1st August

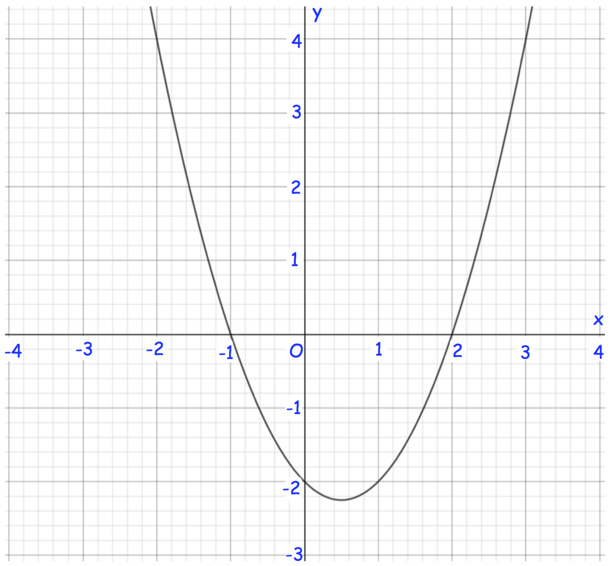
Write down the exact value of *sin 30°*

There are x apples in a crate.
2 of the apples are bad.

Jesse chooses two apples from the crate, without replacement.
The probability that he selects two bad apples is $\frac{1}{28}$

Prove $x^2 - x - 56 = 0$

Find x, the number of apples in the crate



Shown is y = f(x)

Find ff(1)

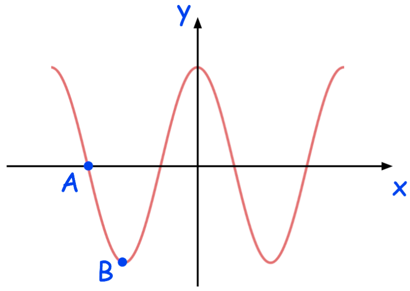
Sketch y = f (x + 3)

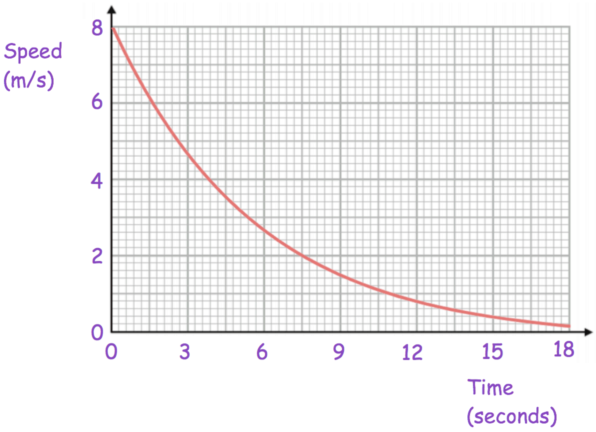
2nd August

Corbettmaths

Here is a sketch of y = cos (x)

Write down the coordinates of point A





Work out an estimate for the distance travelled over the first 12 seconds of the journey.
Use 4 strips of equal width.

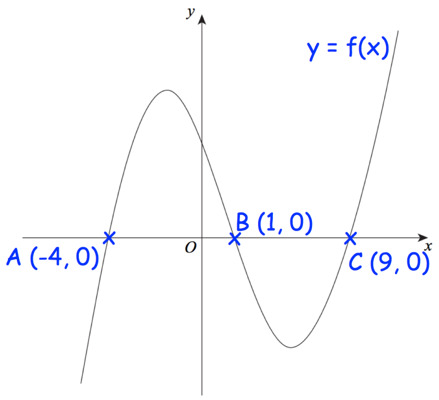
Find the coordinates where the line
$y = x + 8$ and the curve
$y = x^2 + 19x + 80$ intersect

Solve

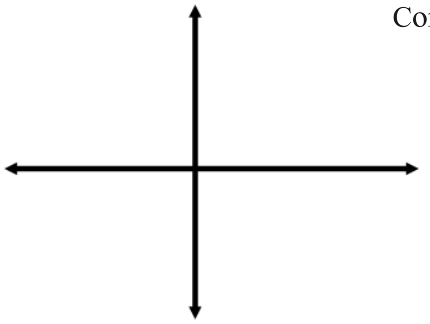
$$\frac{8^{4+x}}{4^{5-x}} = 0.5$$

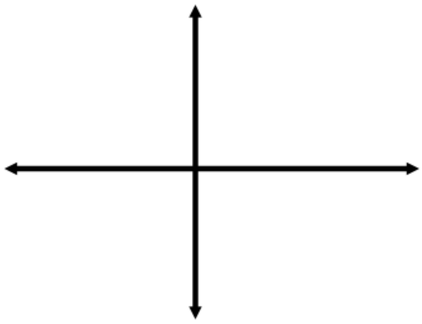
3rd August

Shown is the graph y = f(x)



Sketch
(a) y = f(–x) (b) y = f(x + 3)

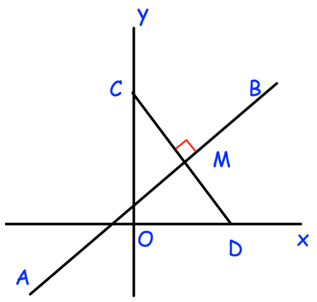




For all values of x

$f(x) = x^2 + 5$
$g(x) = x - 4$

Solve
$fg(x) = gf(x)$



Shown are the straight lines AB and CD.
M is the midpoint of CD
AB is perpendicular to CD and passes through the point M
C is the point (0, 12) and D is the point (6, 0)

