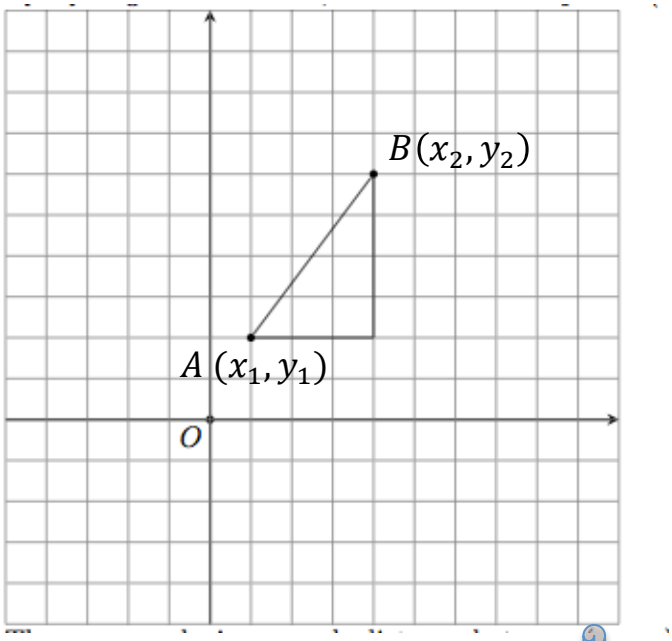
MATH 7 **September 17th**

Review

1. Distance and midpoint.

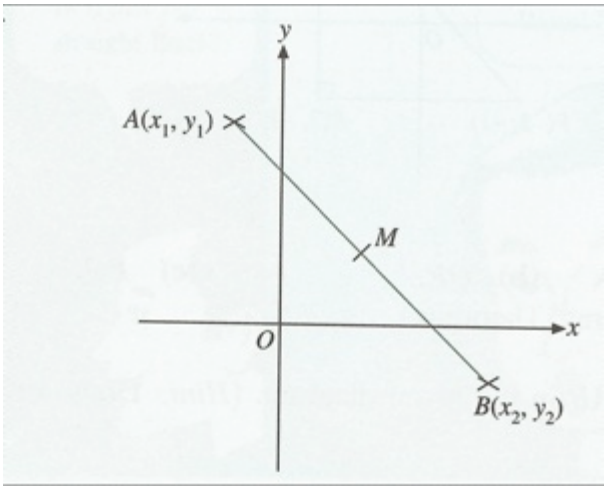


$$AB = \sqrt{((x_2 - x_1)^2 + (y_2 - y_1)^2)}$$

$M(x, y)$

$$x = \frac{x_1 + x_2}{2}$$

$$y = \frac{y_1 + y_2}{2}$$



2. Slope (gradient) of a straigh line. Slope-intersept equation of a straight line.

Slope of AB: $\boldsymbol{m = \frac{y_2 - y_1}{x_2 - x_1}}$

Equation of a straight line:

$$\boldsymbol{y = mx + b, m - slope, b - y - intercept}$$

1. $ABCD$ is a rectangle where $A = (-1,2), B = (1,5), C = (4,3), D = (p,q)$.
   a) Find the midpoint, M, of the diagonal AC.
   b) Find the value of p and q.
   c) Show that the diagonals of $ABCD$ have equal length.

2. Show that the point $A(3,2), B(0,2) and\ C(-3,6)$ lie on a straight line.

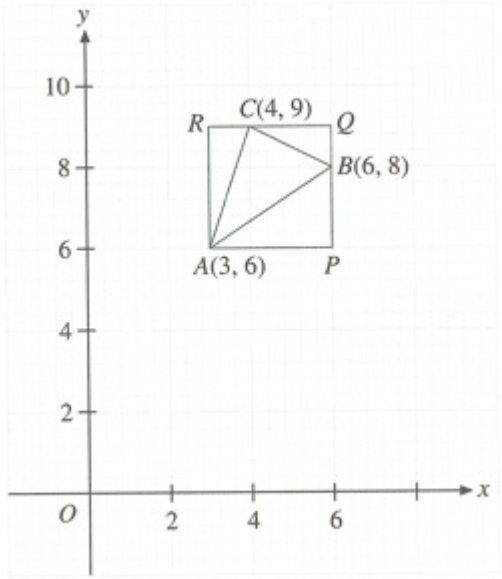
3. $A(5,6), B(3,2) and\ C(7,q)$ are the vertices of a triangle.
   a) If BC is parallel to the x-axis, write down the value of q.
   b) Find the height, AD, of ΔABC.
   c) Find the area of ΔABC.

