## A - Level Maths Coordinate Geometry Recap

## Straight Lines / Linear Functions

The equation of a line with gradient $m$ passing through the point $\left(x_{1}, y_{1}\right)$ has equation

The equation of a line passing through the points with coordinates $\left(x_{1}, y_{1}\right)$ and $\left(x_{2}, y_{2}\right)$ has equation

Consider the line $a x+b y+c=0$
$x$-intercept:
$y$-intercept:

Gradient:

Consider two lines $l_{1}: y=m_{1} x+c_{1}$ and $l_{2}: y=m_{2} x+c_{2}$. Then
$l_{1}$ and $l_{2}$ are parallel if:
$l_{1}$ and $l_{2}$ are perpendicular if:

The midpoint of the line segment joining $\left(x_{1}, y_{1}\right)$ to $\left(x_{2}, y_{2}\right)$ is:

The distance between the point $\left(x_{1}, y_{1}\right)$ and the point $\left(x_{2}, y_{2}\right)$ is:

## Example

Find the equation of the perpendicular bisector of the line segment $A B$ where $A(2,-4)$ and $B(6,4)$

## Circles

The circle, centre the origin radius $r$ has equation:

The circle, centre $(a, b)$, radius $r$ has equation:

Annotate the circles below to complete the circle theorems


The tangent at $(h, k)$ to the circle with equation $x^{2}+y^{2}=a^{2}$ has equation:

## Example

Find the centre and radius of the circle $x^{2}-12 x+y^{2}+6 y-4=0$

## Example

Find the equation of the tangent to the circle $(x-2)^{2}+(y+1)^{2}=25$ at the point $(5,3)$.

## Example

A circle passes through the points $A(8,8), B(16,-4)$ and $C(-2,-16)$. Find the equation of the circle given that the equation of the perpendicular bisector of $B C$ is $3 x+2 y=1$.

