

HIAS MOODLE+ RESOURCE

The Use of Technology to Support in the Teaching of Graphs

Secondary

HIAS Maths Team
January 2019
Final version

© Hampshire County Council

Overview

In this document

Technology is an integral part of classrooms, with interactive whiteboards and projectors now being common place. The question that needs to be considered is how these resources can be used to enhance learning and the development of mathematical thinking. This document offers ideas on the role of graphing packages to support understanding of graphing in the Secondary curriculum

Points to consider when using this resource

The extent of access teachers and students have to software that will support the learning of graphs.

Graphing and Technology

Exploration of graphs is a key area in the secondary curriculum where students benefit from the use of technology. There are several pieces of software available that enable graphs to be produced quickly and accurately. It is still important for students to be able to construct tables of values and plot graphs accurately. However, technology can now be used to explore how changes to an equation affects the resulting graph and the relationships between graphs.

Introducing the use of technology with $y = mx + c$ in key stage 3, will enable students to consider the effects when one aspect of an equation is changed at a time. The use of the question: 'what is the same and what is different?' This encourages the use of dynamic language, for example, 'The line moves up and down depending if c is large / small / negative'. Students will often use hand movements to mimic this. With this familiarity at KS3, exploration of solving simultaneous equations; transformations of quadratics; cubic and reciprocal graphs will be enhanced at KS4.

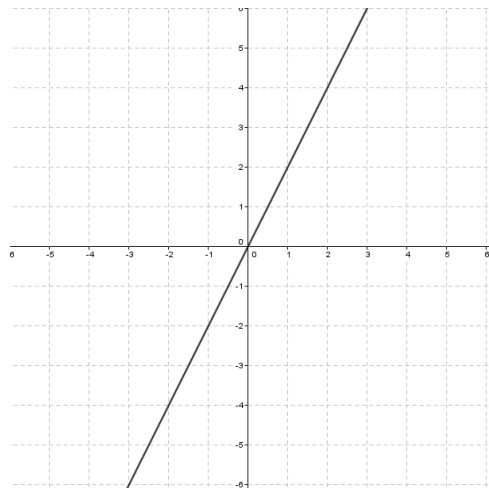
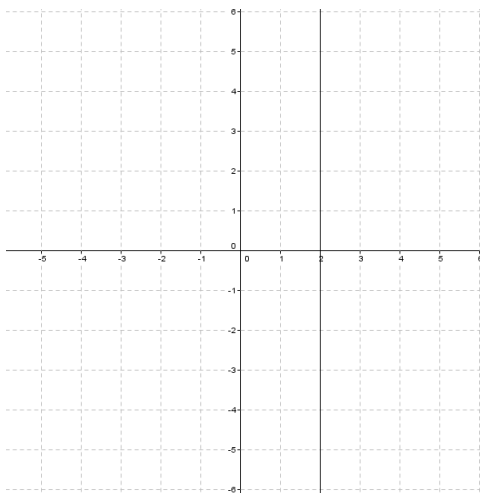
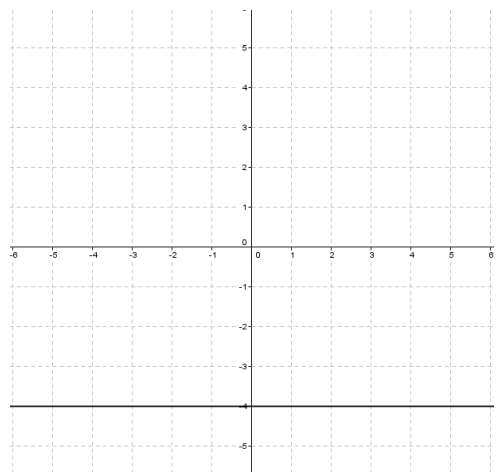
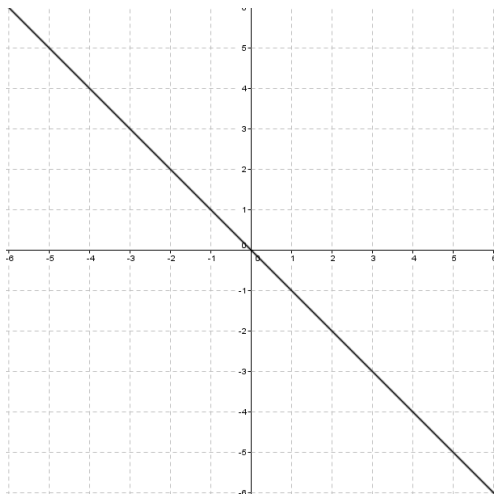
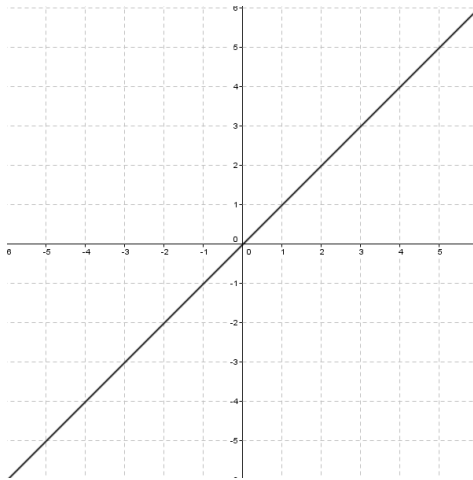
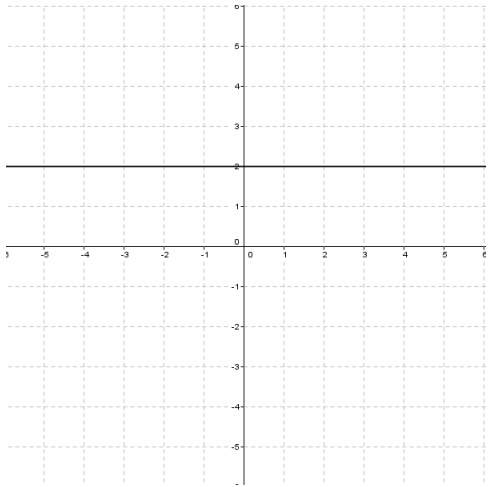
A key element of using any technology in the teaching of mathematics is having meaningful tasks. For graphing, tasks can be often based on key questions, all of which encourage reasoning from students:

