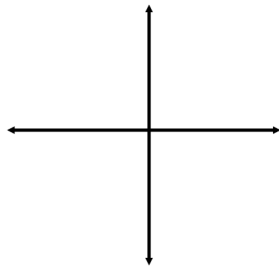
20th August

Use approximations to estimate the value of

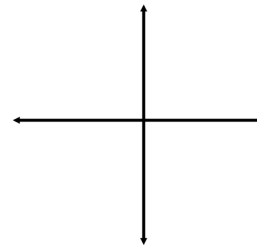$$\frac{4.12 \times 1.89}{0.21}$$

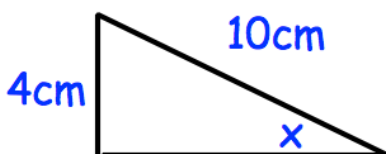In the diagram, AB is parallel to CD.
Work out the size of angle x.

Not drawn accurately

51°

116°

A ———————— B

x

C ———————— D

Sketch y = x³

Sketch $y = \frac{1}{x}$ where x ≠ 0
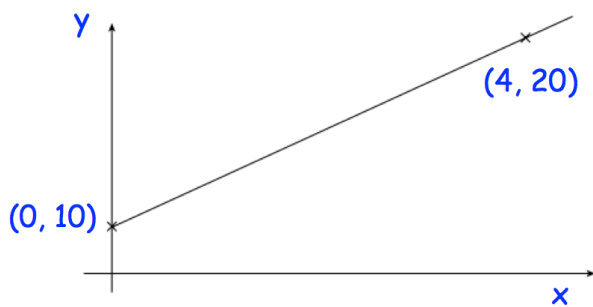
Find the equation of this line

y

(4, 20)

(0, 10)

x

Shown is a right angled triangle.

10cm

4cm
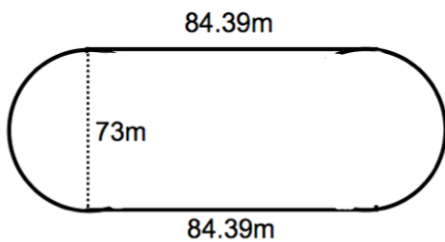
x

Find Angle x.

21st August

Corbettmaths

Expand and simplify

$5(3x + 2) - 4(x - 9)$

Find the area inside the running track.

84.39m

73m

84.39m

Here are the equations of four lines.
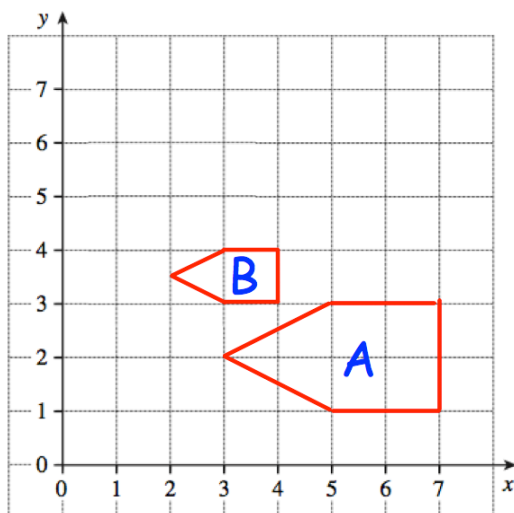
Line 1 $2y = 8x + 6$
Line 2 $x + y = 6$
Line 3 $4x - y = 5$
Line 4 $4x + 2y = 1$

Two of the lines are parallel.

Which lines?

Describe fully the single transformation that maps shape A onto shape B.

Reflect B in the mirror line $y = 5$
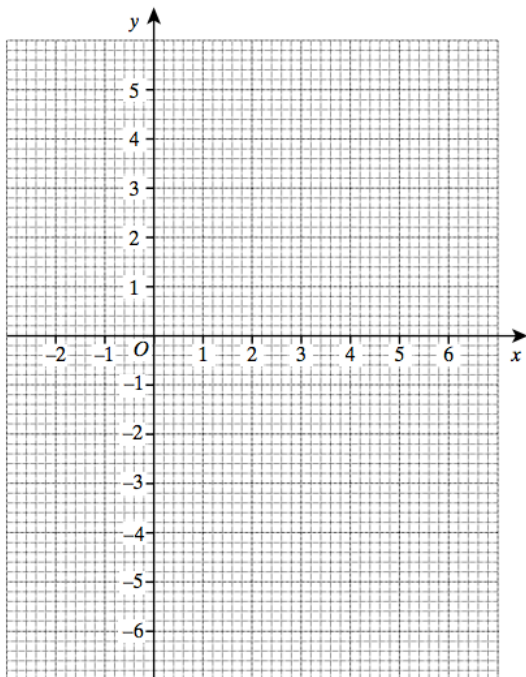
22nd August

