What is the cosine rule?

If f(x) is a function and g(x) is a function.
what does fg or fg(x) mean?

{e.g if f(x)=4x and g(x)=x+3}

What is the Fibonacci sequence and how is it calculated?

If f(x) is a function and g(x) is a function.
what does fg(3)mean?

{e.g if f(x)=2x+10 and g(x)=10-x}

What is the quadratic formula?

What is the sine rule?

If f(x) is a function.
what does f(a) mean?

e.g if f(x)=3x+2

What is the formula for the area of a non right angled triangle?

Substitute g(x) into the function f(x).

{therefore fg(x)= 4(x+3)=4x+12}

$a^2 = b^2 + c^2 - 2ab\ \cos A$

$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$

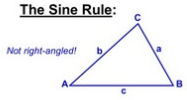
Substitute 3 into g(x) first and then substitute that answer into f(x)

{therefore g(3)= 10-3=7 then sub 7 into f(x)
f(7)=2(7)+10=**24**}

1 1 2 3 5 8 13 21

You add the previous 2 terms together to get the next

The Sine Rule:



In any triangle *ABC* $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

or $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

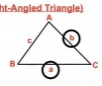
The Quadratic Formula ...

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

For Quadratic Equations
$ax^2 + bx + c = 0$

Area of a Triangle (Non Right-Angled Triangle)

Area = $\frac{1}{2}$ a b SinC



This formula finds the area of a non right-angled triangle from 2 sides

Substitute a into the function.
therefore f(a)=3a+2

If you calculate the maximum possible value of
A x B
given both A and B have been rounded.

Which values would you use?

What are the steps to show 0.23 recurring is equivalent to 23/99?

If you calculate the maximum possible value of A divide B
given both A and B have been rounded.

Which values would you use?

What is the general formula
when a is proportional to g?

If you calculate the minimum possible value of A divide B
given both A and B have been rounded.
Which values would you use?

What is the general formula when m is proportional to the square n?

What are the steps to show 0.5 recurring is equivalent to 5/9?

What is the general formula when m is inversely proportional to the n?

1) make x=0.23232323...
2) multiply to make the recurring decimals the same (e.g. 100x=23.23232323...)
3) Subtract the two (e.g 99x=23)
4) divide (e.g. x=23/99)

Upper bound for A
multiplied by
upper bound for B

a=kg
k is a constant

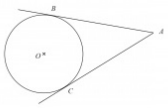
Upper bound of A
divided by
Lower bound of B

m=kn squared
k is a constant

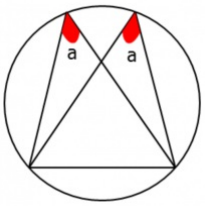
Lower bound of A
divided by
upper bound of B

m=k/n
k is a constant

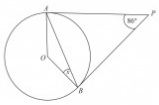
1) make x=0.5555555...
2) multiply to make the recurring decimals the same (e.g. 10x=5.55555...)
3) Subtract the two (e.g 9x=5)
4) divide (e.g. x=5/9)



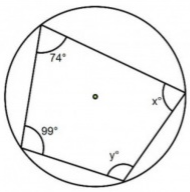
List 3 things you know about this diagram



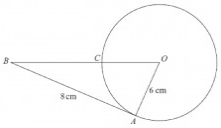
Which circle theorem indicates the two a angles are equal



What is the method to find x?
First list what you know.

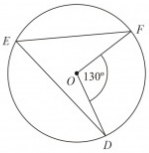


Which circle theorem will find x and y?



Which circle theorem is needed to calculate C?

What is the sine ratio?



Which circle theorem will allow you to work out angle E?

What is the cosine ratio?

angles subtended by the **same chord** are **equal**
OR
Angles in the **same segment** are **equal**.

bold writing are key words that must be included in answer

BA and CA are tangents to the circle.

BO and CO are radiis of the circle (hence equal)

angle OCA and OBA are right angles

Opposite angles in a **cyclic quadrilateral** add up to 180°

bold writing are key words that must be included in answer

1) Know PBO and PAO are right angle triangles.
2) Know AOB is an isosceles triangle
3) Using the Triangle OPB, 43+90+half of O=180 degrees
4) Half of O is 47. Thus angle AOB=94 degrees
5) Isosceles triangle with AOB at 94 degrees (180-94 then halved)
6) x=43 degrees

$$\sin(\theta) = \frac{opp}{hyp}$$

theta is the angle

hypotenuse is the longest length

The **tangent** of a circle and the **radius** meet at **right angles/90 degrees**

bold writing means words must be included in answer

$$\cos(\theta) = \frac{adj}{hyp}$$

theta is the angle

hypotenuse is the longest length

Angle at **centre is twice** angle at **circumference**

bold writing are key words that must be included in answer

What is the tan ratio?