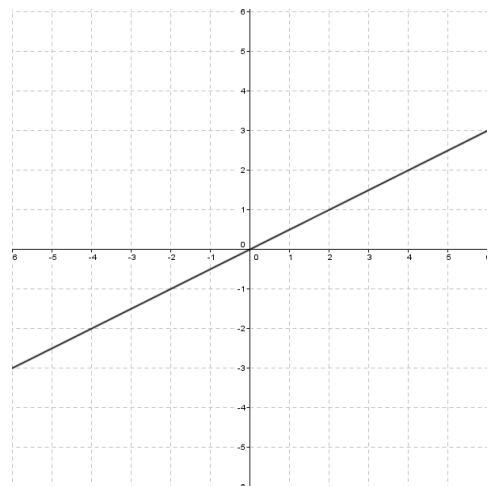
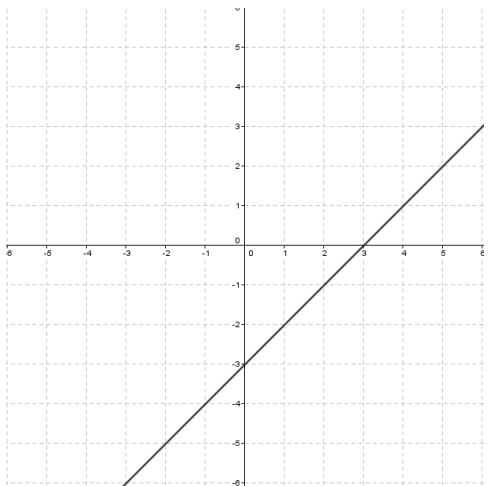
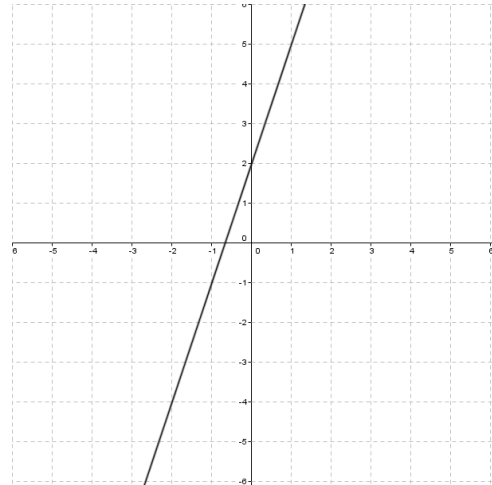
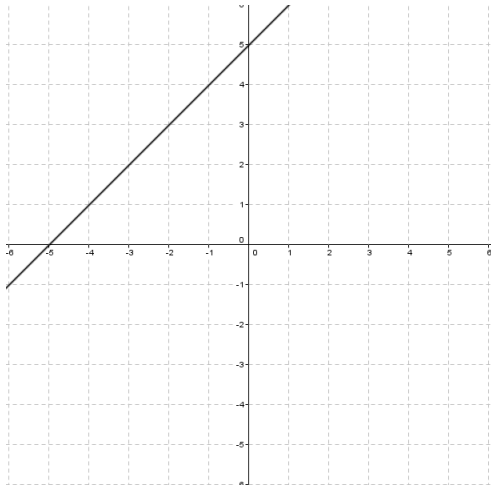
- What is the same and what are the differences when comparing these graphs?
- Can you give me an example of another graph with a gradient of... / crosses the x-axis at...? and another, and another....?
- Which is the odd one out? For example: $y = 2x + 4$; $y - 2x = 7$; $y = 3x + 4$
- True or false: a straight line always crosses the y-axis