Find the equation of AB

B is the point (11, 10)
AM:MB = 5:2

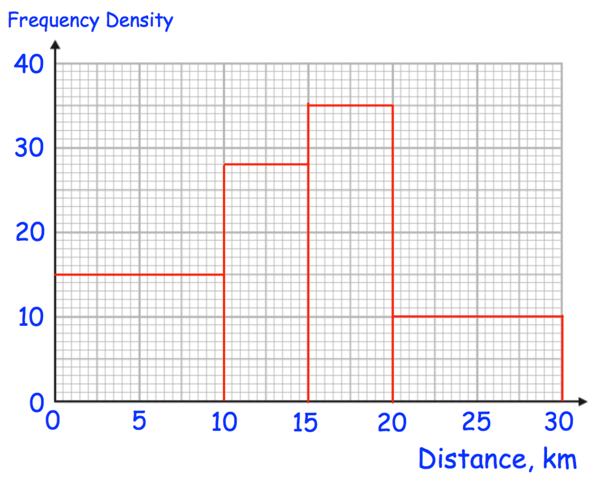
Find the coordinates of the point A

4th August

Corbettmαths

Harry has rounded a number to 10 to one significant figure.

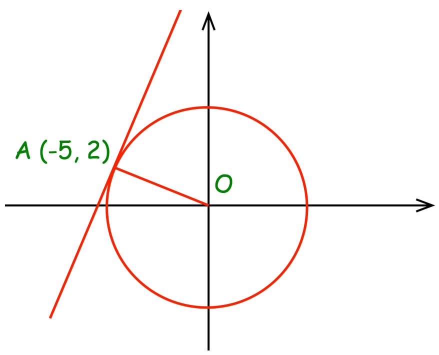
Write down the upper bound and lower bound.



Hannah surveyed students on how far they travel to college

How many students did Hannah survey?

Calculate an estimate of the mean distance travelled



The diagram shows the circle $x^2 + y^2 = 29$ with a tangent at the point (-5, 2)

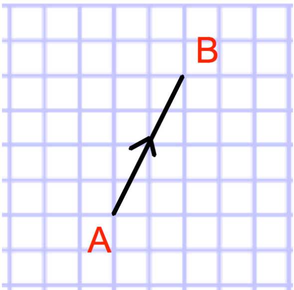
Find the equation of the tangent

The tangent crosses the x-axis at the point B and the y-axis at the point C

Find the length BC

5th August

Corbettmαths



$\overrightarrow{AB} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$

Write down a vector that is perpendicular to AB and twice the length

a is directly proportional to $\sqrt{c}$.
w is inversely proportional to a^3.

When c = 49, a = 35
When a = 2, w = 16.

Find the value of w when c = 4.

The population of birds living on an island is decreasing exponentially.

Martin has begun to monitor the population each year.
Year 6 - Population 8000
Year 8 - Population 4000

What was the population in Year 2?

Two ships, A and B, leave a port at midday.

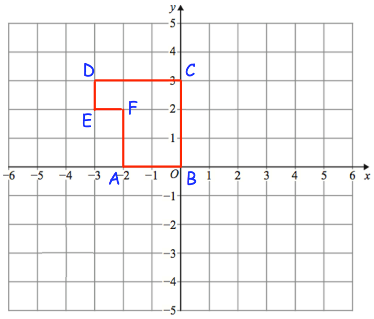
A travels on a bearing of 095° at a speed of 18km/h.
B travels on a bearing of 113° at a speed of y km/h.

At 14:00 the distance between A and B is 30km.
Boat B was travelling at a slower speed than boat A
Work out y, the speed of boat B.

6th August

Evaluate

$16^{-\frac{3}{4}}$



Describe a single transformation so that only vertex F is invariant.

Show that the equation $x^3 + 4x = 8$ has a solution between $x = 1$ and $x = 2$

Show the equation $x^3 + 4x = 8$ can be rearranged to give

$x = \sqrt[3]{8 - 4x}$

Starting with $x_0 = 1$, use the iteration formula $x_{n+1} = \sqrt[3]{8 - 4x_n}$ three times to find an estimate for the solution of $x^3 + 4x = 8$

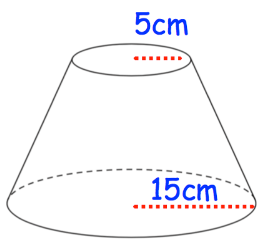
7th August	
A and B are similar cuboids volume of A: volume of B = 8 : 1000 Work out surface area of B: surface area of A	
How many even numbers greater than 40000 can be created using the digits 1 2 5 8 9 using each digit once?	
Find the coordinates where the line $x + y = 3$ and the curve $x^2 + 3y = 27$ intersect	
$\frac{61}{330}$ $0.\dot{1}7\dot{8}$ 3^{-2} $\frac{19}{110}$ Arrange in order from smallest to largest	
A solid metal cube has a side length of 6cm to 2 significant figures. The mass of the cube is 3.2×10^3 grams correct to 2 significant figures.	Work out the upper bound for the density of the metal.

8th August

Simplify

$$(\sqrt{32} + 7\sqrt{2})^2$$

A frustum is made from cutting a small cone from the top of a larger cone.
The larger cone was 21cm tall.