Corbettmaths

Solve the simultaneous equations
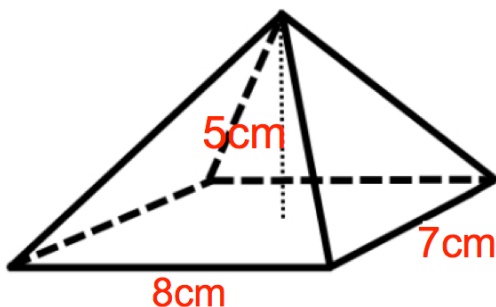
$2x + y = 21$

$x - 2y = 8$

There are 90 cards in a pack.
Each card is red or yellow.
The ratio of the number of red cards to yellow cards is 1:2
10 more yellow cards are added to the pack.

Find the ratio of red cards to yellow cards that are now in the pack.
Give your answer in its simplest form.

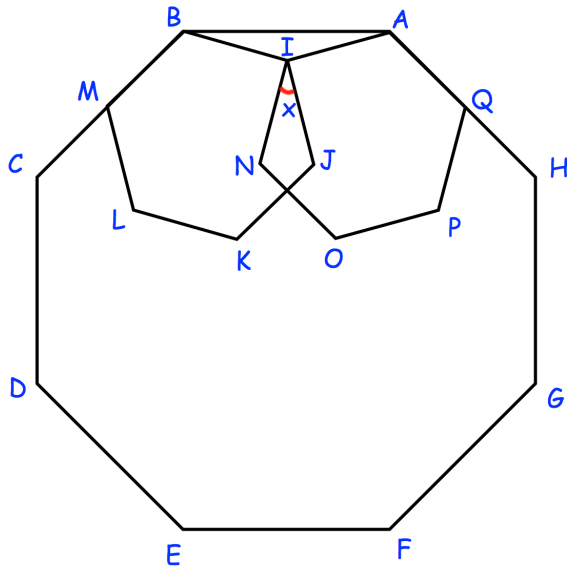On the grid, draw the graph of
$y = x^2 - 4x - 2$

Calculate the volume of the pyramid

5cm
7cm
8cm

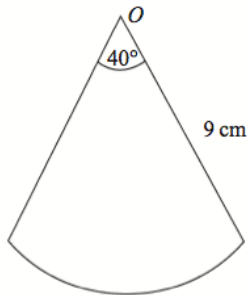

23rd August

Corbettmaths

Martin says 'There is a 30% chance of rain today.'

Tim says 'That means there is a 70% chance of it being sunny today.' Explain why Tim is not correct.

ABCDEFGH is a regular octagon
AQPONI and BIJKLM are congruent regular hexagons.

Find the size of the angle labelled x.

Calculate the area of this sector.

$$\frac{1}{5} \div 2\frac{3}{4}$$
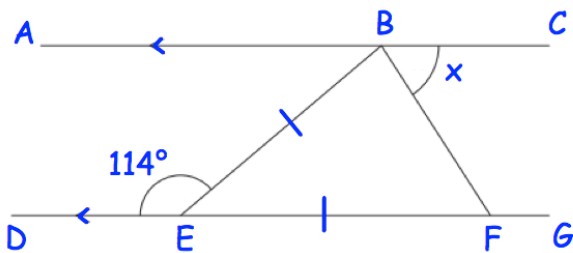
24th August

Corbettmaths

Solve $x^2 - 6x - 27 = 0$

There are 20 students in class 1.
There are 10 students in class 2.

Both classes sit the same test.

The mean mark in class 1 is 70%.
The mean mark in class 2 is 90%

Work out the overall mean for both classes.

FInd the size of the angle x.
Give reasons for your answer.

A drink is made from mixing orange juice and lemonade in the ratio 1:4

Lemonade costs £0.80 per litre.
Orange juice costs £1.50 per litre.

Work out the cost of 4 litres of the drink.

