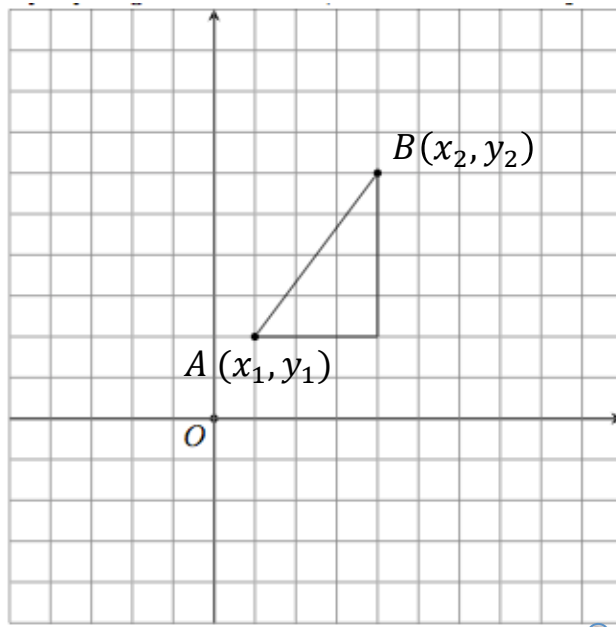


MATH 7

Review

1. Distance and midpoint.

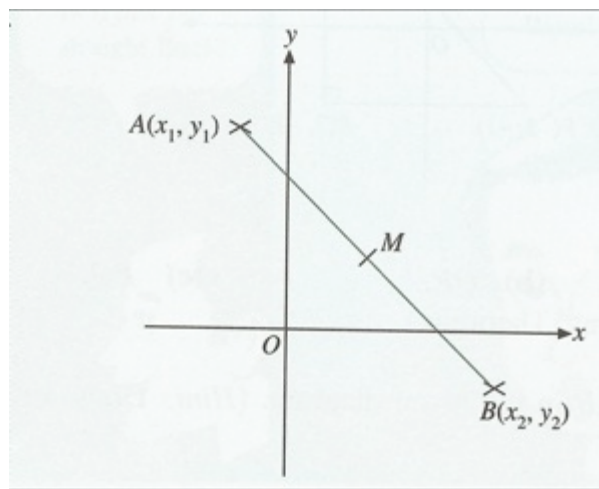


$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$M(x, y)$$

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

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



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

Slope of AB:

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Equation of a straight line:

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

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.

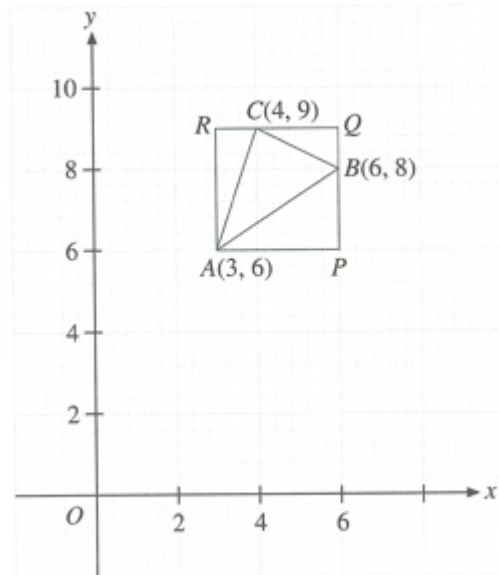
3. $A(5, 6)$, $B(3, 2)$ and $C(7, q)$ are the vertices of a triangle.
 - a) If BC is parallel to the x -axis, write down the value of q .
 - b) Find the height, AD , of $\triangle ABC$.
 - c) Find the area of $\triangle ABC$.

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 .

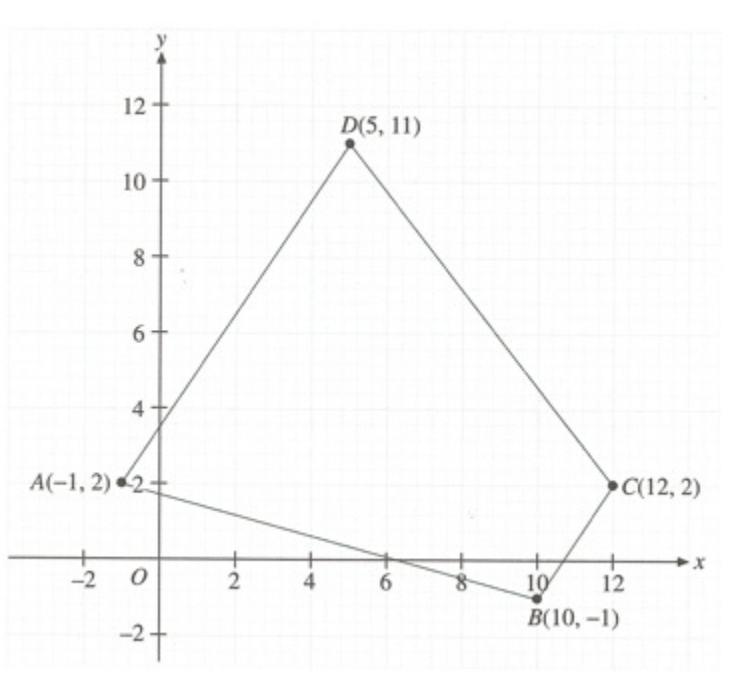
b) Find the coordinates of B .

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.

- Show that polygon $ABCD$ is an isosceles trapezoid.
- Find the length and midpoint of each of parallel sides.
- 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 $(0, 4)$, $(4, 16)$, $(4, 11)$ and $(3, t)$ respectively.

- Calculate the value of t .
- Does the trapezoid have line symmetry? If it has, find the equation of the line of symmetry.
- 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) $x^2 - x - 7x + 7$