Calculate the surface area of the frustum

Work out the exact answer of

$$\tan 30^\circ + \tan 60^\circ$$

Factorise

$$6x^2 - 35xy + 49y^2$$

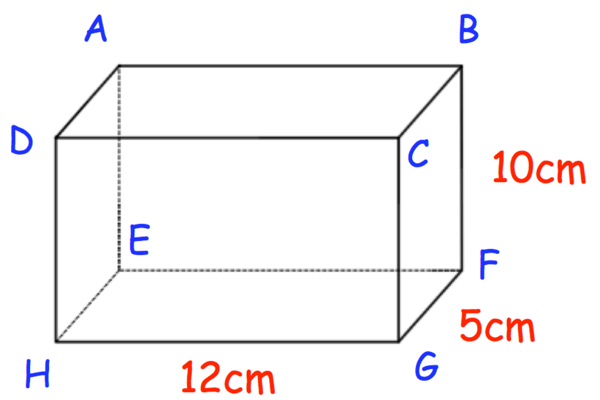
9th August

Corbettmaths

$g(x) = 15 - x \qquad h(x) = x^3$

Solve $gh(x) = 140$

ABCDEFGH is a cuboid



Calculate the length of BH

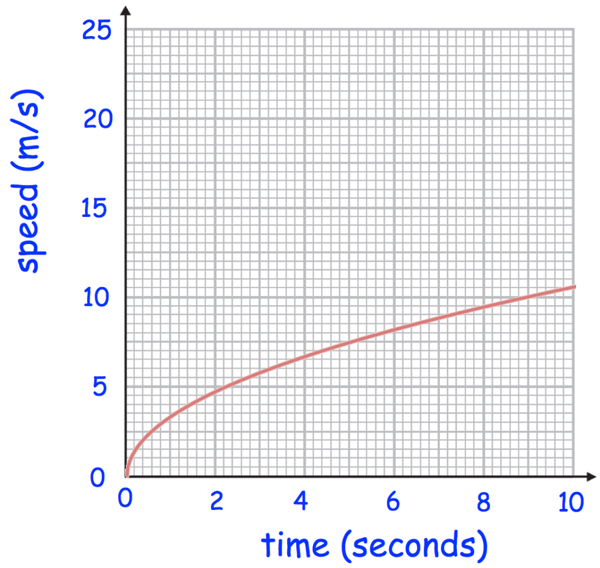
Find the size of angle BHF

Sketch the graph of $y = 2^x$

The nth term of a sequence is
$n^2 - 10n + 30$

By using completing the square, show that every term is positive.

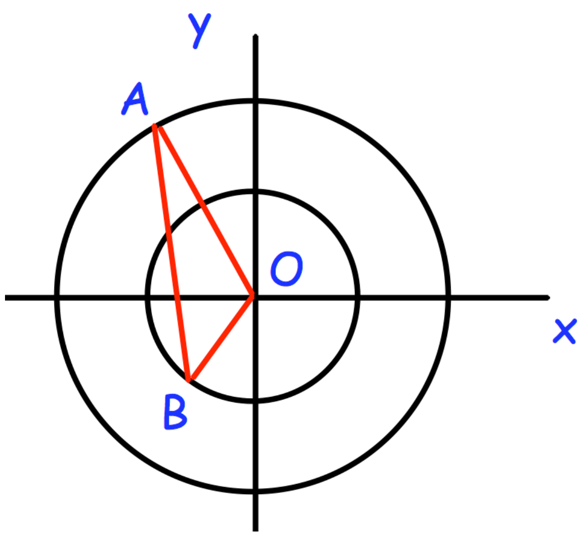
10th August



Shown is the first 10 seconds of the journey of a car

Work out an estimate for the distance the car travels in these 10 seconds

Is your answer an underestimate or an overestimate?
Explain your answer.



A is a point on a circle.
B is a point on another circle with equation $x^2 + y^2 = 36$

radius of the smaller circle : radius of the large circle is 5 : 7

AB = 12

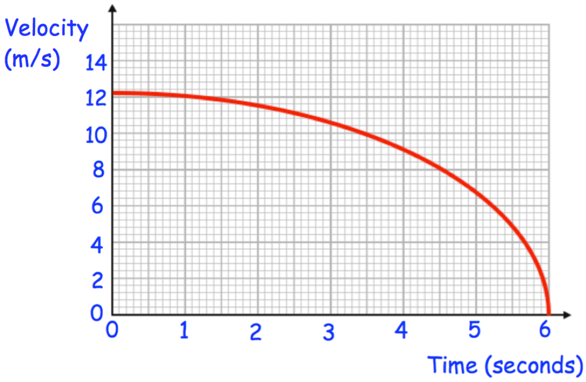
Work out the size of angle AOB

Given

$$(ax + b)(x + 4)(x + c) \equiv 2x^3 + 19x^2 + 49x + 20$$

Find a, b and c

11th August



Here is a velocity-time graph for 6 seconds of a journey.

Work out an estimate for the distance travelled over 6 seconds.
Use 3 strips of equal width.

Make h the subject of

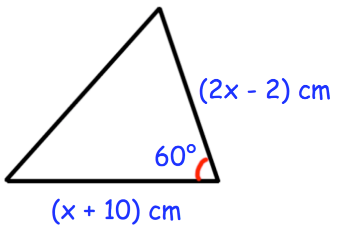
$$\sqrt{\frac{r+h}{4rh}} = V$$

Find the equation of the line that is perpendicular to 2x + 3y = 4 and passes through the point (9, 0)

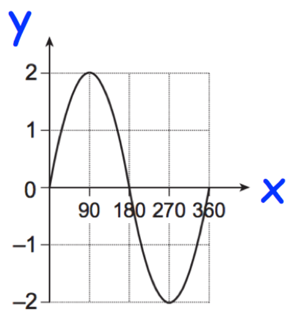
Solve

$$8^{4x+1} - 16^{x-1} = 0$$

12th August

Write as a fraction $64^{-\frac{2}{3}}$	
Donald saves some of his pocket money each week. He saves 8p in week 1, 16p in week 2, 26p in week 3, 38p and so on for 20 weeks.	Find the amount he saves in week 20.
	The area of the triangle is $90\sqrt{3}$ cm² Work out the value of x.
The circle C has equation $x^2 + y^2 = 4$ The circle is reflected in the line $y = 2$ to give circle D Circle D is translated by the vector $\begin{pmatrix} -1 \\ 0 \end{pmatrix}$ to give circle E	Draw a sketch of circle E Write down the coordinates of the centre of circle E.

