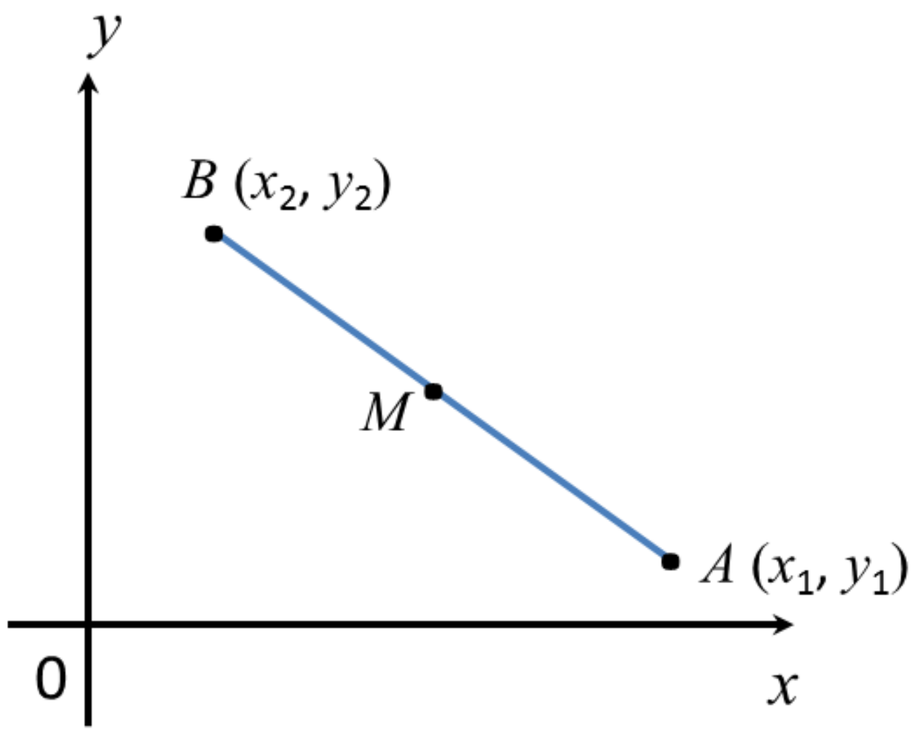
Coordinate geometry



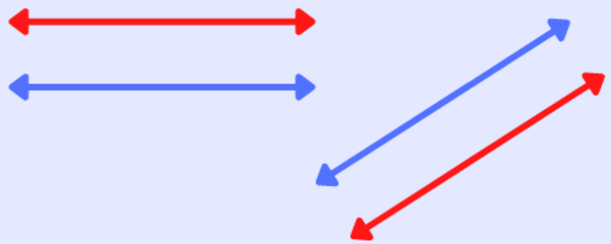
LENGTH OF A LINE SEGMENT AND MIDPOINT

M-midpoint M((x1+x2)/2 , (y1+y2)/2))

AB^2 = (x2-x1)^2 + (y2-y1)^2

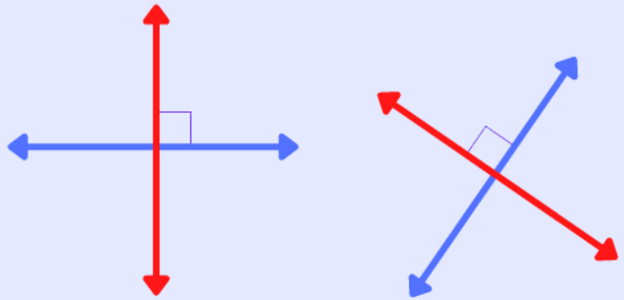
Gradient = (y2-y1) / (x2-x1)

Parallel



- In the same plane
- Never intersect
- Always the same distance apart
- Have the same slope
- Symbol is ||
- Railroad tracks are an example

Perpendicular



- In the same plane
- Always intersect
- Intersect at a 90° angle
- One line has slope m, other has slope -1/m
- Symbol is ⊥
- The letter "T" is an example

