**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 = x2 + 2**, for -3 $\leq x \leq $ 3:

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

b) Draw the graph of **y = x2 + 2** on the grid:



2a) Complete the following table for the equation

**y = x2 - 1**, for -3 $\leq x \leq $ 3:

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

bb) Draw the graph of **y = x2 – 1** on the grid:

3a) Complete the following table for the equation

**y = x3**, for -3 $\leq x \leq $ 3:

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

b) Draw the graph of **y = x3** on the grid:



 4a) Complete the following table for the equation

**y = x3 + 3,** for -3 $\leq x \leq $ 3:

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

b) Draw the graph of **y = x3 + 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 (‘x2’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘U’ or ‘n’ shape when drawn graphically.

Equations where the highest power of x is 3 (‘x3) 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 = 2x3 |
|  | y = x2 – 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 = x2 + 2**, for -3 $\leq x \leq $ 3:

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

b) Draw the graph of **y = x2 + 2** on the grid:



2a) Complete the following table for the equation

**y = x2 - 1**, for -3 $\leq x \leq $ 3:

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

bb) Draw the graph of **y = x2 – 1** on the grid:

3a) Complete the following table for the equation

**y = x3**, for -3 $\leq x \leq $ 3:

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

b) Draw the graph of **y = x3** on the grid:



 4a) Complete the following table for the equation

**y = x3 + 3,** for -3 $\leq x \leq $ 3:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **x** | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| **y** |  | -5 |  | 3 |  |  | 30 |

b) Draw the graph of **y = x3 + 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 |  | -1.5 | -2 |  |  | ∞ | 6 | 3 |  |  | 1.2 |  |



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.$\dot{6}$ |  | -1 |  |  | -4 | ∞ |  | 2 |  |  | 0.8 |  |

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 (‘x2’) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘U’ or ‘n’ shape when drawn graphically.

Equations where the highest power of x is 3 (‘x3) 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 = 2x3 |
|  | y = x2 – 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 = x2 + 2**, for -3 $\leq x \leq $ 3:

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

b) Draw the graph of **y = x2 + 2** on the grid:

Substitute, plot coordinates, join with a smooth curve!



2a) Complete the following table for the equation

**y = x2 - 1**, for -3 $\leq x \leq $ 3:

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

bb) Draw the graph of **y = x2 – 1** on the grid:

Substitute, plot coordinates, join with a smooth curve!

3a) Complete the following table for the equation

**y = x3**, for -3 $\leq x \leq $ 3:

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

b) Draw the graph of **y = x3** on the grid:

Substitute, plot coordinates, join with a smooth curve!



 4a) Complete the following table for the equation

**y = x3 + 3,** for -3 $\leq x \leq $ 3:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **x** | -3 | -2 | -1 | 0 | 1 | 2 | 3 |
| **y** |  | -5 |  | 3 |  |  | 30 |

b) Draw the graph of **y = x3 + 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 |  | -1.5 | -2 |  |  | ∞ | 6 | 3 |  |  | 1.2 |  |



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.$\dot{6}$ |  | -1 |  |  | -4 | ∞ |  | 2 |  |  | 0.8 |  |

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

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

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Equations where the highest power of x is 3 (‘x3) are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ equations. They create a ‘ ‘ or ‘ ‘ shape when drawn graphically.

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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 = 2x3 |
|  | y = x2 – 6 |
|  | y = 7 - x |