13th August



Write down the equation of the curve shown

$f(x) = x^2 + 3x + 8$

show that

$f(x + 1) - f(x) = 2x + 4$

Solve the inequality
$2x^2 + 9x + 10 > 0$

Hannah has some coins.

Hannah has to pay £2.40 for a coffee.
She picks 3 coins at random, without replacement, from her pocket.

Work out the probability that she has chosen enough money to pay for the coffee.

14th August

Corbettmaths

Simplify fully

$$\frac{6}{(x-5)(x-3)} + \frac{x}{x-3}$$

$$x_{n+1} = -3 - \frac{5}{x_n^2}$$

Starting with $x_0 = -4$

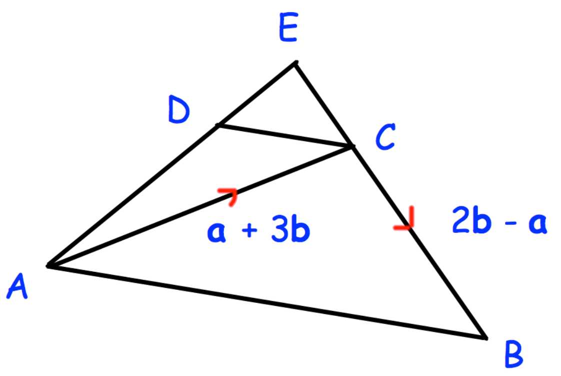
Find x_1 , x_2 and x_3

Explain the relationship between the values of x_1 , x_2 and x_3 and the equation $x^3 + 3x^2 + 5 = 0$

A is directly proportional to the cube root of B.
B is increased by 60%.
Work out the percentage increase in A.

The distance between the points (1, 2) and (16, p) is 17.
Find the possible values of p.

15th August



$\overrightarrow{EC} = \frac{1}{5}\overrightarrow{CB}$

$\overrightarrow{DE} = \frac{1}{5}a$

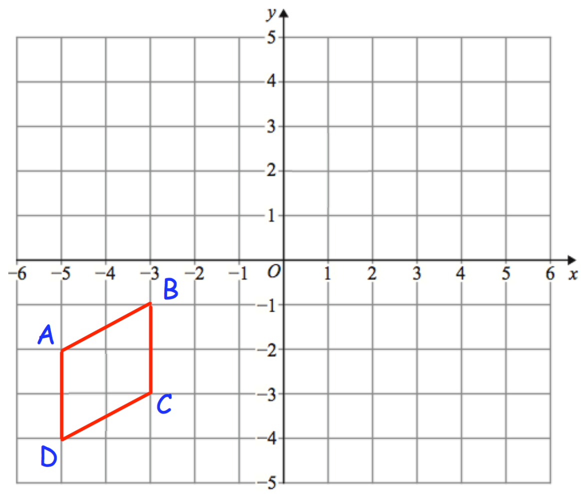
Find the vector $\overrightarrow{AB}$

Prove DC is parallel to AB

Here is quadrilateral ABCD

ABCD is reflected in the line $x = -1$ followed by a reflection in the line $y = -x$ followed by a rotation of 180° about $(-1, -1)$

Which of the vertices are invariant?



A = {2, 3, 4, 5, 7}

B = {2, 3, 5, 9}

Find P(A’ ∪ B’)

16th August

A car travelled for 100 minutes, to the nearest 5 minutes.
It travelled for a total distance of 100 km, to the nearest 10km

Work out the greatest possible average speed, in m/s

Height (h cm)	Frequency
$110 < h \leq 120$	8
$120 < h \leq 130$	16
$130 < h \leq 140$	25
$140 < h \leq 150$	32
$150 < h \leq 160$	19

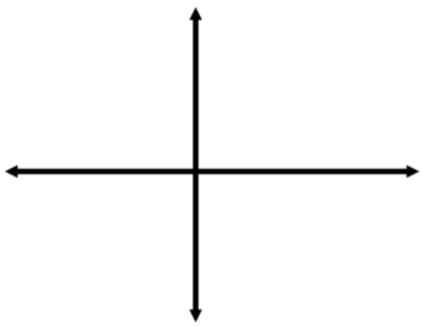
Calculate an estimate of the upper quartile

Solve $2x^2 - x - 6 < 0$

Circle A has equation $x^2 + y^2 = 9$ is translated by the vector $\begin{pmatrix} 0 \\ 2 \end{pmatrix}$ to give Circle B