Gradient of parallel lines are same

m1*m2= -1

Equations of straight lines

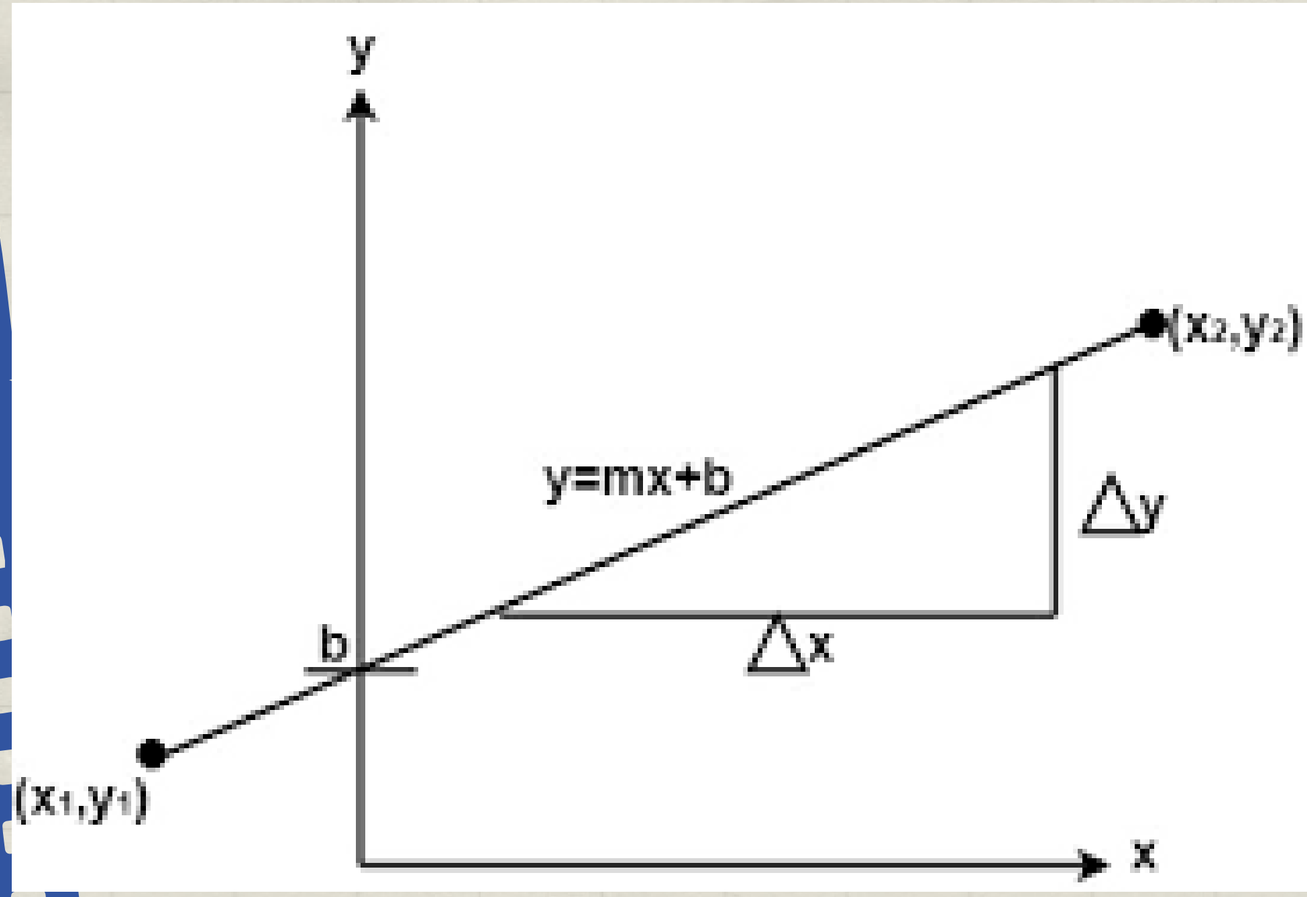
y=mx+c

c - y-intercept

m - gradient

passes through P(x1 , y1)

(y-y1)=m(x-x1)



Three points have coordinates $A\,(0,\ 7)$, $B\,(8,\ 3)$ and $C\,(3k,\ k)$. Find the value of the constant k for which

(i) C lies on the line that passes through A and B. [4]