A matching task is included that requires students to find which graph matches with each equation. There are some equations which don't match to an equation, in these cases, students would be expected to draw the graph that the equation produces.

By exploring these types of questions, students will have the opportunity to explore; make connections; spot patterns and develop conjectures. This will support their conceptual understanding of graphs as well as allowing them to reason and problem solve.

Linear Matching Task:





$$y = x$$

$$y = -x$$

$$y = 2$$

$$y = -4$$

$$x = 2$$

$$y = 3x + 2$$

$$y = 2x$$

$$y = x - 3$$

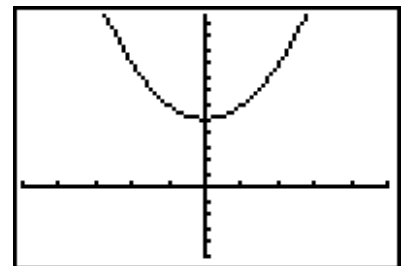
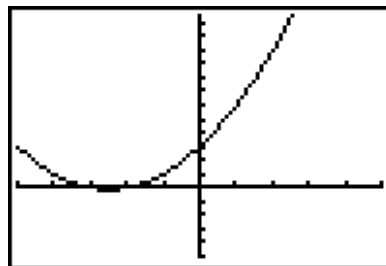
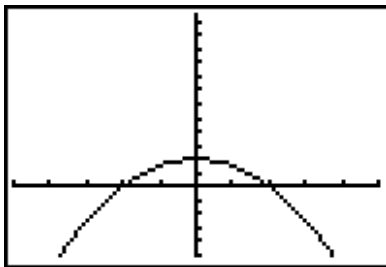
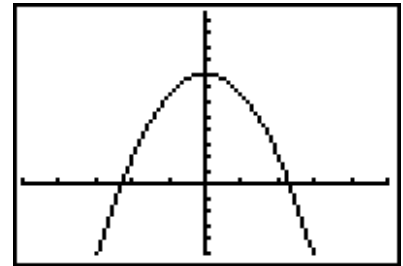
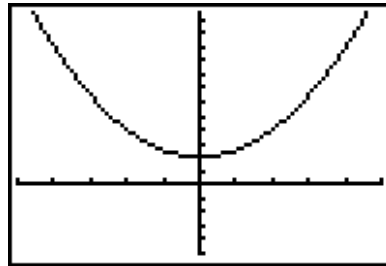
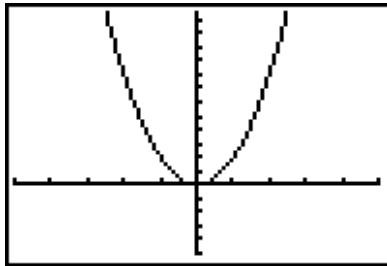
$$y = 3x - 1$$