Sketch Circle B

Label the centre of B and the points of intersection with the x-axis

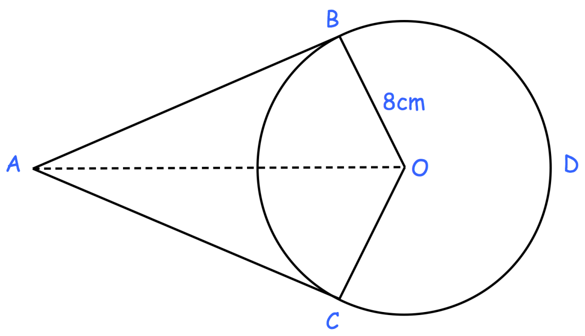


17th August

Corbettmaths

Expand

$(3 + \sqrt{2})(1 - \sqrt{2})$

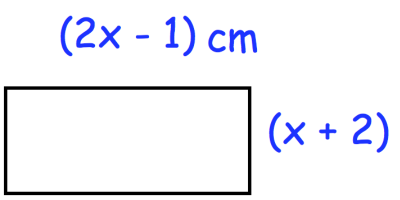


B, C and D are points on a circle of radius 8cm.
AB and AC are tangents to the circle.
AO = 11cm

Work out the length of arc BDC

Work out the area of sector BOC

The area of the rectangle is greater than 10cm²

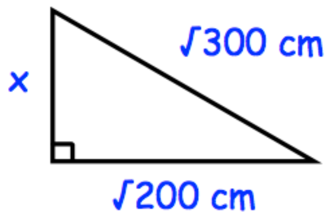


Work out the range of possible values of x

18th August

Find the nth term of the quadratic sequence with the first four terms

10 33 64 103 ….



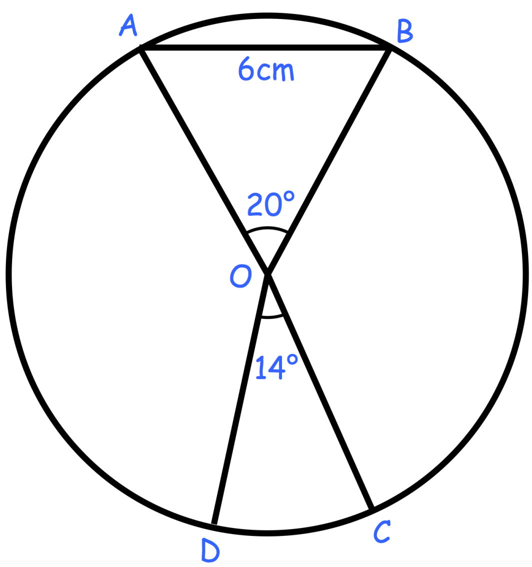
Find x

$(x + 2)(x^2 – ax – 4)$

is expanded and simplified

The coefficient of x is 6 times the coefficient of x^2

Find a

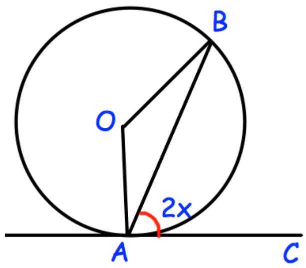


Which has the greatest area, triangle OAB or sector ODC?

19th August

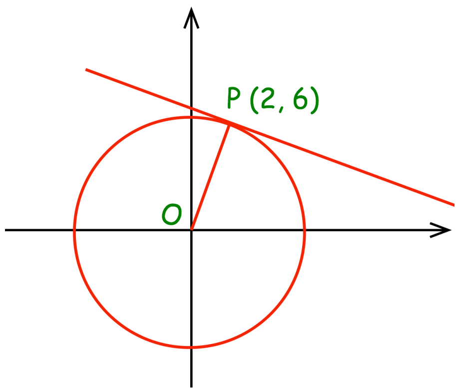
Show using algebra

$$1.0\dot{2}\dot{4} = 1\frac{4}{165}$$



A and B are points on the circumference of a circle, centre O.
CA is a tangent to the circle.
Angle CAB = 2x

Prove that angle AOB = 4x
Give reasons for each stage of your working.



The diagram shows the circle $x^2 + y^2 = 40$ with a tangent at the point (2, 6)

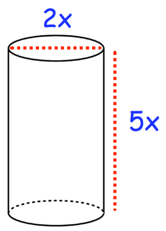
Find the area of the circle

Find the equation of the tangent

20th August

Corbettmαths

The cylinder has a surface area of 972π cm².
Find x.

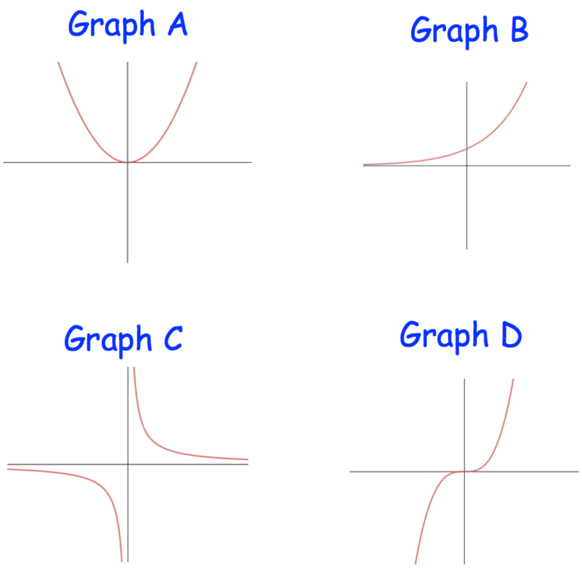


Simplify fully

$$\frac{x^3 - x}{x + 2} \div \frac{x^2 - x}{x^2 - 5x - 14}$$

$$\frac{81^y}{3^{y-5}} = 3\sqrt{3}$$

Find y



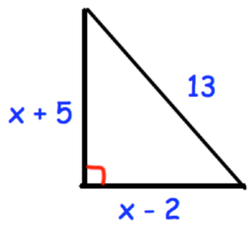
$y = x^2$ is graph **A**

$y = x^3$ is graph ……..

