

Unit 2: Analytic Geometry

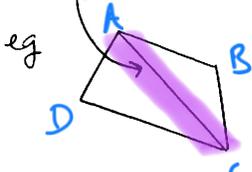
Glossary of Terms

altitude



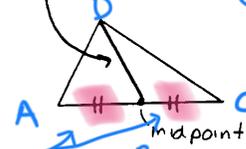
- the perpendicular distance from a **vertex** to an opposite side

diagonal



- a **line segment** joining two non-adjacent vertices of a polygon eg. segment AC is a diagonal

median



two tick marks mean $AB = BC$ in length

NOTE: when labelling vertices, proceed in order around the figure. eg.



- a median is a line segment joining a vertex to the opposite side's midpoint

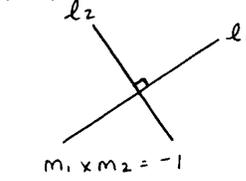
parallel lines



two arrows mean lines are parallel

- parallel lines, l_1 and l_2 in this case, have the **same slope** (so, $m_1 = m_2$)

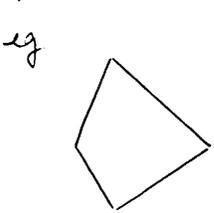
perpendicular lines



- perpendicular lines have slopes that are negative reciprocals

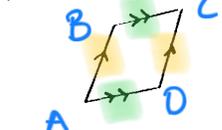
eg if $m_1 = \frac{3}{4}$, $m_2 = -\frac{4}{3}$ $\therefore m_1 \cdot m_2 = \frac{3}{4} \cdot (-\frac{4}{3}) = -1$
 So... $l_1 \perp l_2$
 read as "is perpendicular to"

quadrilateral



- a quadrilateral is a closed (all line segments meet) figure with four sides.

parallelogram

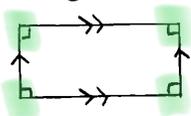


- a parallelogram is a quadrilateral with opposite sides that are parallel

So... $AB \parallel CD$
 and... $BC \parallel AD$

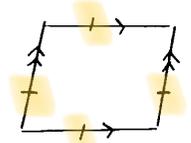
read as "is parallel to"

rectangle



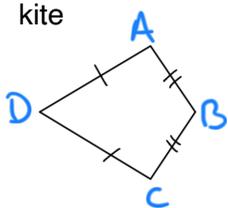
- a rectangle is a parallelogram with **four right angles**

rhombus



- a rhombus is a parallelogram with **all side lengths equal**

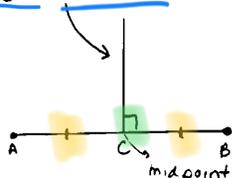
kite



is a quadrilateral with

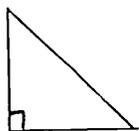
(sides next to one another)

right bisector of a line segment



- a line that is **perpendicular** to a line segment, dividing it into **two equal parts**.

right triangle



- a triangle with a 90° angle

vertex



- a **point** at which two line segments meet.

So...
 $AB = BC$
 and...
 $AD = CD$

Exercises

1. Line r is parallel to line s . Line s has a slope of $\frac{2}{3}$. What is the slope of line r ?

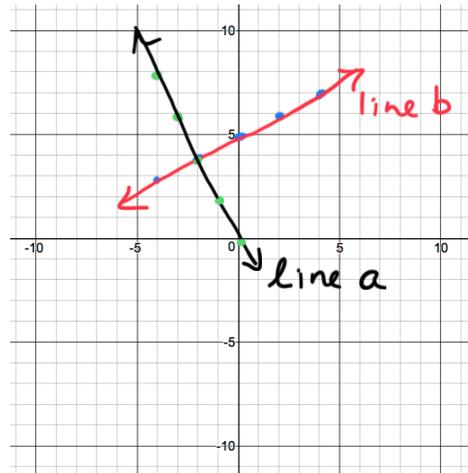
$$m_r = \frac{2}{3}$$

2. Line a is perpendicular to line b .

Line b has a slope of $\frac{1}{2}$ passing through $(0, 5)$.

What is the slope of line a ?

$$m_a = -\frac{2}{1}$$



3. What is the equation of a line p that is perpendicular to a line q with equation $y = \frac{2}{3}x - 4$? Line p passes through the point $(6, -4)$.
NOTE: Write the equation in *slope-intercept* form (that is, in the form: $y = mx + b$).

$$m_q = \frac{2}{3} \quad p \perp q \therefore m_p = -\frac{3}{2}$$

we have slope of line p
need to find b , the vertical intercept
sub to find b

$$\begin{aligned} y &= mx + b \\ -4 &= \left(-\frac{3}{2}\right)(6) + b \\ -4 &= \frac{-18}{2} + b \end{aligned}$$

$$\begin{aligned} -4 &= -9 + b \\ +9 & \quad +9 \\ 5 &= b \end{aligned}$$

conclusion

$$\begin{aligned} \therefore \text{the equation} \\ \text{of line } p \text{ is} \\ y &= -\frac{3}{2}x + 5 \end{aligned}$$