**Task 1:**

1. Match the graphs to the equation, using the discriminant ($b^{2}-4ac$).

  

$$a) y=x^{2}-4x+4$$

$$b) y= x^{2}-2x-13$$

$$c) y= x^{2}+2x+5$$

**Task 2**

**Find the nature of the roots for the following:**

Use the discriminant!

1. $h^{2}+5h+11=0$
2. $x^{2}-4x-23=0$
3. $y^{2}+2y-21=0$

**Task 3**

Fill in the table of values for y = x2+8x+15.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | -6 | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 |
| y |  |  |  |  |  |  |  |  |  |

1. Use these as coordinates to plot the graph on a sheet of graph paper.
2. How many roots are there?
3. What is the discriminant?

**Supporting notes:**

Have a look at this link if you need a refresher on the discriminant:

https://www.bbc.co.uk/bitesize/guides/zcwhjty/revision/1

**Answers:**

* 1. $y= x^{2}-4x+4$. The discriminant is $b^{2}-4ac= \left(-4\right)^{2}-4 ×1×4=16-16=0.$ Therefore there is one real, repeated root. The graph touches the x axis once. This is the last graph.
	2. $y= x^{2}-2x-13$. The discriminant is $b^{2}-4ac= \left(-2\right)^{2}-4 ×1×-13=4+52=56.$ This is positive so there are two real and distinct roots. The graph crosses the x axis twice. This is the first graph.
	3. $y= x^{2}+2x+5$. The discriminant is $b^{2}-4ac= \left(2\right)^{2}-4 ×1×5=4-20=-16.$ This is negative so there are no real roots. The graph does not cross the x axis. This is the middle graph.
	4. No real roots.
	5. Two real and distinct roots.
	6. Two real and distinct roots.
1.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| x | -6 | -5 | -4 | -3 | -2 | -1 | 0 | 1 | 2 |
| y | 3 | 0 | -1 | 0 | 3 | 8 | 15 | 24 | 35 |

* 1. 

* 1. 2 real and distinct roots
	2. y = x2+8x+15. The discriminant is $b^{2}-4ac= \left(8\right)^{2}-4 ×1×15=64-60=4.$ This is positive which is what we expect because the graph shows two real and distinct roots.