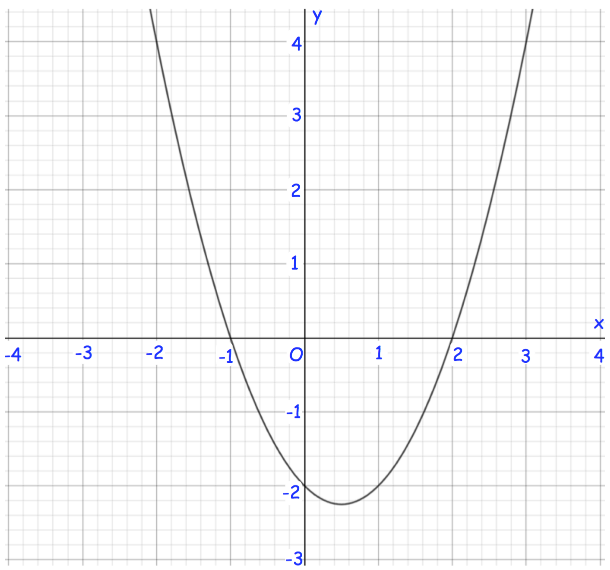
$y = 2^x$ is graph ……..

$y = \frac{1}{x}$ is graph ………

21st August



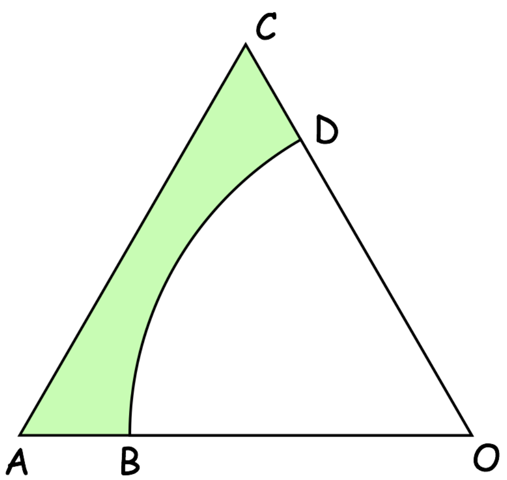
Find x



Shown is $y = x^2 - x - 2$

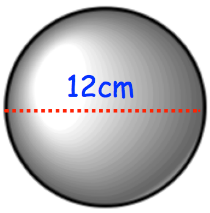
By drawing an appropriate straight line, use your graph to find estimates for the solutions of $x^2 - 2x - 1 = 0$

Calculate an estimate for the gradient of the graph $y = x^2 - x - 2$ at the point where $x = 1$

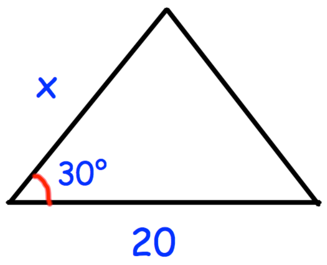


AOC is an equilateral triangle of side length 14cm.
OBD is a sector of a circle with centre *O* and radius 11cm.

Calculate the area of the shaded region as a percentage of the area of triangle AOC.
Give your answer correct to 3 significant figures.

22nd August	Corbettmaths
Given $2^y = \frac{1}{16}$ Find y	
Show the equation $x^2 - 5x + 1 = 0$ can be written in the form $x = 5 - \frac{1}{x}$	
Starting with $x_0 = 3$, use the iteration formula $x_{n+1} = 5 - \frac{1}{x_n}$ twice to find an estimate of the solution of $x^2 - 5x + 1 = 0$	
Here are the first 5 terms of a quadratic sequence 3 9 17 27 39 Find an expression, in terms of n, for the nth term of this quadratic sequence	
A solid sphere has a diameter of 12cm. The sphere is made from glass. The density of the glass is 3.15g/cm³ Find the mass of the glass sphere.	

23rd August

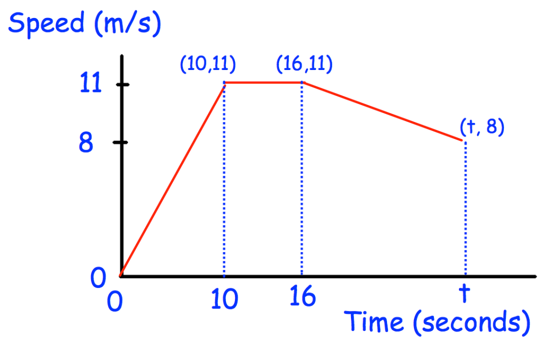


Find the area of the triangle in terms of x.

Given

$$y = \frac{5\sqrt{3}}{2}$$

Write an expression for y^3



The average speed from 0 to t seconds was 8.725m/s

Find t

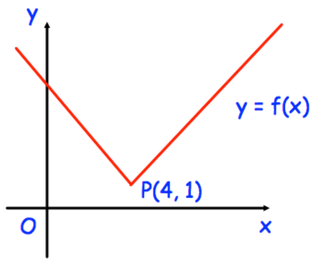
Find the deceleration for the final stage of the journey

The point (–5, 1) is the turning point of the graph of $y = x^2 + ax + b$

Find a and b

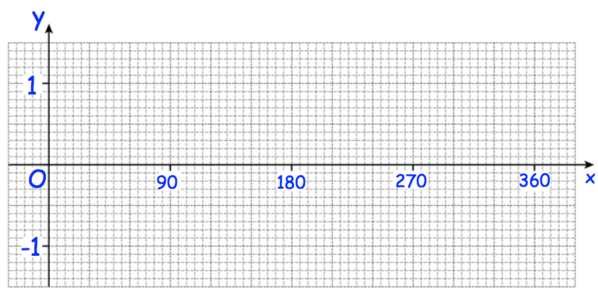
24th August

Solve $x^2 - 8x + 15 \leq 0$



What are the coordinates of the new position of P when the graph $y = f(x)$ is transformed to the graph of $y = -f(x)$?