(ii) C lies on the perpendicular bisector of AB. [4]

y=mx+c

m = (7-3)/0-8

m= -1/2

3 = -1/2 * 8 +c

3= -4+c

c=7

y = -1/2x+7

k=-1/2 * 3k +7

k= -3/2k+7

5/2k=7

k=5/14

Bisector means it passes through midpoint between A and B

M((0+8)/2 , (7+3)/2) => M(4, 5)

m1=-1/2 m1*m2= -1

-1/2 * m2 = -1 m2 = 2

y=2x+c

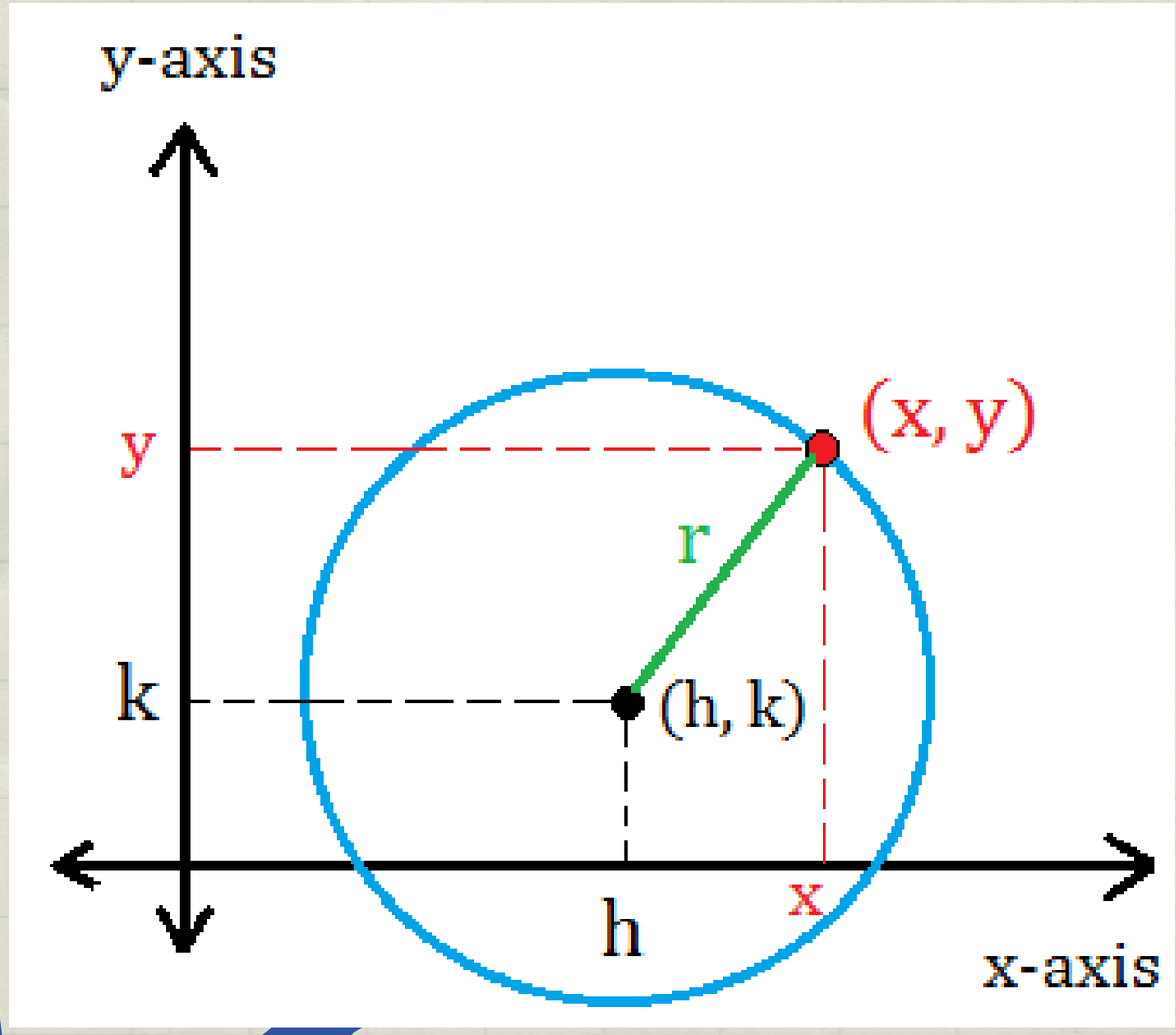
5=2*4+c 5=9+c c= -4

y=2x-4 k=6k-4 5k=4 k=4/5

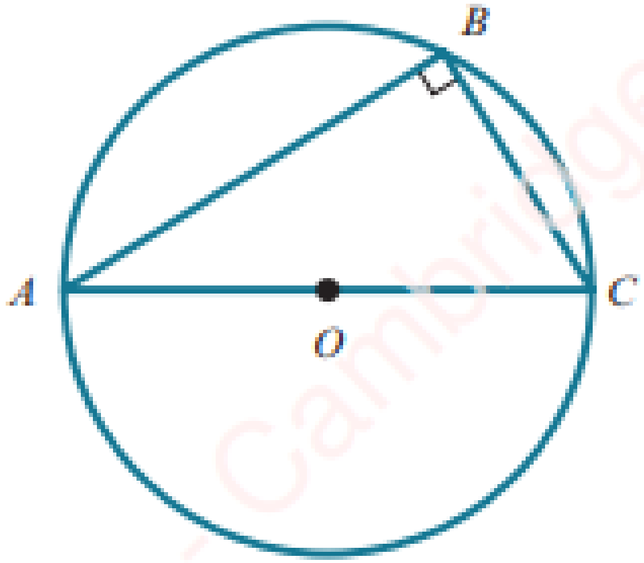
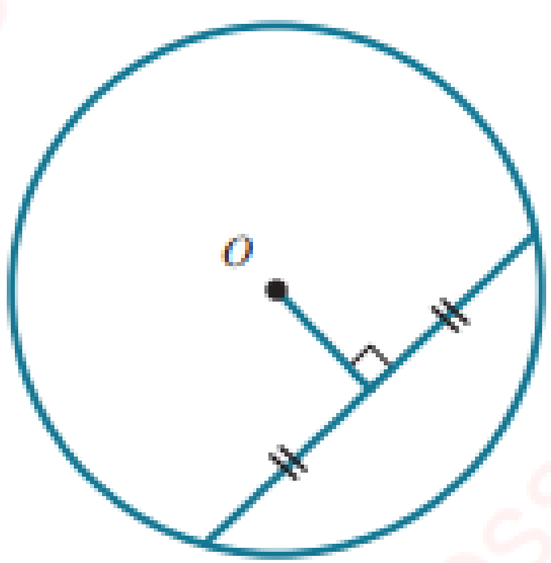
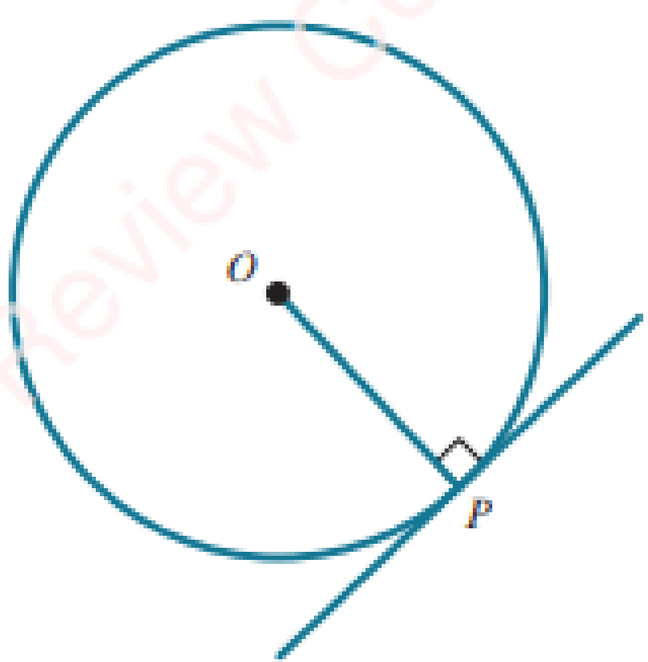
The equation of a circle

$(x-h)^2 + (y-k)^2=r^2$

center coordinate (h ; k)



REMEMBER

		
The angle in a semicircle is a right angle.	The perpendicular from the centre of a circle to a chord bisects the chord.	The tangent to a circle at a point is perpendicular to the radius at that point.

Discriminant of a Quadratic Equation

Given the quadratic equation $y = ax^2 + bx + c$

The discriminant $D = b^2 - 4ac$ tells the types of roots the equation has.

Discriminant	$D < 0$	$D = 0$	$D > 0$
Types of Roots	No real roots; Two imaginary roots	One real root	Two distinct real roots