**Sketching Graphs of Quadratics, Cubics and Reciprocals GREEN**

**TIP:** When joining up the points that you have plotted, join them with a **smooth curve**, not a straight line!

**1a) Complete the following table for the equation

$y=x^{2}+2$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ |  |  |  |  |  |  |  |

b) Draw the graph of $y=x^{2}+2$ on the grid:



2a) Complete the following table for the equation

$y=x^{2}-1$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ |  |  |  |  |  |  |  |

bb) Draw the graph of $y=x^{2}-1$on the grid:

3a) Complete the following table for the equation

$y=x^{3}$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ |  |  |  |  |  |  |  |

b) Draw the graph of $y=x^{3}$ on the grid:



 4a) Complete the following table for the equation

$y=x^{3}+3$**,** for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ |  |  |  |  |  |  |  |

b) Draw the graph of $y=x^{3}+3$on the grid:

5a) Complete the following table for the equation: $y=\frac{3}{x}$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2.5 | -2 | -1.5 | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| $$y$$ |  |  |  |  |  |  |  |  |  |  |  |  |  |

b) Draw the graph of$y=\frac{3}{x}$ on the grid:

6a) Complete the following table for the equation: $y=\frac{2}{x}$, for $-3\leq x\leq 3$

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2.5 | -2 | -1.5 | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| $$y$$ |  |  |  |  |  |  |  |  |  |  |  |  |  |

b) Draw the graph of $y=\frac{2}{x} $on the grid:

7) Fill in the gaps using the following words: **Cubic / Linear / Reciprocal / Quadratic**

Equations where the highest power of x is 1 (‘$x$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a straight line when drawn graphically.

Equations where the highest power of x is 2 (‘$x^{2}$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘U’ or ‘n’ shape when drawn graphically.

Equations where the highest power of x is 3 (‘$x^{3}$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘ ‘ or ‘ ‘ shape when drawn graphically.

Equations that include a number divided by $x$ (e.g. $\frac{4}{x} $) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. The graph never touches the axes.

8) Name the type of equation for each of the following:

a) $y= 3x^{2}+ 2x+1$ \_\_\_\_\_\_\_\_\_\_ b) $y= 4x^{3}+ x^{2}$ \_\_\_\_\_\_\_\_\_\_

c) $y= \frac{7}{x}$ \_\_\_\_\_\_\_\_\_\_ d) $y= 5x+9$ \_\_\_\_\_\_\_\_\_\_

e) $y= 4x^{2}- 5$ \_\_\_\_\_\_\_\_\_\_ f) $y= 9x^{2}- 6x^{3}$ \_\_\_\_\_\_\_\_\_\_

9) Write the type of equation (linear/quadratic/cubic/reciprocal) of each graph:



a) b) c)

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_



d) e) f)

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

10) Match the graph to the equation:



|  |  |
| --- | --- |
| Graph (letter) | Equation |
|  | $$y=2x-5$$ |
|  | $y=\frac{5}{x}$  |
|  | $$y=2x^{3}$$ |
|  | $$y=x^{2}-6$$ |
|  | $$y=7-x$$ |

**Sketching Graphs of Quadratics, Cubics and Reciprocals AMBER**

**TIP:** When joining up the points that you have plotted, join them with a **smooth curve**, not a straight line!

**1a) Complete the following table for the equation

$y=x^{2}+2$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ | 11 | 6 | 3 |  |  |  |  |

b) Draw the graph of $y=x^{2}+2$ on the grid:



2a) Complete the following table for the equation

$y=x^{2}-1$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ | 8 | 3 | 0 |  |  |  |  |

bb) Draw the graph of $y=x^{2}-1$on the grid:

3a) Complete the following table for the equation

$y=x^{3}$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ | -27 | -8 | -1 |  |  |  |  |

b) Draw the graph of $y=x^{3}$ on the grid:



 4a) Complete the following table for the equation

$y=x^{3}+3$**,** for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ | -24 | -5 | 2 |  |  |  |  |

b) Draw the graph of $y=x^{3}+3$on the grid:

5a) Complete the following table for the equation: $y=\frac{3}{x}$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2.5 | -2 | -1.5 | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| $$y$$ | -1 | -1.2 | -1.5 | -2 |  |  |  |  |  |  |  |  |  |

b) Draw the graph of$y=\frac{3}{x}$ on the grid:

6a) Complete the following table for the equation: $y=\frac{2}{x}$, for $-3\leq x\leq 3$

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2.5 | -2 | -1.5 | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| $$y$$ | -0.67 | -0.8 | -1 |  |  |  |  |  |  |  |  |  |  |

b) Draw the graph of $y=\frac{2}{x} $on the grid:

7) Fill in the gaps using the following words: **Cubic / Linear / Reciprocal / Quadratic**

(Think: cube… straight line… inverse… quadrilateral)

Equations where the highest power of x is 1 (‘$x$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a straight line when drawn graphically.

Equations where the highest power of x is 2 (‘$x^{2}$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘U’ or ‘n’ shape when drawn graphically.

Equations where the highest power of x is 3 (‘$x^{3}$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘ ‘ or ‘ ‘ shape when drawn graphically.

