



SUBJECT and GRADE	Mathematics Grade 11									
TERM 2	Week 2									
TOPIC	Analytical Geometry: The equation of the line									
AIMS OF LESSON	<ul style="list-style-type: none"> Finding the equation of a line passing through two points. Finding the equation of a line if one point and information regarding the gradient (parallel or perpendicular) is given. 									
RESOURCES	Paper based resources	Digital resources								
	Please go to the Analytical Geometry section in your Mathematics Textbook.	https://www.youtube.com/watch?v=9hryH94KFJA https://www.youtube.com/watch?v=pJ0_Lvkvo9E https://www.youtube.com/watch?v=7G8EwEc5xLw								
INTRODUCTION	<p>We know that the equation of a line is $y = mx + c$ where m is the gradient and c is the y - <i>intercept</i> of the line. To find the equation of a line, we need:</p> <ul style="list-style-type: none"> The gradient (m) and any point on the line. <p>In this lesson we will be finding the equation of the line using,</p> <ul style="list-style-type: none"> $y = mx + c$ and $y - y_1 = m(x - x_1)$ <p>Where $m = \text{gradient}$ ($x_1; y_1$) is any other point.</p>									
CONCEPTS AND SKILLS										
<p>We will be using both these formulae to determine the equation of a line.</p> <p>Example 1: Determine the equation of the line passing through the points A(6; 8) and B(-6; 2) by using the equation $y = mx + c$ and then using $y - y_1 = m(x - x_1)$</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">$y = mx + c$</th> <th style="width: 50%;">$y - y_1 = m(x - x_1)$</th> </tr> </thead> <tbody> <tr> <td> $m = \frac{8 - 2}{6 - (-6)} = \frac{6}{12} = \frac{1}{2}$ </td> <td> $m = \frac{1}{2}$ </td> </tr> <tr> <td> $y = \frac{1}{2}x + c$ </td> <td> $y - y_1 = \frac{1}{2}(x - x_1)$ </td> </tr> <tr> <td> $8 = \frac{1}{2}(6) + c$ $8 = 3 + c \therefore c = 5$ $y = \frac{1}{2}x + 5$ </td> <td> $y - 8 = \frac{1}{2}(x - 6)$ $= \frac{1}{2}x - 3$ $y = \frac{1}{2}x - 3 + 8$ $y = \frac{1}{2}x + 5$ </td> </tr> </tbody> </table>		$y = mx + c$	$y - y_1 = m(x - x_1)$	$m = \frac{8 - 2}{6 - (-6)} = \frac{6}{12} = \frac{1}{2}$	$m = \frac{1}{2}$	$y = \frac{1}{2}x + c$	$y - y_1 = \frac{1}{2}(x - x_1)$	$8 = \frac{1}{2}(6) + c$ $8 = 3 + c \therefore c = 5$ $y = \frac{1}{2}x + 5$	$y - 8 = \frac{1}{2}(x - 6)$ $= \frac{1}{2}x - 3$ $y = \frac{1}{2}x - 3 + 8$ $y = \frac{1}{2}x + 5$	<p>CAN YOU?</p> <ol style="list-style-type: none"> Determine the equation of the following lines passing through two points: <ol style="list-style-type: none"> (5; 0) and (-3; 2) (-2; 6) and (5; 9) Determine the equation of the lines where the gradient and a point are given: <ol style="list-style-type: none"> $m = -1$ and point (-6; 4) $m = 0$ and point (-1; 5)
$y = mx + c$	$y - y_1 = m(x - x_1)$									
$m = \frac{8 - 2}{6 - (-6)} = \frac{6}{12} = \frac{1}{2}$	$m = \frac{1}{2}$									
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Find m

- Substitute point
- find c .
- Subs into original

- Substitute one point
- Simplify



Example 2: Determine the equation of a line which passes through the point (3; 1) and is parallel to $2y = 3x + 6$

Solution:

$$y = \frac{3}{2}x + 3 \quad \text{[Standard form]}$$

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

Equation of new line:

$$y - y_1 = m(x - x_1) \quad \text{[lines are parallel; gradients are equal]}$$

$$y - 1 = \frac{3}{2}(x - 3) \quad \text{[Substitute point]}$$

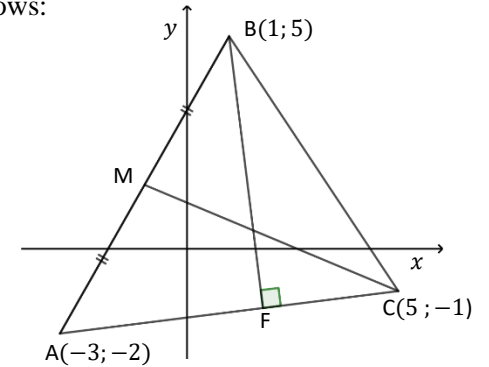
$$y = \frac{3}{2}x - \frac{7}{2} + 1$$

$$y = \frac{3}{2}x - \frac{5}{2}$$

**We need:
Gradient(m)
and a point**

CAN YOU?

Use the diagram to answer the questions that follows:



- Determine coordinates of M the midpoint of AB.

Solution: $M(-1; \frac{3}{2})$

- Determine the equation of the median CM.

Solution:

$$y = -\frac{5}{12}x + \frac{13}{12}$$

- Determine the equation of the altitude BF.

Solution:

$$y = -8x + 13$$

Important terminology

Median	Altitude	Perpendicular bisector
Line from vertex to midpoint of opposite side.	Line from any vertex perpendicular to the opposite side.	Line passes through midpoint and is perpendicular to the line.

ACTIVITIES/ASSESSMENT

Mind Action Series

Ex: 5 & 6;
Pg: 72 & 74

Platinum

Ex: 1
Pg: 61

Classroom Mathematics

Ex: 4.5
Pg: 99

Everything Mathematics

Ex: 4.2- 4.4
Pg: 115-123

CONSOLIDATION

- Use the given information to find m . Substitute the point.
- Remember the facts regarding // and \perp lines.
- Remember to practice daily!



**Western Cape
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