4. In the diagram, $APQR$ is a rectangle. AP is parallel to the x-axis. The vertices of ΔABC are $A(3,6), B(6,8) and\ C(4,9)$.

   a) Write down the coordinate of P, Q and R.

   b) Find the area of the rectangle $APQR$.

   c) Find the area of the ΔABC.



5. M is the midpoint of AB where $A = (3,-1) and\ M = (-1,3)$.
   $N(p,-3) is\ a\ point\ directly\ below\ M$.

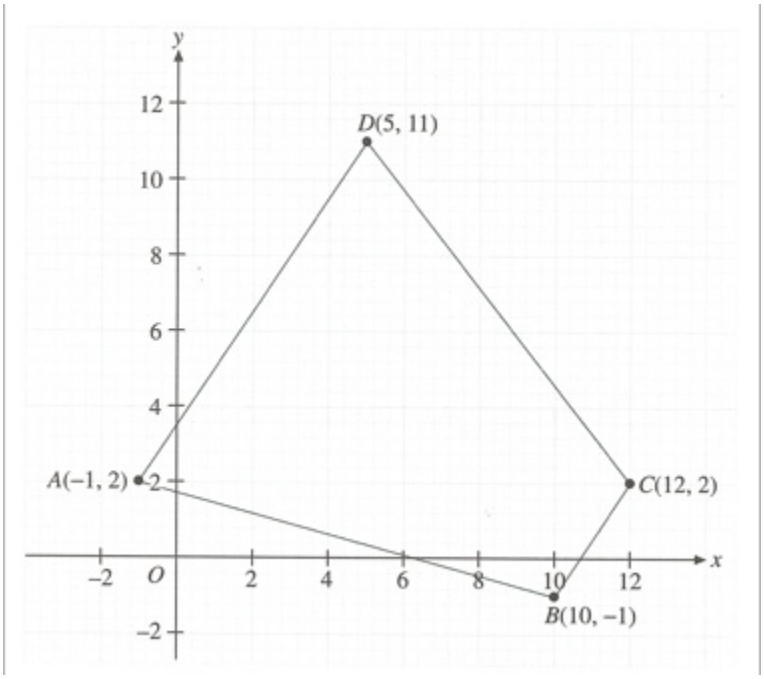
   a) Write down the value of p.

   b) Find the coordinates of B.

   c) If the line parallel to AB and passing through N cuts the y-axis at C, find the equation of NC.

   d) Find the distance between C and B.

6. $A(-1,2), B(10,-1), C(12,2) and\ D(5,11)$ are the vertices of a polygon as shown on the diagram.
   a) Show that polygon $ABCD$ is an isosceles trapezoid.
   b) Find the length and midpoint of each of parallel sides.
   c) Find the area of the polygon $ABCD$.



7. $A(7.8) and\ B(-1,12) are\ the\ ends\ of\ a\ line\ segment.$ If P divides line segment AB in the 1:3 ratio, find the coordinates of p.
8. ABCD is a trapezoid with the side AB parallel to DC. The vertices A, B, C and D are $(o, 4), (4, 16), (4, 11) and\ (3, t)$ respectively.
   a) Calculate the value of t.
   b) Does the trapezoid have line symmetry? If it has, find the equation of the line of symmetry.
   c) Find the area of the trapezoid.

9. Expand the following

a) $(3x+1)^2$

b) $(5x-3y)^2$

c) (6x+4)^2

d) $(2x+3y)(2x-3y)$

e) $4x(w+y+2z)$

f) $(x+y)(2p+3q)$

g) $(3x-2)(4x+3)$

h) $y^3(y^2-y+1)$

i) $(3x^2-y)(6x^2-14y)$

j) $a^2-2a+4)(a+3)$

k) $(3x^2-xy-2y^2)(2x+3y)$

l) $(x^2-x+1)(x^3+x^4+2)$

10. Factorize the following:

a) $mn+mp)$

b) x^2+x

c) $3xy+4yz-5y)$

d) $3x(x+1)+2\,(x+1)$

e) $6x(x+4)+\ 3(x+4)$

f) $4x^2-12x+5x-15$

g) $x^2-x-7x+7$