Equations that include a number divided by $x$ (e.g. $\frac{4}{x} $) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. The graph never touches the axes.

8) Name the type of equation for each of the following:

a) $y= 3x^{2}+ 2x+1$ \_\_\_\_\_\_\_\_\_\_ b) $y= 4x^{3}+ x^{2}$ \_\_\_\_\_\_\_\_\_\_

c) $y= \frac{7}{x}$ \_\_\_\_\_\_\_\_\_\_ d) $y= 5x+9$ \_\_\_\_\_\_\_\_\_\_

e) $y= 4x^{2}- 5$ \_\_\_\_\_\_\_\_\_\_ f) $y= 9x^{2}- 6x^{3}$ \_\_\_\_\_\_\_\_\_\_

Choose from: **Cubic / Linear / Reciprocal / Quadratic**

9) Write the type of equation (linear/quadratic/cubic/reciprocal) of each graph:



a) b) c)

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_



d) e) f)

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

10) Match the graph to the equation:



|  |  |
| --- | --- |
| Graph (letter) | Equation |
|  | $$y=2x-5$$ |
|  | $y=\frac{5}{x}$  |
|  | $$y=2x^{3}$$ |
|  | $$y=x^{2}-6$$ |
|  | $$y=7-x$$ |

**Sketching Graphs of Quadratics, Cubics and Reciprocals RED**

**TIP:** When joining up the points that you have plotted, join them with a **smooth curve**, not a straight line!

**1a) Complete the following table for the equation

$y=x^{2}+2$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ | 11 | 6 | 3 |  |  |  |  |

b) Draw the graph of $y=x^{2}+2$ on the grid:

Substitute, plot coordinates, join with a smooth curve!



2a) Complete the following table for the equation

$y=x^{2}-1$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ | 8 | 3 | 0 |  |  |  |  |

bb) Draw the graph of $y=x^{2}-1$on the grid:

Substitute, plot coordinates, join with a smooth curve!

3a) Complete the following table for the equation

$y=x^{3}$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ | -27 | -8 | -1 |  |  |  |  |

b) Draw the graph of $y=x^{3}$ on the grid:

Substitute, plot coordinates, join with a smooth curve!



 4a) Complete the following table for the equation

$y=x^{3}+3$**,** for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| $$y$$ | -24 | -5 | 2 |  |  |  |  |

b) Draw the graph of $y=x^{3}+3$on the grid:

Substitute, plot coordinates, join with a smooth curve!

5a) Complete the following table for the equation: $y=\frac{3}{x}$, for $-3\leq x\leq 3$:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2.5 | -2 | -1.5 | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| $$y$$ | -1 | -1.2 | -1.5 | -2 |  |  |  |  |  |  |  |  |  |

b) Draw the graph of$y=\frac{3}{x}$ on the grid:

Substitute, plot coordinates, join with two separate smooth curves!

6a) Complete the following table for the equation: $y=\frac{2}{x}$, for $-3\leq x\leq 3$

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| $$x$$ | -3 | -2.5 | -2 | -1.5 | -1 | -0.5 | 0 | 0.5 | 1 | 1.5 | 2 | 2.5 | 3 |
| $$y$$ | -0.67 | -0.8 | -1 |  |  |  |  |  |  |  |  |  |  |

b) Draw the graph of $y=\frac{2}{x} $on the grid:

Substitute, plot coordinates, join with two separate smooth curves!

7) Fill in the gaps using the following words: **Cubic / Linear / Reciprocal / Quadratic**

(Think: cube… straight line… inverse… quadrilateral)

Equations where the highest power of x is 1 (‘$x$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a straight line when drawn graphically.

Equations where the highest power of x is 2 (‘$x^{2}$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘U’ or ‘n’ shape when drawn graphically.

Equations where the highest power of x is 3 (‘$x^{3}$’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘ ‘ or ‘ ‘ shape when drawn graphically.

Equations that include a number divided by $x$ (e.g. $\frac{4}{x} $) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. The graph never touches the axes.

8) Name the type of equation for each of the following:

a) $y= 3x^{2}+ 2x+1$ \_\_\_\_\_\_\_\_\_\_ b) $y= 4x^{3}+ x^{2}$ \_\_\_\_\_\_\_\_\_\_

c) $y= \frac{7}{x}$ \_\_\_\_\_\_\_\_\_\_ d) $y= 5x+9$ \_\_\_\_\_\_\_\_\_\_

e) $y= 4x^{2}- 5$ \_\_\_\_\_\_\_\_\_\_ f) $y= 9x^{2}- 6x^{3}$ \_\_\_\_\_\_\_\_\_\_

Choose from: **Cubic / Linear / Reciprocal / Quadratic**

9) Write the type of equation (linear/quadratic/cubic/reciprocal) of each graph:



a) b) c)

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_



d) e) f)

 \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_

10) Match the graph to the equation:



|  |  |
| --- | --- |
| Graph (letter) | Equation |
|  | $$y=2x-5$$ |
|  | $y=\frac{5}{x}$  |
|  | $$y=2x^{3}$$ |
|  | $$y=x^{2}-6$$ |
|  | $$y=7-x$$ |