$\frac{\sqrt{a}}{\sqrt{b}}$ *simplify these surds*

$(a + \sqrt{b})(a - \sqrt{b})$

Expand and simplify this.

What is the exact value of Cos (90)?

$\sqrt{a} + \sqrt{b}$

Simplify these surds

What is the exact value of sin(30) and cos (60)?

$\sqrt{a} \times \sqrt{b} =$

Simplify these surds

What is the exact value of sin(45) and cos (45)?

$$\frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$$

$$\tan(\theta) = \frac{opp}{adj}$$

theta is the angle

cos (90)=0

$(a + \sqrt{b})(a - \sqrt{b})$

$= a^2 + a\sqrt{b} - a\sqrt{b} - b$

$= a^2 - b$ *difference of two squares!*

sin (30)=1 / 2
and
cos (60)=1 / 2

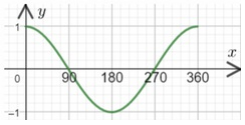
$\sqrt{a} + \sqrt{b}$ - can't simplify!

$$\frac{\sqrt{2}}{2}$$

is sin (45) and cos (45)

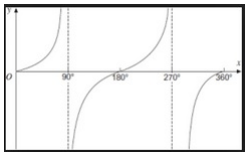
$$\sqrt{a} \times \sqrt{b} = \sqrt{ab}$$

What is the exact value of sin(60) and cos (30)?



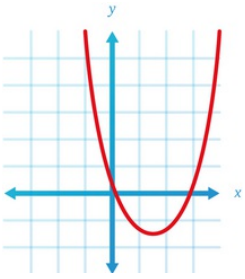
what is this graph?

What is the exact value of sin(90) and cos (0)?

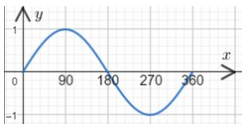


what is this graph?

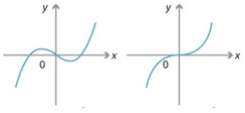
What is the value of tan(45)?



what is this graph?



what is this graph?



what is this graph?

cos curve
y=cos(x)

$\frac{\sqrt{3}}{2}$ is sin(60) and cos (30)

tan curve
y=tan(x)

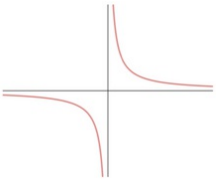
sin(90)=1
and
cos (0)=1

A quadratic graph
y=x squared

tan(45)=1

A cubic graph
y= x cubed

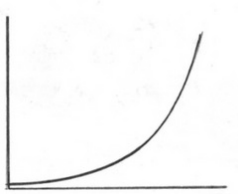
Sine curve
y=sin(x)



what is this graph?

x^{-m}

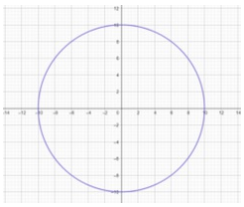
is equal to



what is this graph?

$x^{1/n}$

is equal to



What is this graph?

$x^{a/n}$

is equal to

x^{0}

is equal to

What is the volume of a prism?

$\frac{1}{x^m}$	A reciprocal graph y=1/x
$\sqrt[n]{x}$	$y = a^x$ An exponential graph
$\sqrt[n]{x^a}$	$x^2 + y^2 = r^2$ A circle graph
Volume of prism=Cross sectional area x length	1 **anything to the power of zero equals 1**

What is the volume of any pyramid?
(e.g. square based, triangular based, circular based aka cone)

What is the Pythagoras theorem?

What is the volume of a sphere?

$1m^2 = ?\ cm^2$

How do you calculate the area of a sector?

$1ml = ?\ cm^3$

What is formula for the arc of a sector?

$1m^3 = ?\ l$

$a^2 + b^2 = c^2$

Volume of pyramid=base area x height x 1/3

$1m = 100cm$
$\therefore 1m^2 = 100^2 cm^2$
$= 10000cm^2$

(hint: the power of the units tells you what to do)

Volume of Sphere
$= \frac{4}{3}\pi r^3$

$1ml = 1cm^3$

$area = \pi r^2 \times \frac{\theta}{360}$

r= radius
theta is angle

Area is the same as a circle multiplied by proportion of the circle

$1m^3 = 1l$

$arc = 2\pi r \times \frac{\theta}{360}$

r=radius
theta= angle

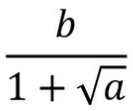
Arc is the circumference of a circle multiplied by proportion of the circle

$1m^3 = ?\ cm^3$

If y=f(x)
how does the transformation
y=f(x+a)
affect the function?

How would you rationalise this surd?

If y=f(x)
how does the transformation
y=af(x)
affect the function?



How would you rationalise this surd?

If y=f(x)
how does the transformation
y=f(ax)
affect the function?

If y=f(x)
how does the transformation
y=f(x) +a
affect the function?