$$y = 0.5x$$

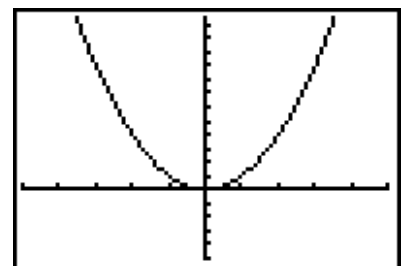
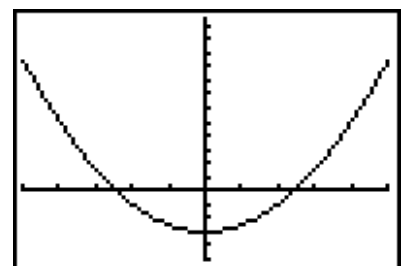
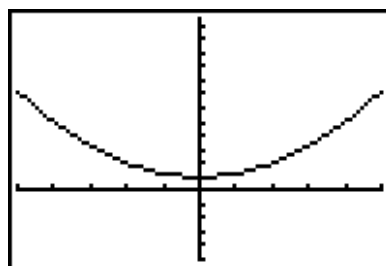
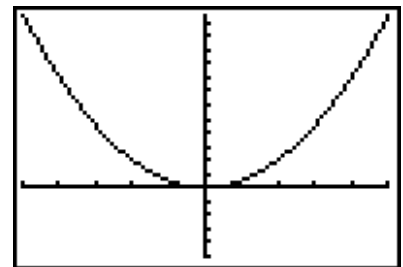
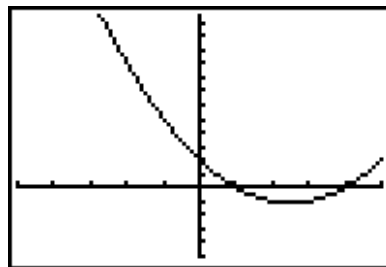
$$y = x + 1$$

$$y = x + 5$$

Quadratic Matching Task:



- $Y=x^2$
- $Y=x^2+4$
- $Y= x^2-6$
- $Y= -x^2+4$
- $Y=2x^2$
- $Y=2x^2+10$
- $Y=0.5x^2+2$
- $Y=4x^2$
- $Y= -3x^2+16$
- $Y=x^2+5x+6$
- $Y= x^2-5x+4$



Mathematics Team

Jo Lees – Area Inspector - Mathematics

Email: jo.lees@hants.gov.uk

Tel: 02380 816139

Jacqui Clift – Area Inspector - Mathematics

Email: jacqui.clift@hants.gov.uk

Tel: 02380 816139

For further details on the full range of services available please contact us using the following details:

Tel: 01962 874820 or email: hias.enquiries@hants.gov.uk

HTLC professional learning moodle

- Searchable course catalogue linked to the Learning Zone.
- Course updates.
- In-house training opportunities.
- Online calendar of events.
- Publications and online resources.
- Bespoke consultancy services.



Link: <https://hias-totara.mylearningapp.com/>

Terms and conditions

Terms of licence

Moodle+ subscribers are licenced to access and use this resource and have agreed to pay the annual subscription fee. This authority starts when the fee is paid and ends when the subscription period expired unless it is renewed. This file is for personal or classroom use only. By using it, you agree that you will not copy or reproduce this file except for your own personal, non-commercial use. HIAS have the right to modify the terms of this agreement at any time; the modification will be effective immediately and shall replace all prior agreements.

You are welcome to:

- download this resource
- save this resource on your computer
- print as many copies as you would like to use in your school
- amend this electronic resource so long as you acknowledge its source and do not share as your own work.

You may not:

- claim this resource as your own
- sell or in any way profit from this resource
- store or distribute this resource on any other website or another location where others are able to electronically retrieve it
- email this resource to anyone outside your school or transmit it in any other fashion.