



MEI GeoGebra Tasks for GCSE Mathematics

Algebra 1

$$y = mx + c$$



1. Open a new GeoGebra file.

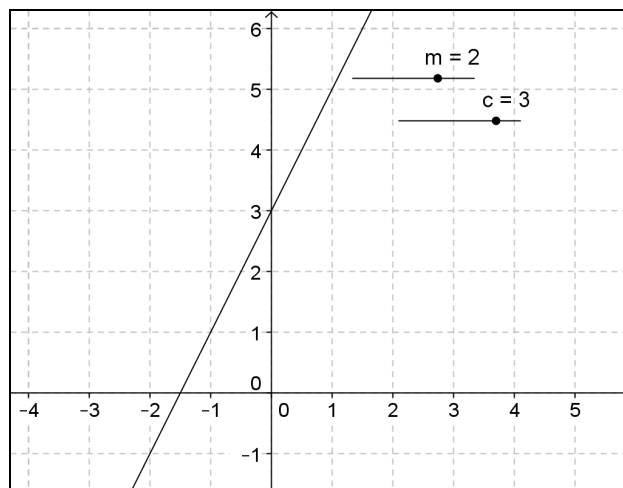
2. Add a slider  and set its name to **m**.

3. Add a slider  and set its name to **c**.

The multiplication sign is essential but you can use a space in place of *.

4. In the Input bar type **y=m*x+c** and press enter.

5. Select the cursor  or  and vary the sliders for **m** and **c**.



Questions


- How does changing **c** affect the line?
- How does changing **m** affect the line?
- Can the line ever be horizontal?
- Can the line ever be vertical?
- Find a way of working out where the lines cross the x-axis?
- If you know the y-value at a point how could you find the x-value?
- If you had two points on the line how could you find **m**?


MEI GeoGebra Tasks for GCSE Mathematics

Algebra 2


Intersection of two lines


1. Open a new GeoGebra file.

2. Add a slider  and set its name to **m**.


3. Add a slider  and set its name to **c**.



4. In the Input bar type $y=m*x+c$ and press enter.

5. Add a slider  and set its name to **n**.

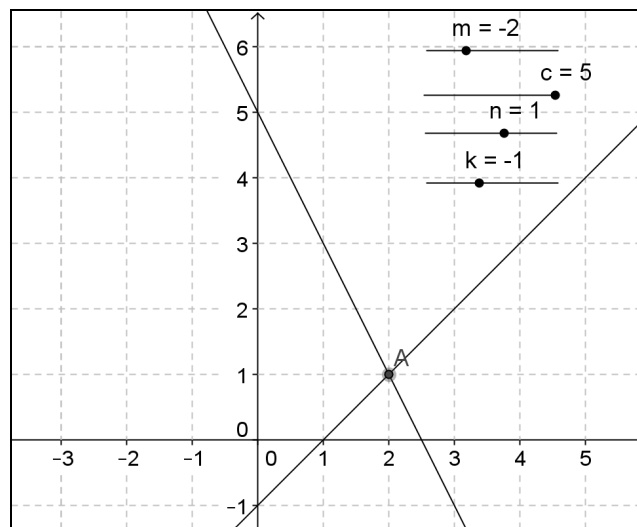
6. Add a slider  and set its name to **k**.

7. In the Input bar type $y=n*x+k$ and press enter.

8. Use the Intersect Two Objects tool (2nd menu)  to find the point of intersection of the two lines.

9. Select the cursor  or  and vary the sliders for **m**, **c**, **n**, and **k**.

The Intersect Two Objects tool can be found on the 2nd Menu. Select this tool then click on each line.



Questions


- How could you find the exact values of the coordinates of the points of intersection from the equations of the lines?
- When are the two lines the same?
- When will the line and the curve have 0 points of intersection?


MEI GeoGebra Tasks for GCSE Mathematics

Algebra 3

Parallel and Perpendicular lines

1. Open a new GeoGebra file.


2. Add a slider  and set its name to **m**.


3. Add a slider  and set its name to **c**.

4. In the Input bar type $y=m*x+c$ and press enter.

5. Add a new point .

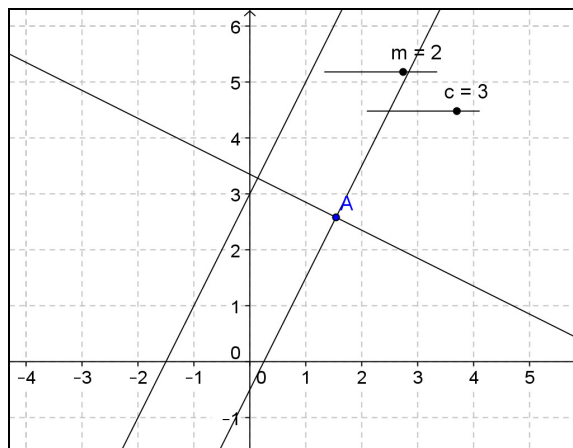
NB this point should not be on the line.

6. Use the Parallel Line tool (4th menu)  to create a line parallel to the original line through the point.

7. Use the perpendicular line tool (4th menu)  to create a perpendicular to the original line through the point.

8. Vary the sliders for **m** and **c** and the position of the point.

The Parallel Line tool can be found on the 4th Menu. Select this tool then click on the point and then the line.