Sketch the graph of $y = \sin x$ for $0 \leq x \leq 360$.



The cost of two TVs are in the ratio x:y

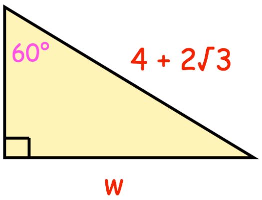
When both prices are increased by £40, the ratio is 13:20

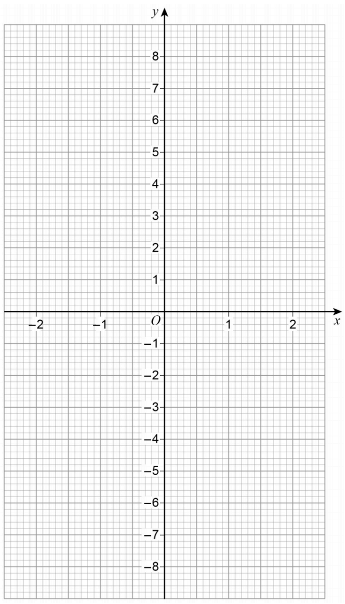
When both prices are decreased by £100, the ratio is 8:15

Find the values of x and y

25th August

Find the exact length of the side labelled w

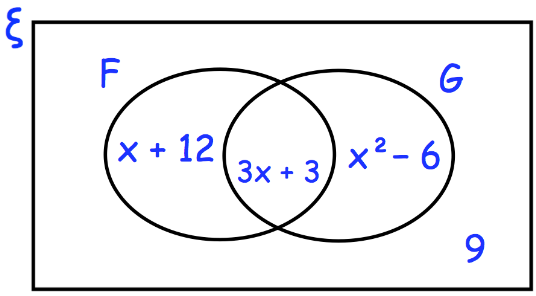




$$f(x) = \frac{x+1}{3}$$

Draw

$$y = f^{-1}(x)$$



The Venn diagram shows information about the languages studied by 50 students.

ξ = 50 students
F = studies French
G = studies German

Find how many students study both languages

A student is chosen at random.
They study German.
Work out the probability they also study French

26th August

Corbettmaths

Weight (x kg)	Frequency
$60 < x \leq 64$	10
$64 < x \leq 68$	20
$68 < x \leq 72$	30
$72 < x \leq 76$	15
$76 < x \leq 80$	18
$80 < x \leq 84$	7

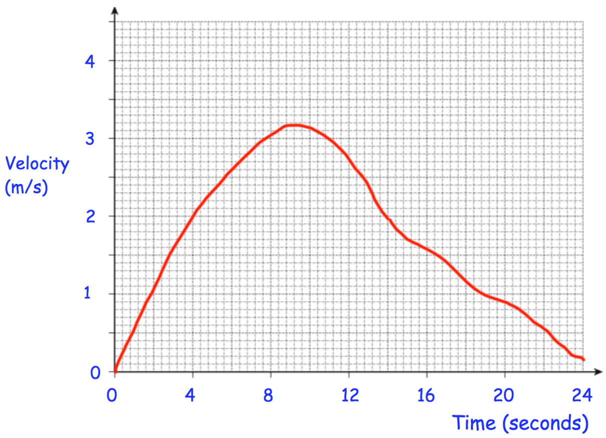
The weights of some rugby players are recorded in the table.

Find the median by using linear interpolation.

Two players are chosen at random. Calculate the probability that both players are over 68kg

$$\sqrt{45} + x\sqrt{20} = 7\sqrt{5}$$

Find x



Here is a velocity-time graph of a particle for 24 seconds

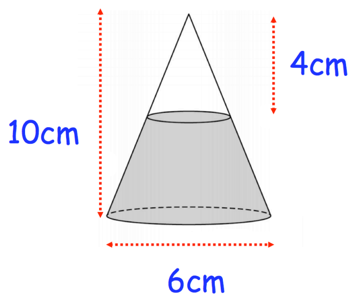
Calculate an estimate of the acceleration at 8 seconds

Calculate an estimate of the acceleration at 16 seconds

27th August

Write as a power of 2

$$\sqrt[4]{32}$$



Find the volume of liquid in the container

Find the coordinates of the minimum point of the curve with equation

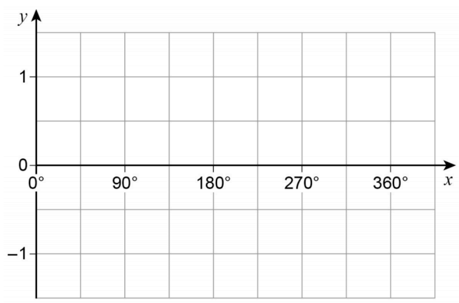
$y = x^2 - 6x + 7$

Express in the form $a\sqrt{7} + b$

$$\frac{\sqrt{7}+1}{\sqrt{7}-3}$$

$f(x) = x + 90$
$g(x) = \cos x$

Draw $y = gf(x)$

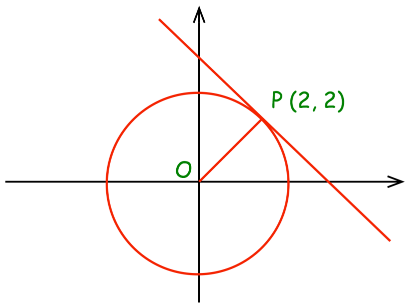


28th August

Corbettmaths

Simplify fully

$$\frac{3cos(45°) - sin(45°)}{tan(30°)}$$



Show is the circle $x^2 + y^2 = 8$

Find the equation of the tangent

In year 7 there are 20% more girls than boys.