$x^2 + bx + c$

Complete the square

all x values decrease by a (or increase if -a)

Graph moves to the left a places (or right if -a)

$$1m = 100cm$$
$$\therefore 1m^3 = 100^3 cm^3$$
$$= 1000000cm^3$$

(hint: the power of the units tells you what to do)

all y values are multiplied by a

Graph is stretched by a scale factor of a in the y axis

$$\frac{A}{\sqrt{B}} x \frac{\sqrt{B}}{\sqrt{B}} = \frac{A\sqrt{B}}{B}$$

and simplify

all x values are multiplied by 1/a

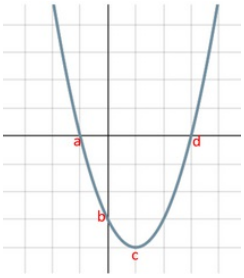
Graph is stretched by a scale factor of 1/a in the x axis

$$\frac{b}{1+\sqrt{a}} \times \frac{(1-\sqrt{a})}{1-\sqrt{a}}$$
$$= \frac{b(1-\sqrt{a})}{1-\sqrt{a}}$$ and simplify

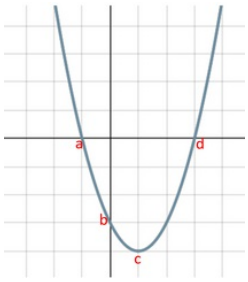
$$x^2 + bx + c = (x + \frac{b}{2})^2 - \left(\frac{b}{2}\right)^2 + c$$

all y values increase by a (or decreases if -a)

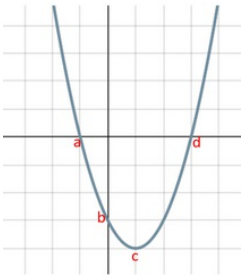
Graph moves up a places (or down if -a)



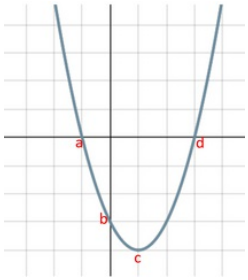
Which letter/s represents the y intercept?



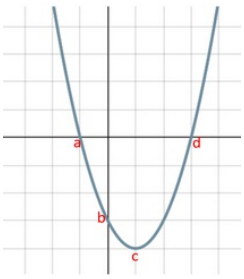
Which letter/s represents the turning point?



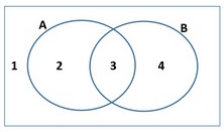
Which letter/s represents the x intercept?



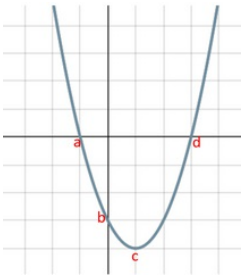
Which letter/s represents the line of symmetry?



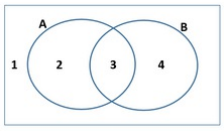
Which letter/s represents the roots?



Which region is represent by P(B)?



Which letter/s represents the minimum point?



Which region is represent by P(A)'?

c
this is also the minimum point
or
where the line of symmetry is drawn

b

c
this is also the minimum point
or
the turning point

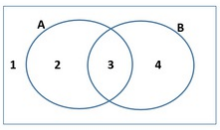
a and d
these are also the roots

shade 3 and 4

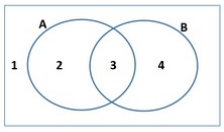
a and d
these are also the x intercept

shade 1 and 4

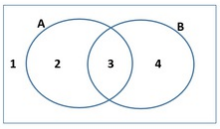
c
this is also the turning point
or
where the line of symmetry is drawn



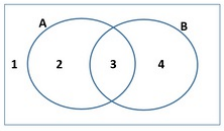
Which region is represent by P(AuB)?



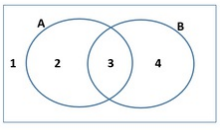
Which region is represent by P(AnB')?



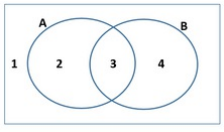
Which region is represent by P(AnB)?



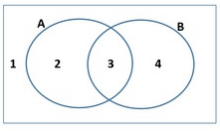
Which region is represent by P(AuB)'?



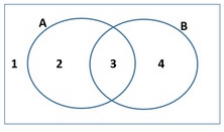
Which region is represent by P(B')?



Which region is represent by P(AnB)'?



Which region is represent by P(A'nB')?



Which region is represent by P(BnA')?

shade 2

shade 2,3 and 4

shade 1

shade 3

shade 1,2 and 4

shade 1 and 2

shade 4

shade 1

What is the relationship between perpendicular gradients?	How do you find the length between two coodinates?
If a gradient of a line is 11. What is the gradient of a line perpendicular to it?	How do you find the gradient between two coordinates?
What is the relationship between parallel lines and their equations?	When measuring bearings what are the three key points to remember?
How do you find the midpoint between two coordinates?	How do you explain a reflection transformation?