You might find it useful to rewrite the equations of the lines in the form $y=mx+c$.

Questions


- What is the relationship between the gradient of parallel lines?
- What is the relationship between the gradient of perpendicular lines?
- How does this relate to vertical and horizontal lines?


MEI GeoGebra Tasks for GCSE Mathematics

Algebra 4



$$y = x^2 + bx + c$$

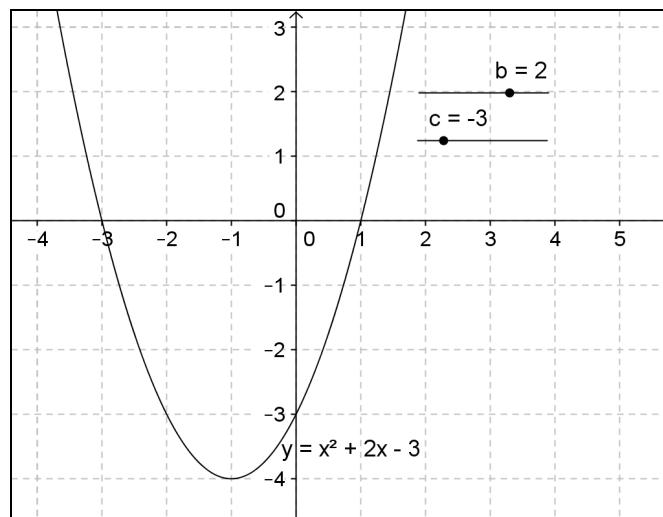
1. Open a new GeoGebra file.

2. Add a slider  and set its name to **b**.

3. Add a slider  and set its name to **c**.

4. In the Input bar type $y=x^2+b*x+c$ and press enter.


5. Select the cursor  or  and vary the sliders for **b** and **c**.



Questions

- What is the effect of varying **c**?
- What is the effect of varying **b**?
- Can you find where the curve crosses the x-axis for different values of **b** and **c**?
- Can you find values of **b** and **c** so the curve touches (but doesn't cross) the x-axis?
- Can you find values of **b** and **c** so the curve doesn't cross or touch the x-axis?

Extension

6. Add a slider  and set its name to **a**.

7. Change the equation of the curve to $y=a*x^2+b*x+c$.

Question

- How does changing **a** affect the curve?

MEI GeoGebra Tasks for GCSE Mathematics

Algebra 5


Factorised form of quadratic equations: $y = (x - p)(x - q)$



1. Open a new GeoGebra file.

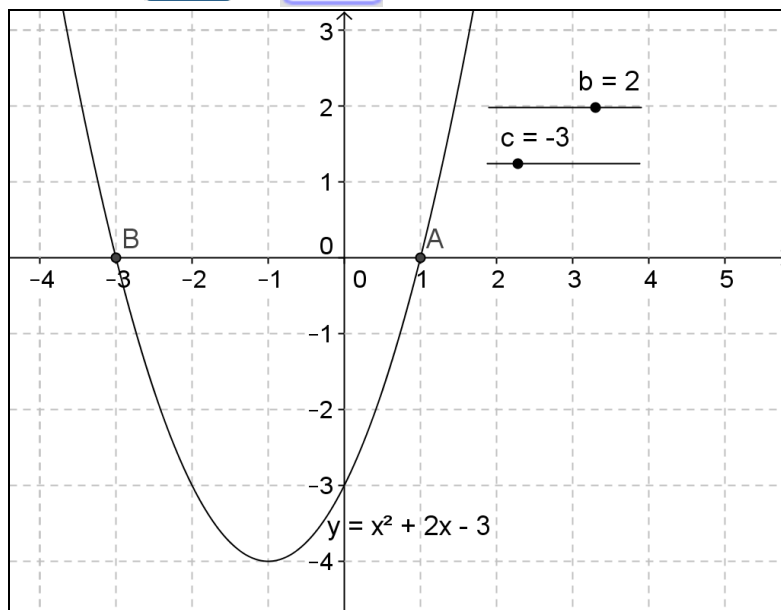
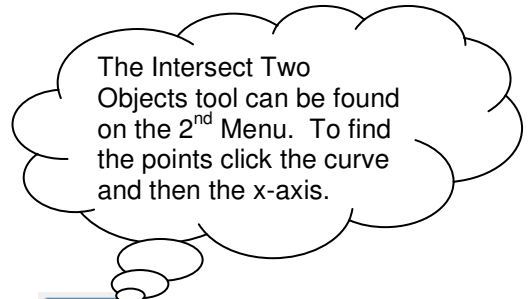
2. Add a slider  and set its name to **b**.

3. Add a slider  and set its name to **c**.

4. In the Input bar type $y = x^2 + b \cdot x + c$ and press enter.

5. Use the Intersect Two Objects tool (2nd menu)  to find the points where the curve cuts the x-axis.

6. Select the cursor  or  and vary the sliders for **b** and **c**.



Questions

- Can you find values of **b** and **c** so the curve cuts the x-axis at points with integer coordinates?
- What is the relationship between **b** and **c** the points where the curve cuts the x-axis?
- What is the relationship between the points where the curve cuts the x-axis and the point where it cuts the y-axis?
- Where is the line of symmetry of the curve?