Solve the simultaneous equations
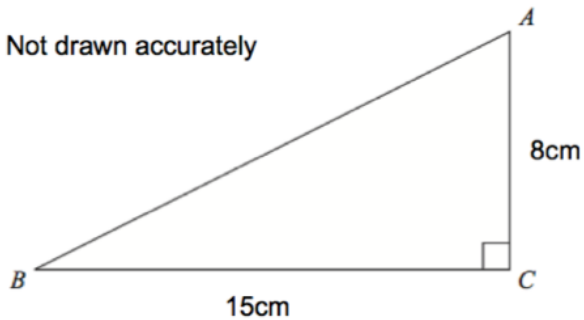
$5x + 3y = 51$
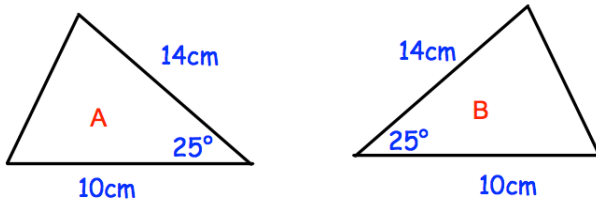$3x + 5y = 37$

25th August

Corbettmaths

Expand and simplify

(3y − 2)(2y + 3)

Not drawn accurately

8cm

15cm

Find the length of AB.
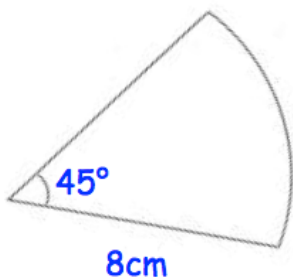

14cm

A

25°

10cm

14cm

B

25°

10cm

State the condition why these triangles are congruent.

Work out

$$\frac{\pi}{6} \div \frac{\pi}{2}$$

Find the perimeter of the sector.

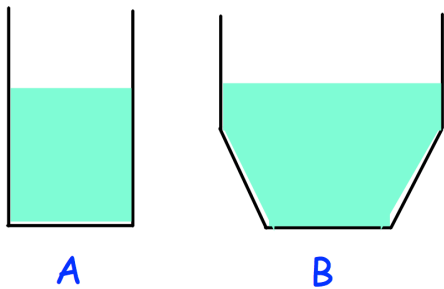45°

8cm

5-a-day

Foundation Plus
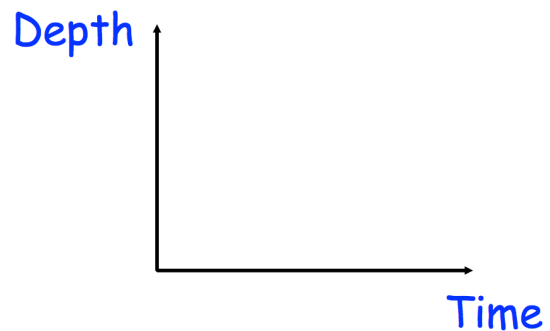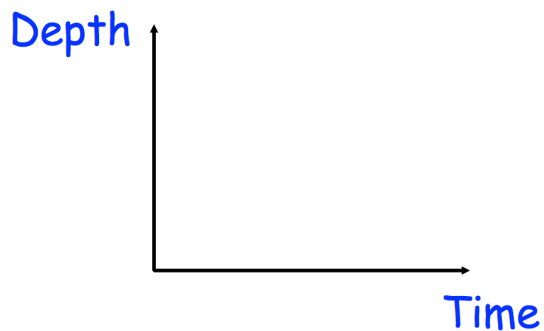
26th August

Corbettmaths

Factorise x² + 9x + 20

Work out the sum of the interior angles for a 40 sided polygon.

A   B

Water pours steadily into containers A and B.
Both containers are empty before the water is poured in.
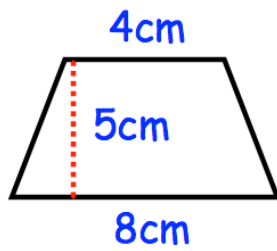Sketch graphs to show the depth of water over time.

Depth

Time

Depth

Time

Which is smaller?

$(x + 3)^2$ or $x^2 + 6x + 7$

27th August

4cm

5cm

8cm

Calculate the area of the trapezium

Expand and simplify

(5y - 2)(2y + 3)

---

x = 10y + 14

Rearrange the formula to make y the subject

A coin is flipped and a dice is rolled.

What is the probability of a tail and a 3

$a = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$ $b = \begin{pmatrix} -2 \\ 1 \end{pmatrix}$
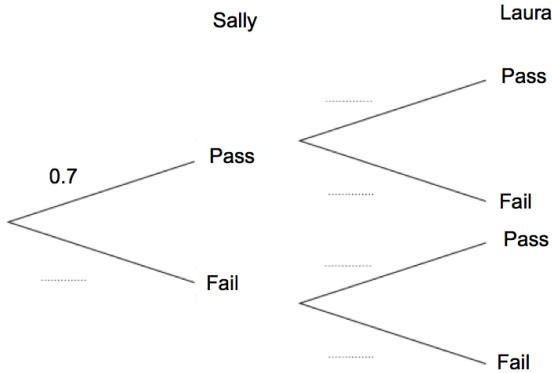
Work out 2a + b

28th August

Corbettmaths

There was 50 club members in June and 72 club members in October.