$\frac{3}{20}$ of the girls are left handed

$\frac{1}{4}$ of the boys are left handed

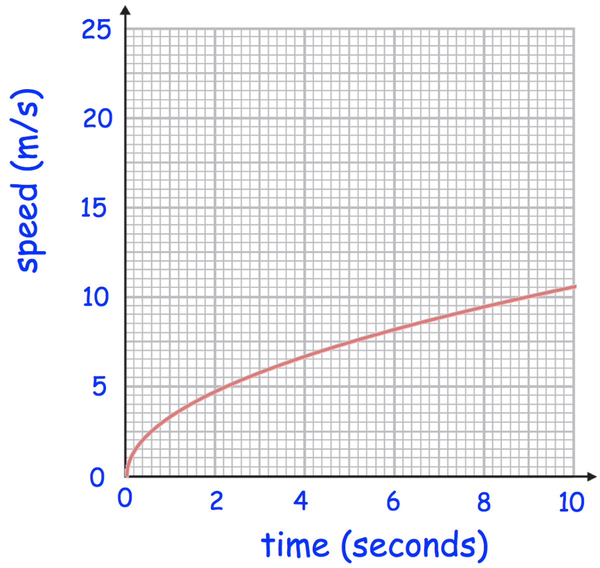
43 of the students in year 7 are left handed.

Find how many students are in year 7

Two ships, A and B, leave a port at midday.
A travels on a bearing of 085° at a speed of 18km/h.
B travels on a bearing of 113° at a speed of y km/h.
At 14:00 the distance between A and B is 30km.
Boat B was travelling at a slower speed than boat A
Work out y, the speed of boat B.

29th August

Corbettmaths

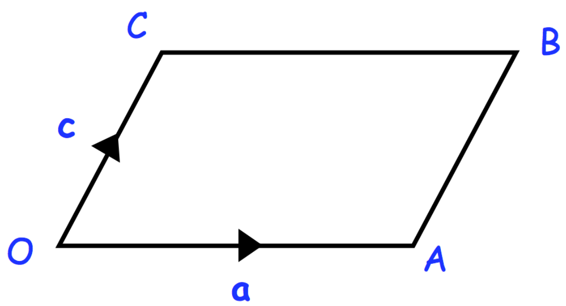


Shown is the first 10 seconds of the journey of a car

Work out an estimate for the acceleration of the car at t = 1.

Work out an estimate for the acceleration of the car at t = 9.

Write down the coordinates of the minimum point of the curve with equation $y = 2x^2 - 6x + 11$



OABC is a parallelogram

$\overrightarrow{OA} = a \quad \overrightarrow{OC} = c$

Y is the midpoint of AC
OAD is a straight line where
OA:AD = m : 1

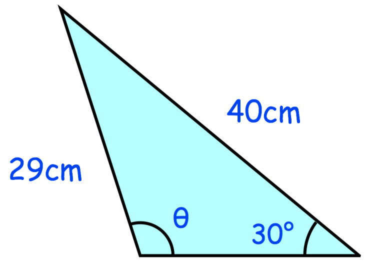
Given that

$$\overrightarrow{YD} = 7a - \frac{1}{2}c$$

Find the value of m

30th August

Corbettmaths



Find the two possible values of θ

Write down the equation of the tangent to the circle $x^2 + y^2 = 25$ at the point (3, 4)

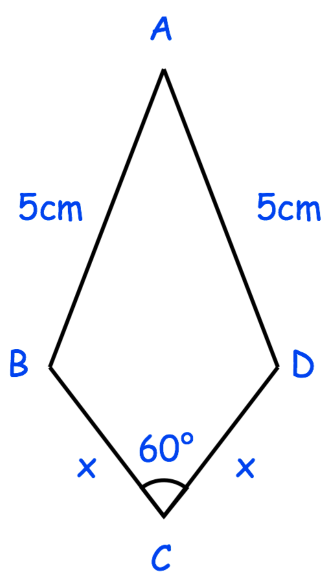
There are 9 counters in a bag.

5 of the counters are red
4 of the counters are white.

Tom takes at random three counters from the bag.

Work out the probability that the counters are all the same colour.

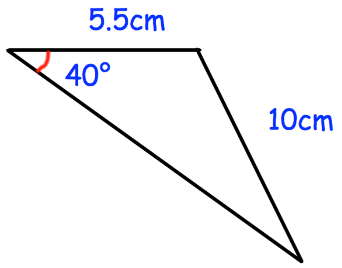
Shown is kite ABCD



Prove

$$CosBAD = 1 - \frac{x^2}{50}$$

31st August

C has coordinates (–6, 2) D has coordinates (–2, –6) E has coordinates (1, 3) Find the equation of the line perpendicular to CD and passing through E.	Give your answer in the form $ax + by + c = 0$, where a, b and c are integers.
The speed limit on a road is 50km/h It took Sam 60 seconds, correct to the nearest 5 seconds, to drive along a road that is 780m long, correct to 2 significant figures.	Could Sam have broken the speed limit?
	Calculate the area of the triangle
Find the coordinates of the points where the line $x + 5y = 37$ and the curve $y = x^2 + x + 2$ meet.	
Prove $(4n + 1)^2 – (2n – 1)$ is an even number for all positive integers values of n.	