Drawing a triangle might help.
The base is the difference in the x values (x1 - x2)
The height is the difference in y values (y1 - y2)
then use Pythagoras theorem.

Perpendicular gradients meet at right angles.

Drawing a triangle might help.
The base is the difference in the x values (x1 - x2)
The height is the difference in y values (y1 - y2)
Gradient is the difference in y divide the difference in x

dy/dx

-1/11

perpendicular gradients are negative reciprocals of each other.

1) Draw a north line
2) From the north line, measure clockwise and with a protractor
3) write your answer using 3 digits (e.g. 65 degrees becomes 065 degrees)

gradients are equal.

Reflection in the **line (x=a OR y=a OR y=x OR y=-x, OR y axis OR x axis)**

bold parts give you the marks

Add the two x values together and divide by 2
then
add the two y values together and divide by 2

How do you explain a rotation transformation?

What is the relationship between exterior and interior angles?

How do you explain a translation transformation?

How do you calculate one exterior angle of a polygon?

How do you explain a enlargement transformation?

How do you find the sum of interior angles of a polygon?

How do you divide numbers in standard form?
$(a \times 10^m) \div (b \times 10^n)$

How do you find one interior angle of a polygon?

Exterior + interior=180 degrees

Rotation, 90/180/270 degrees clockwise, about the point **(x,y)**

bold parts give you the marks

An Exterior angle is 360 divide n

n=number of sides

Translation in the vector $\begin{pmatrix} x \\ y \end{pmatrix}$

Bold parts give the marks

sum of interior angles= (n-2) x 180

Enlargement at the **point (x,y)**
by a **scale factor of #**

Bold parts give the marks

Find exterior (360/n) and then subtract from 180.

(remember interior + exterior=180)

$(a \times 10^{m}) \div (b \times 10^{n})$

$= \frac{a \times 10^{m}}{b \times 10^{n}}$

$= \frac{a}{b} \times 10^{m-n}$

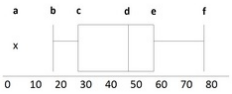
Then manipulate so the number is in standard form

What does A u B mean in set notation?

Which letter represents the upper quartile?

What does A n B mean in set notation?

Which letter represents the median?



Which letter represents the lowest value?

Which letter represents the quartile 1?

Which letter represents the outlier?

Which letter represents the highest value?

e

upper quartile also known as "quartile 3"

A **or** B

u means **union**

d
median also known as "quartile 2"

A **and** B

n means **AND (at the same time)**

c
quartile 1 also known as lower quartile

b

f

a

How would you use the boxplot to find the interquartile range?

What formula is used to workout the percentage change (or percentage increase/decrease)?

How do you find the upper and lower bound to the nearest significant figure?

Which formula is used for reverse percentage?

What formula is used to find compound interest?

Describe the process of random sampling.

What is the formula to increase/decrease an amount by a percentage?

Describe the process of stratified sampling.

$\%\ \text{change} = \frac{N-O}{O} \times 100$

O= original amount
N=new amount

e subtract c

Upper quartile - lower quartile

$O \times \left(1 \pm \frac{\%}{100}\right) = N$

You must substitute and then rearrange for O
O= original amount
%= percentage
N=new amount

1) Find which place value the sig fig is (e.g. tens column, 100 column, 1/10 column etc)
2) halve the column amount (e.g half 10 if in the 10s column, half 100 if in the hundred column)
3) add this to the original number to get upper bound
4) subtract this from the original number to get lower bound

Two answers are allowed
1) Assign a number to each member of the population and then use a computer to randomly generate numbers to select who to include in sample.
2) Put all the names of the members in a hat/box and pick your sample from the hat/box without looking.

$O \times \left(1 \pm \frac{\%}{100}\right)^{m} = N$

O= original amount
%= percentage
N=new amount

1) Work out the current proportions of the population.
2) For each group make sure the proportion is the same for the sample size you have chosen.

e.g. If men make 20% of a population then they must represent 20% of sample. If sample=50, you need 20% of 50 to represent men (i.e. 10 men).

$O \times \left(1 \pm \frac{\%}{100}\right) = N$

O= original amount
%= percentage
N=new amount

How do you convert an equation to an iteration?

How do you multiply numbers in standard form?
$(a \times 10^m) \times (b \times 10^n)$

1) identify the highest power term.
2) rearrange to make this the subject.
3) then make this x the subject (by using the nth root)

$(a \times 10^m) \times (b \times 10^n)$
$= (a \times b) \times (10^m \times 10^n)$
$= ab \times 10^{m+n}$
Then manipulate so the number is in standard form