**Week 7/8
Term 1
2024**

HAWKER COLLEGE
Engage | Inspire | Achieve
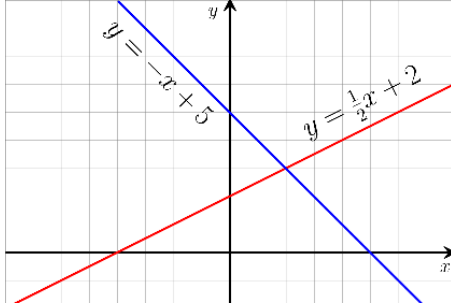
**Learning Brief
MM1**

Goals

By the end of this fortnight, you will:

- Examine examples of direct proportion and linearly related variables
- Recognise features of the graph of y=mx+c, including its linear nature, its intercepts and its slope or gradient
- Find the equation of a straight line given sufficient information, parallel and perpendicular lines
- Solve linear equations
- Understand the concept of a function as a mapping between sets, and as a rule or a formula that defines one variable quantity in terms of another
- Use function notation, domain and range, independent and dependent variables
- Understand the concept of the graph of a function
- Recognise the distinction between functions and relations, and the vertical line test

Theoretical Components

Knowledge Checklist:
- Know about gradients
- Be able to sketch linear functions quickly, easily and with accuracy
- Find the equation of a line given certain information
- Use modelling techniques -applications using linear functions
- Define the domain and range of a function
- Use the vertical line test for functions

Formulas
- General form for linear equations
$$y = mx + c$$
where m is the gradient and c is the y-intercept (when x=0)

- Gradient
$$m = \frac{rise}{run} \quad \text{or} \quad m = \frac{y_2 - y_1}{x_2 - x_1}$$
- Perpendicular lines
$$m_1 \times m_2 = -1$$
- Parallel lines
$$m_1 = m_2$$
- Finding the equation of a straight line
$$y - y_1 = m(x - x_1)$$

Online reading
- http://www.mathsisfun.com/algebra/linear-equations.html
- http://www.mathsisfun.com/gradient.html
- http://www.mathsisfun.com/data/straight_line_graph.html
- http://www.mathsisfun.com/algebra/line-equation-point-slope.html
- https://www.mathsisfun.com/sets/function.html
- https://www.mathsisfun.com/sets/domain-range-codomain.html

Practical Components

Resources:
Make notes on the following chapters and websites:
- 1A Solving linear equations and inequations
- 1B Rearrangement and substitution
- 1C Gradient of a straight line
- 1D Sketching linear functions
- 1F Finding the equation of a straight line
- 1H Linear modelling
- 4C Domain and range
- 4D Types of relations (including functions)

Do the following questions:
Organise your solutions neatly in your exercise book.
Chapters 1 and 4 of Maths Quest 11 Mathematical Methods (pdf – Google Classroom)
- 1A: 3
- 1B: 3, 5
- 1C: 1a, 2c, 7, 8
- 1D: 8a, 8d, 9c, 9f, 10a, 14
- 1F: 5a, 5b, 12, 14, 15
- 1H: All even numbered questions
- 4C: 1b, 1g, 2d, 2h, 3, 7, 10
- 4D: 1a, 1d, 1g, 1j, 2a, 2d, 2g, 2j, 4

Investigation

See next page

Other

Fun fact: How do computers render smooth curves for graphics design and animation? One technique is that of Bézier curves, which is essentially the result of linear interpolation. Its inventor, Pierre Bézier, originally invented this method to help design Renault cars in the 1960s.

Week 7 and 8 Investigation

Here are the equations of 12 straight lines.

$y = 4x + 4$	$4y = x + 3$	$y = 8x - 3$	$y + 4x + 6 = 0$
$3y = 2x - 8$	$y + 6x = 11$	$y + 8x = 6$	$2y + 8 = 3x$
$2y + x = 4$	$2y = 8x + 3$	$y = 6x - 4$	$y + x + 8 = 0$

1. **Rewrite each equation in the form *y* = m*x* + c**

2. **These 12 straight lines can be divided up into pairs/group, each pair matching one of the following descriptions. Sort them into the correct pairs and complete the final description.**
    *   These lines are parallel.

    *   These lines are perpendicular.

    *   These lines have the same y-intercept.

    *   These lines have the same x-intercept.

    *   These lines both go through the point (1,5).

    *   These lines …