What was the percentage increase?

Sally   Laura

Pass

Pass

0.7

Fail

Pass

Fail

Fail

Sally and Laura sit their driving tests.

The probability of Sally passing her driving test is 0.7
The probability of Laura passing is 0.8

Complete the tree diagram.

Find the probability of both women failing.

The nth term of a sequence is 6n – 4

The nth term of another sequence is 10n + 2
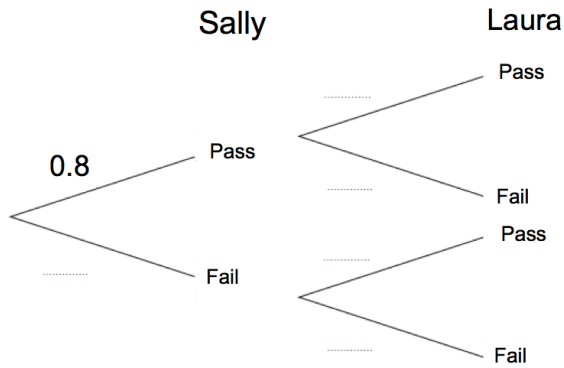
Find any number, less than 150, that are in both sequences

10cm   35°

x
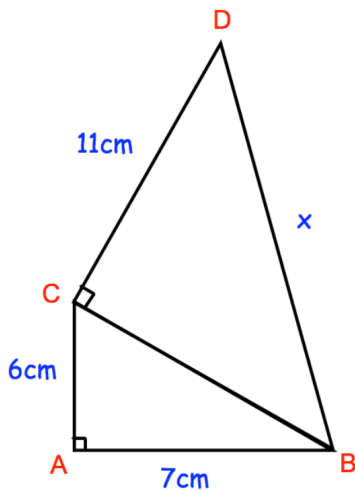
Find x

Name: _____
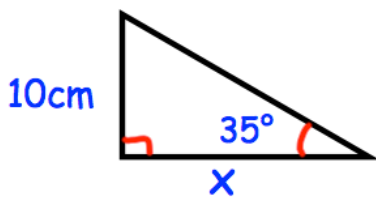
29th August

Corbettmaths

The probability of Sally passing an exam is 0.8
The probability of Laura passing an exam is 0.9

Sally   Laura

```
                                    Pass
                   Pass
         0.8      ╱        ╲
                 ╱          ╲  Fail
                ╱            Pass
                ╲           ╱
         ........  Fail    ╱
                          ╲
                           ╲  Fail
```

Complete the tree diagram

Find the probability that only one girl passes.

D

11cm

x

C

6cm

A   7cm   B

Find the length of DB

James weighed 100kg.
His target was to weigh 80kg or less.
His weight decreased by 3% each month.
Has he achieved his target after six months?
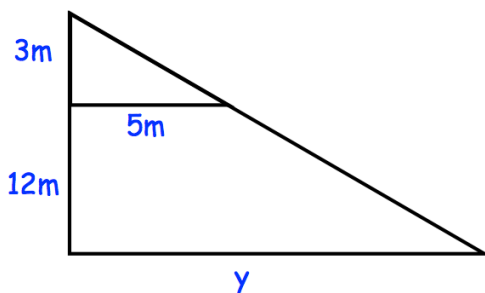Show your workings.

30th August

Corbettmaths

Work out

$$\frac{5}{6} \div 3$$

Work out the Lowest Common Multiple of 24 and 64.

Calculate the pressure if the area is 10cm² and the force is 420N

ξ = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12}
A = {prime numbers}
B = {numbers greater than 8}

Draw a Venn diagram for this information.

Find y

3m

5m

12m
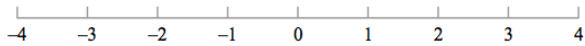
y

31st August

Corbettmaths

Work out an estimate for

$$\frac{(5.14)^2}{0.398}$$

Draw a line to represent x ≥ 2

Solve

3(x − 4) − 2(x − 1) = 3x − 20

Write 50 as a product of primes.
Give your answer in index form.

Write 48 as a product of primes.
Give your answer in index form.

Find the HCF of 50 and 48.

Find the LCM of 50 and 48.